Networks Northwest
Talent / Business / Community

Chief Elected Official: **Chris Christensen**

Board Chair: **Nicole Sulak**

Manistee-Missaukee-Wexford Multi-County Materials Management Planning Committee

Date: February 25, 2026
Time: 10:00 a.m. – 12:00 p.m.
Location: Wexford County Courthouse Building
Commissioners Meeting Room
437 East Division Street
Cadillac MI 49601

PROPOSED AGENDA

I. **Call to Order**
II. **Public Comment**
III. **Approval of Agenda**
IV. **Approval of October 22, 2025 Meeting Minutes**
V. **Election of Officers**
VI. **2026 Meeting Dates**
VII. **Materials Management Planning**
   a. **Process Update**
   b. **Data Analysis Review**
   c. **MMP LUG Survey**
   d. **MMP Business Survey**
   e. **MMP Resident Survey**
   f. **Goals and Objectives Discussion**
VIII. **Committee Member Comments**
IX. **Public Comment**
X. **Adjourn**

Posted:_____

Signature: _____

Manistee-Missaukee-Wexford Multi-County
Materials Management Planning Committee Minutes
October 22, 2025 at 10:00 AM
Wexford County Government Center
415 3rd St, Manistee, MI 49660

MMPC Member Attendance			
Chris Gee, GFL *rep. of a solid waste disposal facility*	P	***Nikki Koons, Manistee County*** *elected official of the county*	E
Todd Harland, Republic Services *rep. of a hauler*	E	***Larry Paquette, Cedar Creek Township*** *elected official of a township*	P
Rita Meech, Ms. Green *rep. of a materials recovery facility*	E	***Joe Gryzbowski, City of Manton*** *elected official of a city or village*	E
Jason Murphy, Waste Management *rep. of a composting facility*	P	***Cory Brown, Northern Disposal*** *business rep. generating material*	P
Karla Kasten-Smith, BARC *rep. of a diversion, reuse, or reduction*	P	***Mike Szokola, Networks Northwest*** *rep. of the regional planning area*	P
Tyler Dula, Manistee Conservation District - representing Renee Mallison *rep. of an environmental interest group,*	P	***Sherry Blaszak, Missaukee County Planning Commission*** *Member of General Public*	P
Jason Baughan, Wexford County *multi-county appointment*	E		
TO BE APPOINTED *Multi-County Elected Official (Wexford)*	-	*Attendance Key:* *P – Present* *A – Absent* *E - Excused Absence*	
Staff in Attendance: Lisa Sagala (Manistee County), Bill Gamble (City of Manistee), Christina Miller (EGLE), Aubree Carlisle (EGLE) Tracy Tomaszewski (EGLE), Kaitlyn Kikstra (SEEDs), Mathew Cooke (DPA-Networks Northwest)			

1. **Call to Order**

   Larry Paquette, Chair, called the meeting to order at 10:05 a.m.

2. **Public Comment**

   None.

3. **Review Proposed Agenda**

   Motion by Karla Kasten-Smith, supported by Joe Gryzbowski, to approve the October 22, 2025 MMPC agenda as presented. Motion carried unanimously.

4. **Approval of April 23, 2025 Meeting Minutes**

   Mathew Cooke noted that corrections to the minutes included correcting the meeting date and Sherry Blaszak not being present.

   Motion by Karla Kasten-Smith, supported by Mike Szokola, to approve the August 27, 2025 MMPC Meeting Minutes as amended. Motion carried unanimously.

5. **EGLE Food Waste and Goals and Objectives Presentation**

   Christina Miller, EGLE Planning Specialist, presented on goals and objectives and Aubree Carlise, Food Waste Specialist from EGLE presented on food waste to the committee (see attached presentation).

6. **Materials Management Planning**

   Mathew Cooke provided an update on the MMP process:

   - Over 200 Resident responses within the planning area
   - Lake City is providing survey business cards in their winter taxes
   - Municipal data collection completion
   - Business and LUG survey collection continues, identify non-responding units
   - Filling compost vacancy on MMPC
   - Review of County Resident Survey Analysis at next meeting

7. **Public Comment**

   None.

8. **Committee Comments**

   None.

9. Adjourn

The October 22, 2025 MMPC meeting adjourned at 11:54 am.

Wednesday, January 28, 2026

To: Manistee-Missaukee-Wexford County MMPC
Fr: Mathew Cooke, Community Planner
Re: MMP Update

I hope that everyone had a great holiday season with friends and family, and are ready to hit the ground running on Materials Management Planning!

Election of Officers
Below are motions for the election of officers for the Charlevoix County Materials Management Planning Committee.

Motion by _____, supported by _____ to nominate _____ as Chair of the Manistee-Missaukee-Wexford County Materials Management Planning Committee.

Motion by _____, supported by _____ to nominate _____ as Vice-Chair of the Manistee-Missaukee-Wexford County Materials Management Planning Committee.

Motion by _____, supported by _____ to nominate _____ as Secretary of the Manistee-Missaukee-Wexford County Materials Management Planning Committee.

Motion by Victor _____, supported by _____ to close nominations and elect the slate of _____ as Chair, _____ as Vice-Chair, and _____ as Secretary for the Manistee-Missaukee-Wexford County Materials Management Planning Committee.

2026 Meeting Dates
Attached you will find the proposed meeting dates for 2026, maintaining the same schedule we have been on.

Motion by _____, supported by _____ to approve the Manistee-Missaukee-Wexford County Materials Management Planning Committee's 2026 Meeting Schedule.

Data Analysis
Attached you will find the Manistee-Missaukee-Wexford County Data Analysis draft assisted by RRS. Please note that we met with RRS on Thursday, January 15, 2026 to discuss the draft and they will be present at the MMP meeting to review.

MMP Surveys
Attached you will find reviews of the Local Unit of Government, Business Survey, and Resident Survey (with updated numbers). Analysis of these surveys will be conducted for inclusion of the MMP document, and submitted for Committee review.

Wednesday, February 25, 2026

To: Manistee-Missaukee-Wexford County MMPC
Fr: Mathew Cooke, Community Planner
Re: MMP Process - MMPC Meeting Update

Over the recent months, the MMPC has struggled to have a consistent meeting quorum. Networks Northwest staff sat down to develop a meeting schedule for the rest of the plan development. Please see the table below with a breakdown of the month and tasks. For months where a MMPC meeting is not designated, Networks Northwest would hold hybrid (virtual and in-person) workshops for interested MMPC members on specific topics necessary to complete the MMP. If the members are interested in continuing meeting monthly for the plan process, we can continue with that as well. Please plan to discuss at the February 2026 meeting.

Wednesday February 25 2026 – MMPC Meeting	• Review/Discuss:
	  ○ Data Analysis
	  ○ Goals and Objectives

Wednesday March 25 2026 – MMPC Meeting	• Review/Discuss:
	  ○ Community Input
	  ○ Previous Planning
	• Siting and Mechanisms

Wednesday April 22 2026	• Deliver Draft Sections:
	  ○ Siting Criteria
	  ○ Funding Mechanisms
	  ○ Contract Mechanisms
	• Administration and Action Plan - Workshop

Wednesday May 27 2026	• Deliver Draft Sections:
	  ○ Action Plan
	  ○ Administration

Wednesday June 24 2026 – MMPC Meeting	• Deliver full MMP Draft • MMP Draft Overview - Review
Wednesday July 22 2026	• MMP Draft Review Workshop
Wednesday August 26 2026 – MMPC Meeting	• Final MMP Review and consider approval for public comment period
September 2026 – July 2027	• MMP Approval Process

2026 Manistee-Missaukee-Wexford Multi-County Materials Management Planning Committee Meeting Schedule

Meetings are generally held on the fourth Wednesday of the month at 10:00am with meetings rotating between Manistee County Government Center, Missaukee County Annex Building, and Wexford County Courthouse. Please see nwm.org/mmp for agendas, minutes, and more information on materials management planning.

10:00 a.m. Wednesday January 28 2026
Wexford County Courthouse
Board of Commissioners Room
437 E. Division St. Cadillac, MI 49601

10:00 a.m. Wednesday February 25 2026
Manistee County Government Center
Board of Commissioners Room
415 Third Street Manistee, MI 49660

10:00 a.m. Wednesday March 25 2026
Missaukee County Annex Building
Board of Commissioners Room
105 S Canal St, Lake City, MI 49651

10:00 a.m. Wednesday April 22 2026
Wexford County Courthouse
Board of Commissioners Room
437 E. Division St. Cadillac, MI 49601

10:00 a.m. Wednesday May 27 2026
Manistee County Government Center
Board of Commissioners Room
415 Third Street Manistee, MI 49660

10:00 a.m. Wednesday June 24 2026
Missaukee County Annex Building
Board of Commissioners Room
105 S Canal St, Lake City, MI 49651

10:00 a.m. Wednesday July 22 2026
Wexford County Courthouse
Board of Commissioners Room
437 E. Division St. Cadillac, MI 49601

10:00 a.m. Wednesday August 26 2026
Manistee County Government Center
Board of Commissioners Room
415 Third Street Manistee, MI 49660

10:00 a.m. Wednesday September 283 2026
Missaukee County Annex Building
Board of Commissioners Room
105 S Canal St, Lake City, MI 49651

10:00 a.m. Wednesday October 28 2026
Wexford County Courthouse
Board of Commissioners Room
437 E. Division St. Cadillac, MI 49601

10:00 a.m. Wednesday November 18 2026
Manistee County Government Center
Board of Commissioners Room
415 Third Street Manistee, MI 49660

10:00 a.m. Wednesday December 16 2026
Missaukee County Annex Building
Board of Commissioners Room
105 S Canal St, Lake City, MI 49651

If you have any questions or need any assistance, please contact Mathew Cooke, Community Planner at Networks Northwest by email: mathew.cooke@networksnorthwest.org or phone: (231) 929-5056

Memo

TO: Mathew Cooke, Networks Northwest
FROM: Caitlyn Wouters and Kristen Wieland, RRS
DATE: January 9, 2026
RE: Manistee County MMP Data Analysis - DRAFT

Introduction

The RRS team undertook a comprehensive analysis to support the five counties' waste management planning efforts. As part of this work, RRS developed a baseline data set based on known waste data, where available, and supplemented with modeled projections of waste generation and recovery potential. This data will serve as a foundational resource to guide each committee's decision-making on key planning and policy issues.

The baseline data will support the identification of strategies for meeting the Benchmark Recycling Standards, both in the near term and over the planning horizon. This memorandum presents a summary of the current materials generation and recovery conditions within Manistee County. It incorporates modeled data prepared by RRS, along with any available actual data provided by the Networks Northwest planning agency or county MMP Committee participants. The information contained herein offers a comprehensive overview of the counties' materials management landscape to serve as a supporting component of the Materials Management Plans.

Recycling Rate

Based on this assessment, RRS estimates that **approximately 54% of landfilled MCW by weight from Manistee County is either readily recyclable or compostable**. Based on the available data, as described in detail within this memo, RRS estimates Manistee County is currently achieving the following countywide recycling rate (including traditional recycling and organics):

- **Countywide Recycling Rate Estimate:** 11.3%

Preliminary Opportunities

RRS has highlighted several key opportunities that should be discussed by the MMP Committee for potential goal setting in the next phase of the MMP development. These opportunities are described below, with additional detail provided throughout the memorandum.

While the data points discussed in this analysis are comprehensive and valuable for general understanding of the current recycling and diversion taking place and the general makeup of the waste stream, it is critical to note that the preliminary opportunities outlined below are based on the data and information that was provided to RRS or otherwise publicly available.

Reliable data is a critical component of MMP implementation. In the absence of data, we have supplemented with modeled data based on actual data from other similar regions to provide a starting point for discussion purposes and aid in goal setting. In the case of Manistee County, RRS found the per capita MCW generation rate to be slightly elevated. One potential explanation for the elevated MCW per capita rate is robust commercial activity. Commercial waste contributes to the total landfilled tonnage but does not increase the resident population used in the per capita calculation, thereby inflating the apparent per capita disposal rate. However, this result could also reflect a reporting or categorization error, or it may accurately indicate a genuinely higher-than-typical disposal rate for the county's population. Improved data reporting and tracking infrastructure would help clarify these possibilities. Having actual community-level data is the only way to monitor progress toward goals and therefore should be considered in all future MMP Committee discussions to ensure impact can be measured during implementation of the MMP. Additional information about the modeling and methodology can be found in the RRS MCW Modeling section of this report.

Additional opportunities to fill data gap for Manistee County include:

- To strengthen materials management and accurately measure progress toward the goals outlined in the Materials Management Plan, Manistee County should implement consistent, countywide reporting and tracking systems. This includes clarifying and standardizing landfill reporting procedures, expanding the tracking of recycling and organic material collection across municipal, private, and commercial sources, and establishing uniform hauler reporting requirements. These actions will enable the County to capture currently missing data, calculate a documented recycling rate, and monitor material flows more effectively, ensuring a reliable foundation for future planning and performance evaluation.
- Food waste is typically disposed of in the landfill as part of mixed MCW, and without a robust waste audit system there is no clear way to quantify how many tons of food waste are disposed in MCW over time. Alternatively, meaningful measurement can be achieved by separating food waste at the source, through food rescue and/or organized or backyard composting programs and tracking the weight of the rescued and composted material. Expanded source separation paired with consistent tonnage reporting would allow the County to quantify diversion more accurately and track reductions in landfilled food waste in a measurable way.
- At this time, comprehensive historical tonnage data are not available across all hard-to-recycle material streams, particularly for tires collected outside of HHW events, electronics managed through private recyclers, and other specialty materials. Expanding and standardizing reporting for these programs would strengthen the County's ability to quantify recovery, assess program effectiveness, and inform future Materials Management Plan implementation.

The **Benchmark Recycling Standard** for curbside recycling is being met in Manistee County through contracted curbside recycling in City of Manistee and the provision of drop-off recycling access is met through a combination of drop-off recycling sites funded by the Public Act 69 (PA 69) Recycling Program, municipally managed drop-off sites, and a public recycling drop-off location at the Republic Services Manistee County Landfill, which is accessible to all county residents. Routinely surveying recyclers will ensure the Center is meeting their needs and engage a committed group of citizens.

The top six materials with diversion significance, by weight, in the county present a prime opportunity for meaningful and measurable impact in the 5-year planning window:

1. Wasted food - discarded food scrap byproducts that are not consumed by humans or food that was edible but ended up wasted - comprises over 4,020 tons of landfill-bound materials generated in Manistee County. This category of waste is not only the most significant by weight but is also significant in its potential social and economic value directly within the County. Good food can be redistributed to people in need instead of sent to landfills, thereby supporting the needs of residents through existing food distribution networks. Food that is unsuitable for redistribution can be processed locally through basic backyard composting to generate a soil amendment for use directly by the homeowner. A more sophisticated collection system that aggregates residential and commercial food waste along with other agricultural waste could be processed at a privately operated composting facility or anaerobic digester operator (potentially through a public-private partnership) to generate a large amount of compost to regenerate soils in the entire county and region and support local agriculture. As noted in a 2021 SEEDS study, Antrim, Benzie, Charlevoix, Kalkaska, Manistee and Missaukee counties all have relatively small amount of organics collection and recommended that these counties focus efforts on food rescue initiatives (recovering edible food before disposal), education on food waste reduction, and promotion of backyard composting practices. Furthermore, the study identified the close proximity to existing composting operations in Sears, MI (Morgan Composting) could present an opportunity for increased organics collection.

2. Plastic film totals over 1,884 tons of landfill-bound materials generated in Manistee County. From residential sources, these typically include plastic shopping bags, grocery bags, and dry-cleaning bags. From commercial sources, these thin, flexible plastics could include stretch wrapping used to stabilize pallets and cases, greenhouse and agricultural bale wrapping, shipping pouches and bubble wrap among others. While not typically accepted in single stream recycling programs due to the low value and difficulty in marketing it post-processing, drop-off programs and commercial plastic film collection programs can keep these plastics clean and dry, resulting in significant volumes of valuable material that has strong end market potential.

3. Corrugated cardboard has become a significant waste material type in recent years due to the shift in online purchasing. RRS estimates Manistee County is landfilling more than 1,605 tons of cardboard from both residential commercial sources. Cardboard was formerly generated primarily at retail establishments and was sometimes collected for recycling. While online purchasing trends have shifted some tons away from the commercial waste stream and into the residential waste stream, 70% of the cardboard remains in the commercial stream, creating opportunities for increased recovery in both. Local manufacturer, Packaging Corporation of America (PCA) in Filer City (Manistee County), would directly benefit from the additional collection of corrugated cardboard from the Northwest Michigan region.

4. Compostable paper refers to paper products that are typically unsuitable for recycling due to their low quality or because they are often soiled during use, such as paper plates, napkins, facial tissues, and paper towels. When combined with food scraps, this compostable paper could be a valuable input to either composting or anaerobic digestion when done at a commercial scale. This fraction of the waste stream comprises nearly 1,439 tons in the county.

5. Mixed paper, estimated at over 1,168 tons landfilled in the county, is a general grade of clean but varied qualities of mixed fiber materials including mail, office paper, paper bags, books, magazines, greeting cards, index cards, cereal

boxes, etc. This paper is often the largest output, by volume, of single stream recycling facilities and has strong Midwest markets ready to accept more material for production of new paper products.

6. **Textiles** are a significant waste category in Manistee County, comprising over 945 tons in our model. Clothing, towels, rope, household linen, leather products, and other similar products that are either discarded out of convenience or due to rips, excessive wear, or are otherwise unsuitable for reuse. Local resale stores could be ideal partners to evaluate additional textile recovery opportunities to get more usable textiles into the hands of people who need them, keeping them out of landfills.

Materials that are readily marketable but currently being landfilled offer strong diversion potential due to established recycling channels and typically yield positive economic returns and should be prioritized for enhanced recovery in the Manistee Materials Management Plan. While not represented in the top six categories by weight, the following materials have consistent value and market demand and are ubiquitous in the waste stream, making them natural opportunities for increased recovery across the region.

Listed in order from highest-lowest potential yield, these materials include:

- **mixed paper** (as identified above, 1,168 tons)
- **ferrous metal** (445 tons)
- **#1 PET plastic** (bottle and non-bottle) (359 tons)
- **#2 HDPE plastic** (colored and natural) (193 tons)
- **white office paper** (182 tons)
- **magazines** (158 tons)
- **steel cans** (149 tons)
- **newspaper** (131 tons)
- **aluminum cans** (127 tons)
- **#5 PP plastic** (109 tons)
- **polycoated paper cups and cartons** (101 tons)

The materials listed below can be **difficult to recycle due to their bulkiness, weight or other challenges** but are generally frequently requested by community members for recycling and disposal options. As such, RRS recommends these be considered in the development of Manistee County's MMP:

Construction and demolition (C&D) materials – primarily clean lumber, pallets, cardboard, concrete, and scrap metal - represent a high-volume opportunity for landfill diversion and reuse. Many of these materials have market value, and reuse programs like Habitat ReStore or other local programs provide both social and environmental benefits. However, current waste characterization studies exclude most C&D debris, meaning its true volume is underrepresented and not well understood. A dedicated study is needed to quantify and stratify C&D materials to develop effective recovery strategies and estimate recovery amounts.

Glass bottles and jars, estimated at 379 tons annually in Manistee County, are endlessly recyclable but require clean separation from contaminants to maintain quality. Mixed collection often leads to contamination, reduced yield, and degradation of other recyclables. When local markets are accessible, clean glass can retain material and economic value; otherwise, it may be diverted to lower value uses like landfill cover. Developing a system to aggregate clean glass for efficient delivery could unlock recycling potential.

Expanded polystyrene (EPS) foam is rarely accepted in curbside recycling because it's difficult to process in automated facilities. When source-separated, it can be recycled but requires densification to improve shipping efficiency and market value. Manistee County discards an estimated 189 tons annually, indicating a strong opportunity for recovery if a collection network and basic processing infrastructure are developed.

Electronics (e-waste) have become pervasive in modern life thanks to technological advancements that make them smaller and more affordable, but these same innovations lead to rapid obsolescence, driving consumers to replace them frequently. Since they are not banned from landfills, computers, cell phones, printers, toasters, coffee pots, and many more devices can be found in the waste stream, with some containing batteries that pose fire and environmental risks. If recycled, precious metals, scrap metal, and rigid plastics can be recovered and diverted from landfills. Residents routinely seek out a permanent collection program to provide ongoing benefits and convenience.

Batteries, especially lithium-ion, are increasingly common in consumer products and pose serious disposal risks. Improperly discarded batteries can ignite fires in collection vehicles, processing facilities, or during shipment, making safe handling and recycling critical. While not quantified in the model, battery collection is a public safety issue that should be addressed to protect people, infrastructure, and the environment.

Mattresses are hard to dispose of, causing illegal dumping and landfill issues due to their bulk and springs. Though Manistee County generates only an estimated 13 tons annually, a local recycler (BARC) offers a solution through community partnership that should be explored.

Scrap tires are banned from Michigan landfills but can be recycled into products like rubber mulch, road additives, or energy sources. They are often illegally dumped, creating health risks from mosquito breeding and a public nuisance for public agencies. Manistee County has one authorized scrap tire collection site[1] that is listed as an end user, TES Filer City Station LP, and could be a partner in hosting periodic collection events that are key to safe disposal and environmental protection.

Storm debris can place significant strain on landfill capacity and, depending on the severity of the event, may generate large volumes of material that could be diverted from disposal if adequate infrastructure and systems are in place. RRS recommends integrating disaster debris planning with MMP development, as both rely on the same foundational materials management framework - facilities, collection and processing capacity, transportation logistics, and end markets - though they operate on different timelines. Even without a finalized County or local Disaster Debris Management Plan, the MMP can establish this connection by documenting the core operational elements needed during an emergency.

[1] Michigan Scrap Tire Collection Sites and Scrap Tire Processors | EGLE Maps & Data

Commercial recyclables present an opportunity for high volumes of targeted materials to be recovered but services are often limited for commercial routes. The 2023 establishment and employment data support a planning approach that prioritizes sector-specific strategies, consistent with EGLE's emphasis on focusing resources where they will yield the greatest diversion impact. By aligning program development with the County's evolving business profile, Manistee County can more effectively reduce disposal, increase recovery of high-value materials, and support progress toward its Materials Management Plan goals.

- The concentration of employment and establishments in Accommodation and Food Services aligns with waste characterization findings that food waste is one of the largest components of the MCW stream, underscoring the importance of food waste prevention, food rescue, and organics diversion strategies targeted to restaurants, hotels, and institutional food service operations.
- Similarly, the scale and growth of Retail Trade, Manufacturing, and Wholesale Trade point to corrugated cardboard as a high-volume, readily recyclable material with strong recovery potential. These sectors collectively represent a large share of establishments and jobs and are well-suited for targeted commercial recycling initiatives, improved access to cardboard recycling, and outreach to private haulers and businesses.

State Landfill Report

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) requires quarterly reporting of all materials landfilled within the state. This reporting, documented through the *Annual Report of Solid Waste Landfilled in Michigan*[2], provides actual data on waste disposed of at Michigan landfills. The dataset includes the total tonnage of waste, identified by county of origin, and classifies materials into broad waste categories.

These categories include **Municipal and Commercial Waste (MCW)**, such as household waste, commercial waste, garbage, regulated medical waste, and municipal solid waste incinerator ash; **Industrial Waste (IW)**, including ashes, auto shredder residue, cement kiln dust, coal ash, food processing residuals, foundry sand, and industrial sludge; **Construction and Demolition (C&D)**, including asbestos waste, scrap wood, and treated or untreated wood; **Other Waste**, such as contaminated soils and technologically enhanced naturally occurring radioactive materials (TENORM); and **Alternative Daily Cover (ADC)**, materials such as chipped tires, ash, foundry sand, sludge, or contaminated soils approved for landfill cover use.

The annual report also includes estimates of remaining landfill capacity. However, it does not account for waste generated in Michigan and disposed of out of state, nor does it provide detailed quantities of specific materials within each category. In addition, the assignment of broad categories (MCW, C&D, ADC, IW, and Other) is not necessarily consistent across the state and may vary by facility and even by individual scale operator. This is particularly relevant for mixed loads that contain multiple

[2]https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Legislative/MMD/Part-115/Report-FY24-Landfilled-Solid-Waste.pdf?rev=b1a8a575d427406f8a4ad4fb4de0ff47&hash=430D8389FB9BEE4BA4AA6D076DCC50F7

material types (e.g., both MCW and C&D), where the total weight of a container or load is typically attributed to a single category, potentially obscuring the true distribution of materials.

For this analysis, RRS reviewed EGLE's reported data covering fiscal years 2020 through 2024.

TOTAL TONS LANDFILLED IN MI GENERATED FROM ANTRIM, CHARLEVOIX, MANISTEE, MISSAUKEE AND WEXFORD COUNTIES

Table 1 below presents the aggregated total tons of all material categories (MCW, IW, C&D, ADC, and Other) landfilled in Michigan and attributed to each county in the past fiscal year. It is important to note that these figures represent tonnage as reported. While the data reflects the best available information, it is possible that some materials were reported under incorrect category types or mixed loads were categorized under a single type.

2024	Tons from Charlevoix	242,114.42
2024	Tons from Manistee	93,033.15
2024	Tons from Antrim	78,111.39
2024	Tons from Wexford	58,665.15
2024	Tons from Missaukee	29,706.13

Table 1: Total Tons Landfilled in MI from Each County 2024

MANISTEE COUNTY

TOTAL TONS LANDFILLED BY TYPE

Table 2 and Figure 1 below present the total tons of landfilled material in each of the five broad categories attributed to Manistee County on the annual landfill reports from 2020 to 2024. On average from 2020 – 2024, the largest share by weight is Industrial Waste (IW) at 55%, followed by Municipal and Commercial Waste (MCW) at 37%.

According to demographic data provided by Networks Northwest, originally sourced from the American Community Survey, Manistee County had an estimated population of 25,247 in 2023. This corresponds with an estimated MCW disposal rate of approximately **6.76 pounds per person per day** based on the 5-year average reported tonnage, which is slightly elevated. For comparison, the state average reported by EGLE is 4.64 pounds per person per day.

One potential explanation for the elevated MCW per capita rate is robust commercial activity. Commercial waste contributes to the total landfilled tonnage but does not increase the resident population used in the per capita calculation, thereby inflating the apparent per capita disposal rate. However, this result could also reflect a reporting or categorization error, or it may accurately indicate a genuinely higher-than-typical disposal rate for the county's population. Improved data reporting and tracking infrastructure would help clarify these possibilities. For planning purposes, the county should anticipate a waste generation rate that falls between the state average of 4.64 pounds per person per day and approximately 6.76 pounds per person per day.

REPORTED LANDFILL WASTE TYPE, TONS[3]	2020	2021	2022	2023	2024	AVERAGE	% OF TOTAL AVERAGE
ADC	18	1,766	242	26	34	417	0.3%
C&D	6,377	4,583	5,665	5,497	5,744	5,573	4.1%
IW	200,301	72,459	89,244	62,003	49,659	94,733	70.0%
MCW	27,817	30,674	29,450	34,728	32,981	31,130	23.0%
OTHER	-	5,413	5,248	2,212	4,616	3,498	2.6%
Grand Total	**234,513**	**114,895**	**129,848**	**104,467**	**93,033**	**135,351**	

Table 2: Michigan Landfill Waste Generated by Manistee County by Type 2020 - 2024

[3] Fiscal years 2020 – 2022 were reported in cubic yards, converted to tons using: MCW = 3 cy : 1 ton, C&D = 2 cy : 1 ton, ADC, IW, OTHER all 1 cy = 1 ton.

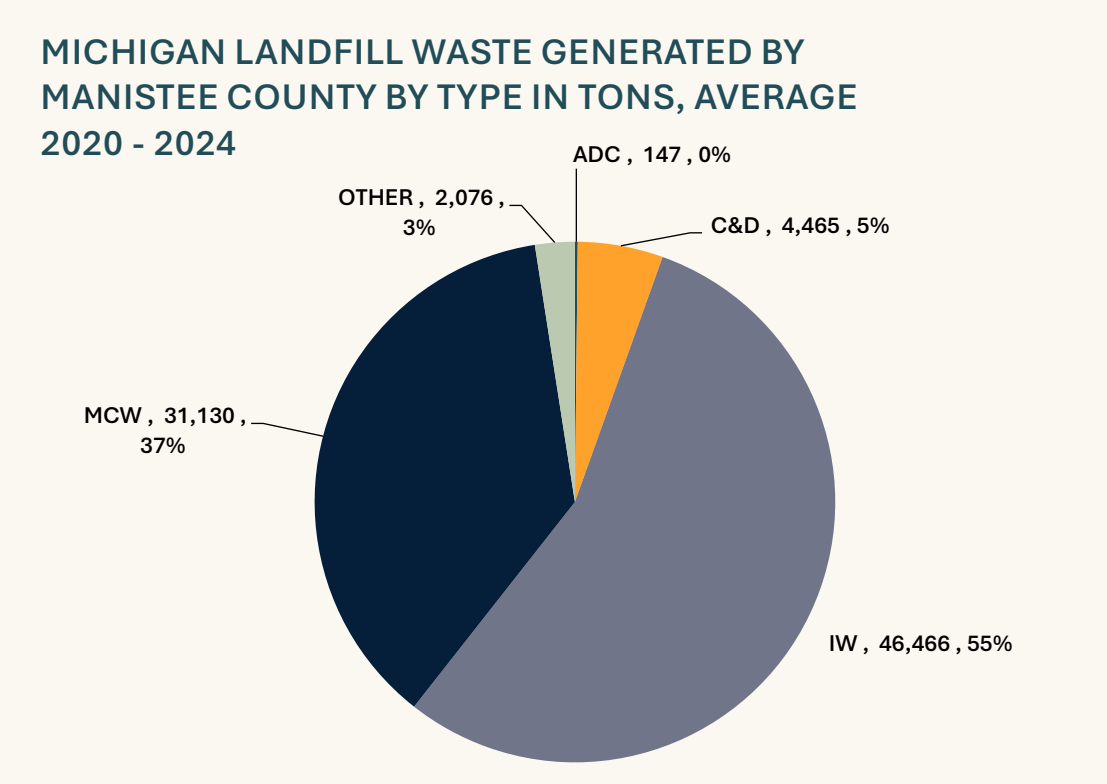


Figure 1: Michigan Landfill Waste Generated by Manistee County by Type in Tons, Average 2020 - 2024

DISPOSAL FACILITIES RECEIVING LANDFILLED MATERIAL FROM MANISTEE COUNTY IN FY 2024

Table 3 below lists the disposal facilities that received landfilled materials originating from Manistee County in 2024 and provides corresponding quantities, by material type, reported in tons. Table 4 presents information on landfill capacity at each location, reported in cubic yards. The remaining years of capacity are presented as a range for each facility: one value is self-reported by the landfills, and the other is calculated by EGLE by dividing the remaining capacity by the amount of capacity used in FY 2024. Differences between these two values account for the range in remaining years of capacity shown in the table.

Landfills Receiving Waste from Manistee County 2024				
	Tons	Glens Sanitary Landfill (Leelanau County)	Manistee County Landfill (Manistee County)	Wexford County Landfill (Wexford County)
ADC	34	-	-	34
C&D	5,744	39	4,585	1,119
IW	49,659	4	49,559	95
MCW	32,981	584	32,280	118

OTHER	4,616	58	4,480	78
Grand Total	**93,033**	**685**	**90,904**	**1,445**

Table 3: Landfills Receiving Waste from Manistee County in 2024

	Wexford County Landfill (Wexford County)	Glens Sanitary Landfill (Leelanau County)	Manistee County Landfill (Manistee)
Remaining Capacity (CY)	15,820,706	17,590,764	7,617,704
Capacity Used in 2024 (CY)	366,293	54,650	156,057
Est Years of Remaining Capacity	43 - 46	321 - 322	49

Table 4: Estimated Remaining Landfill Capacity in 2024

Manistee County Landfill

The Manistee County Landfill Inc is a licensed solid waste landfill and solid waste transfer facility located at 3890 Camps Road, in Manistee Michigan and is regulated under Michigan's Part 115 solid waste program through EGLE. The facility is privately owned and is operated by Republic Services. The landfill also serves as a recycling drop-off site for cardboard, paper, metal and plastic[4], which is discussed further in a later section.

Figure 2 below presents the materials received at the Manistee County Landfill from **2020 through 2024**, reported in tons and attributed by **county of origin**. The data include all reported landfill material categories, including Industrial Waste (IW), Construction and Demolition (C&D), Municipal and Commercial Waste (MCW), Alternative Daily Cover (ADC), and Other.

Over this five-year period, the Manistee County Landfill received an average of ~125,700 tons per year, the **majority of which (65%) was generated within Manistee County**. From all counties, MCW represents the largest share of total reported tonnage totaling approximately 340,000 tons, or **54% of the five-year total**, followed by **Industrial Waste (IW)** at approximately 240,000 tons, or **38% of the five-year total.** Within both of these categories, most of the reported tonnage originated within Manistee County.

In addition to locally generated material, the Manistee County Landfill serves as a significant disposal destination for MCW generated in Mason County. These county-of-origin patterns and material-specific flows are detailed further in the Appendix.

[4] https://www.manisteetownship.com/recyclingmanisteetownship

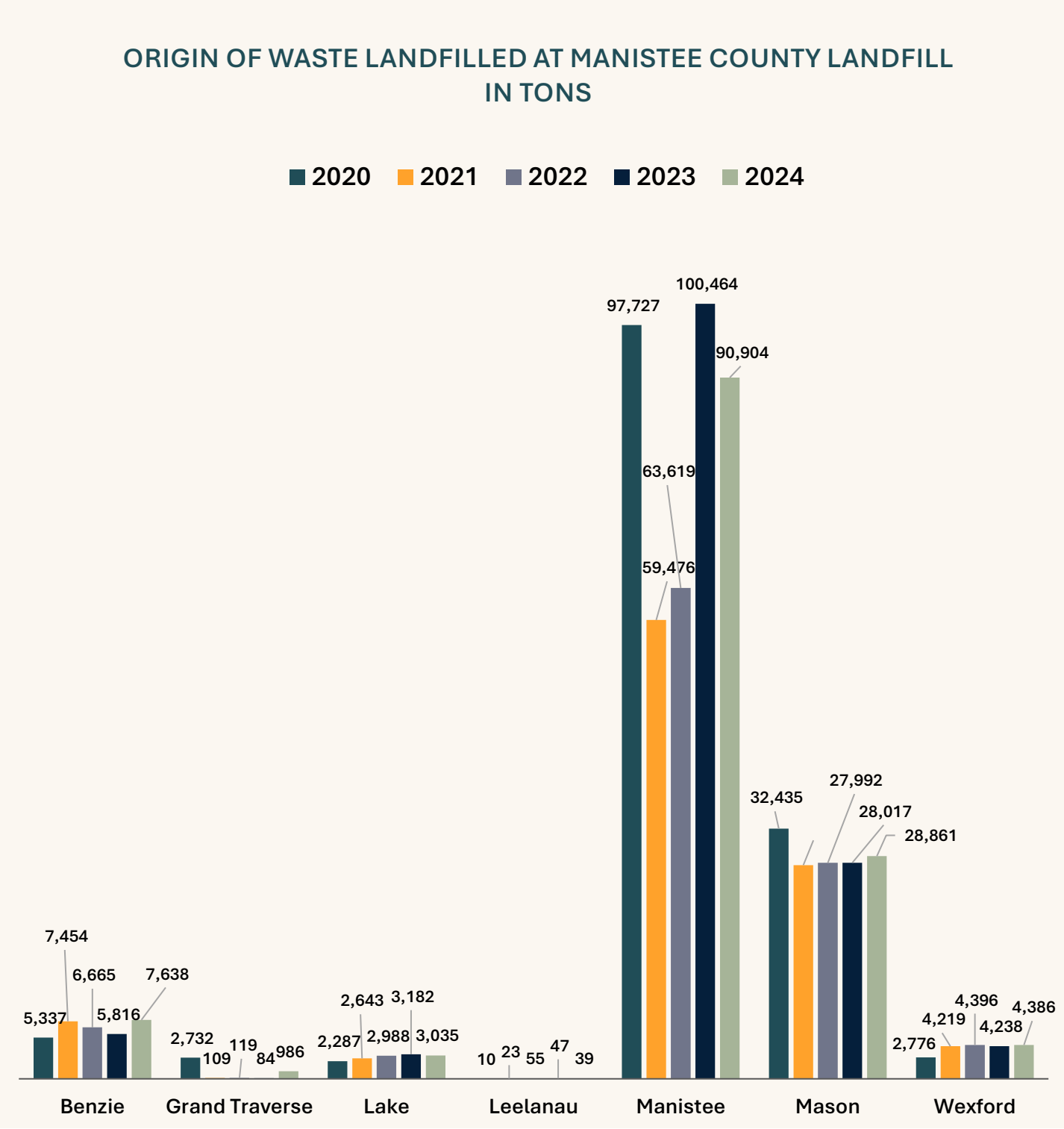


Figure 2: Origin of Waste at Manistee County Landfill

RRS MCW Modeling

The RRS Municipal and Commercial Waste (MCW) Characterization Model is designed to identify potential recovery opportunities within the MCW stream, broken down by specific material types and generating sectors, including single-family residential, multi-family residential, and commercial sources. The model was developed using multiple waste characterization and capture rate studies conducted over the past five years, including studies specific to Michigan as well as broader research from the Midwestern United States. This model is intended as a planning tool to help the County understand which specific materials are being landfilled within the MCW stream, thereby identifying the greatest opportunities and potential tons available for recovery.

The model estimates the composition of MCW by dividing it into approximately 50 distinct material categories, expressed as percentages of the total waste stream. These percentages are then applied to the total tons of landfilled MCW attributed to Manistee County in 2024 (32,981) as reported to EGLE to estimate the tonnage of each material category disposed. Additionally, the model uses aggregated data to differentiate between waste generated by commercial businesses and residential sources. Within the residential sector, housing data from the 2020 U.S. Census is incorporated to allocate tonnages between single-family and multi-family residences.

The approximately 50 material categories were also ranked according to their ease of recovery. The rankings are as follows:

1. **Readily Recyclable** – materials that are almost universally accepted in existing curbside recycling programs. Examples include cardboard, plastics #1-2, aluminum cans.

2. **Compostable** – materials that break down naturally, including food waste, yard waste, brush, and leaves.

3. **Recyclability Variable by Municipality** – materials that are sometimes accepted in established curbside recycling programs. Examples include HHW, plastic films, textiles.

4. **Minimal Access for Recycling/Specialty Recycling** – materials that may be recyclable through drop-off or specialized programs, such as bulky waste, tires, and polystyrene.

5. **Not Recyclable** – materials that are currently not recyclable through existing programs.

Based on this assessment, RRS estimates that approximately 54% of landfilled MCW by weight from Manistee County is either readily recyclable or compostable. This approach provides a detailed, data-driven foundation for evaluating material-specific recovery potential and informing county-level planning efforts.

RRS LANDFILLED MCW RECYCLABILITY MODEL BY WEIGHT IN TONS

Figure 3 below illustrates the recyclability of municipal and commercial waste (MCW) by weight for materials currently landfilled, based on an estimated MCW tonnage of 32,981; the amount of MCW attributed to Manistee County on the 2024

EGLE Landfill Report. It highlights the potential opportunities to divert waste from landfill toward higher-value outcomes, such as established recycling programs or composting initiatives.

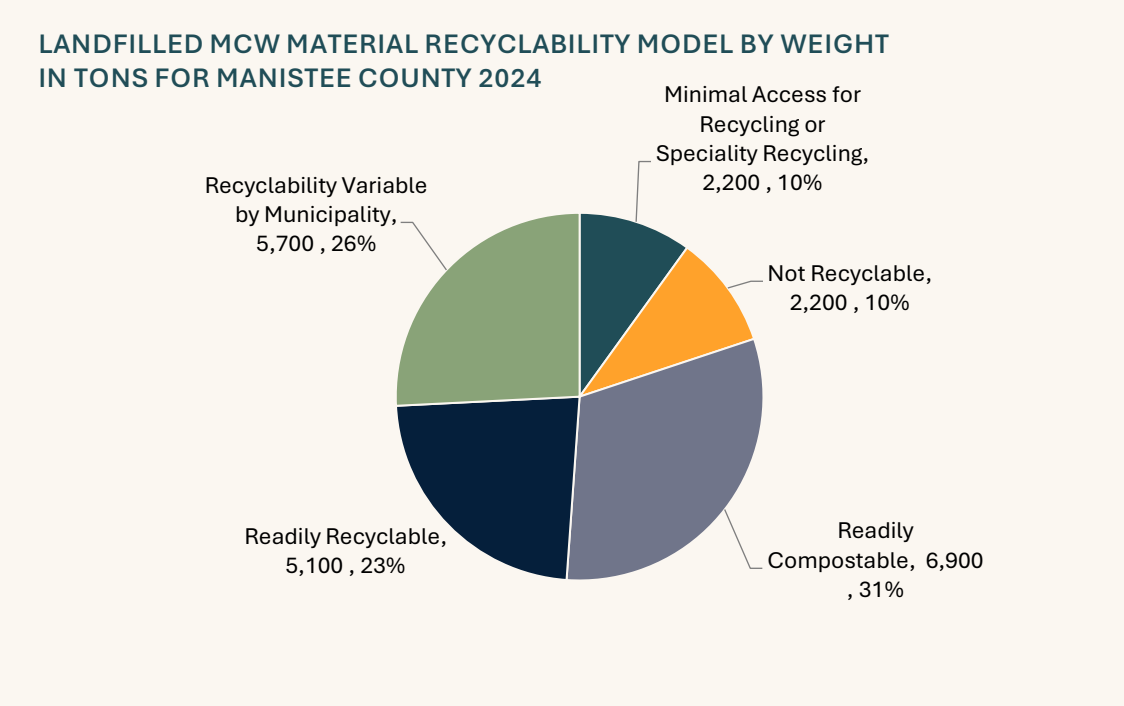


Figure 3: RRS Model, Landfilled MCW Recyclability by Weight in Tons

RRS MCW COMPOSITION MODEL BY WEIGHT

Figure 4 below outlines the 25 most prevalent materials within the MCW stream by weight, as identified by the RRS model. It also illustrates the proportional generation of each material by single-family households, multi-family households, and the commercial sector. The tonnage and relative proportions of these materials provide valuable insights for planners to target key materials for diversion efforts as discussed previously in the Preliminary Opportunities section. Wasted food represents a significant opportunity to both increase diversion and reduce overall waste through food rescue and composting. In addition, the large quantity of compostable paper further increases the potential feedstock for expanded composting infrastructure. The model also indicates a strong potential to increase recovery of corrugated cardboard and plastic films, particularly within the commercial sector, where these materials represent a larger share of total generation. Textile waste also represents a significant tonnage and therefore presents an opportunity to expand or encourage textile reuse and donation outlets within the county.

A full depiction of all 50+ materials and their anticipated composition in the waste composition model can be found in the Appendix.

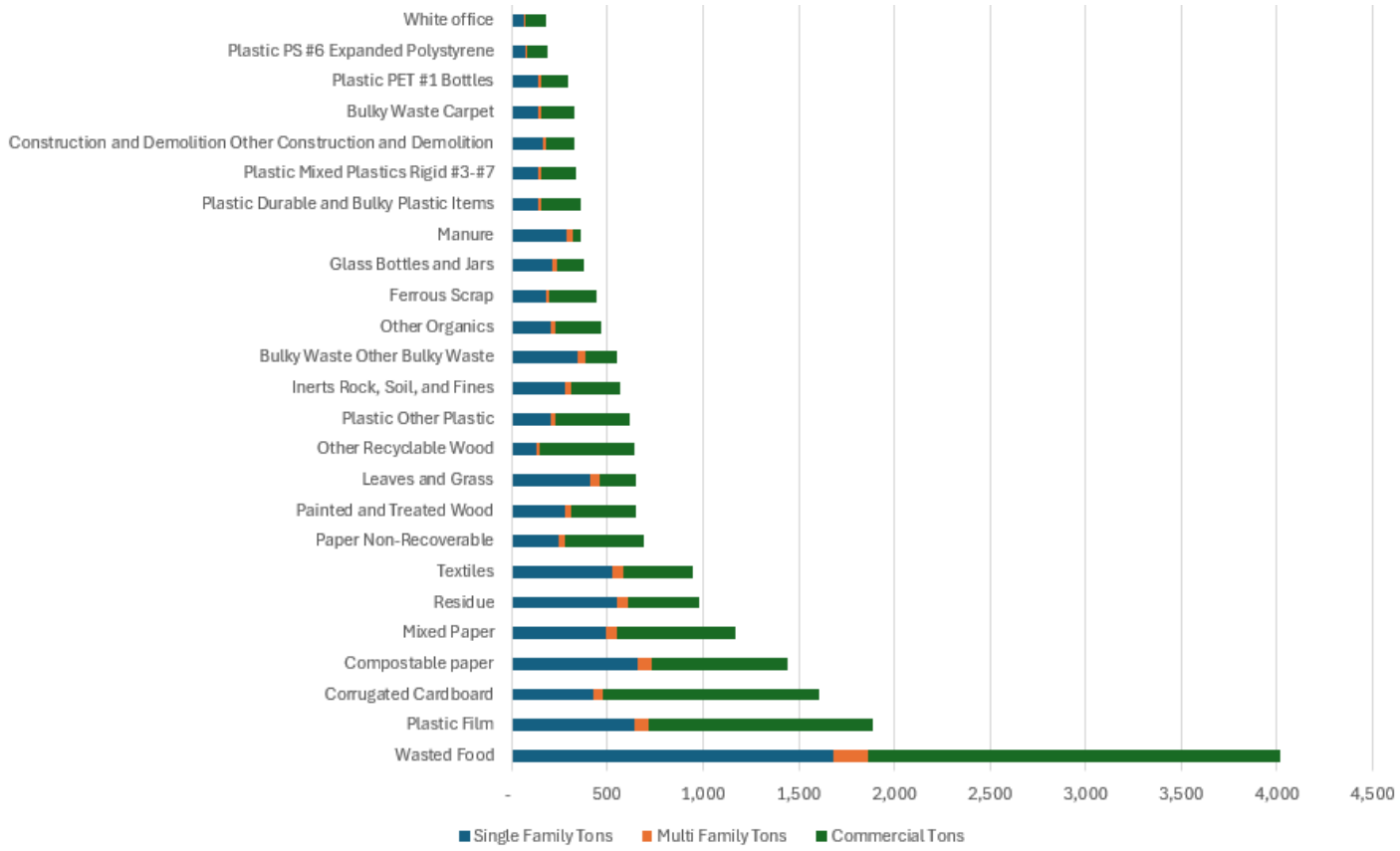


Figure 4: RRS Modeled MCW Composition by Weight

POTENTIAL ECONOMIC OPPORTUNITY

When approached strategically, materials management plans present significant economic opportunities for the county. Recovered materials, often considered "waste," can be valuable resources when properly sorted and processed, serving as key inputs for various industries. The following table illustrates the potential economic value of materials currently being landfilled by residents and businesses in Manistee County. It provides a breakdown of Manistee's estimated MCW tonnage into specific material categories, based on the RRS model. Additionally, commodity values for each material were sourced from Recyclingmarkets.net, a trusted industry resource, to demonstrate the potential value of these landfilled materials if they were properly captured, sorted, and prepared for market (e.g., baled). While this analysis serves as an illustration of potential value, it is recognized that achieving a 100% capture rate for all landfilled recyclables is unlikely. Furthermore, the snap-shot values presented reflect a relatively low commodities market, so the estimated value should be considered somewhat conservative. **Even under these conservative assumptions, the analysis indicates that more than $220,000 in "Readily Recyclable" materials from Manistee County are currently landfilled each year.**

Type Modeled	Ease of recoverability	Total Tons	Recyclingmarkets.net value 9.15.25	Est Market Value of Tons
Corrugated Cardboard	Readily Recyclable	1,605	$ 65	$ 104,323
Mixed Paper	Readily Recyclable	1,168	$ 35	$ 40,891
Steel Cans	Readily Recyclable	149	$ 160	$ 23,809
White office	Readily Recyclable	182	$ 125	$ 22,744
Aluminum Cans	Readily Recyclable	127	$ 80	$ 10,197
Magazines	Readily Recyclable	158	$ 35	$ 5,513
Newspaper (ONP)	Readily Recyclable	131	$ 35	$ 4,582
Plastic HDPE #2 Bottles Natural	Readily Recyclable	93	$ 46	$ 4,256
Plastic PET #1 Bottles	Readily Recyclable	292	$ 6	$ 1,679
Paperboard Boxboard	Readily Recyclable	42	$ 35	$ 1,470
Plastic HDPE #2 Bottles colored	Readily Recyclable	100	$ 3	$ 250
Plastic HDPE #2 Non-Bottle colored and natural combined	Readily Recyclable	5	$ 1	$ 3
				$ 220,103
Plastic Film	Recyclability Variable by Municipality	1,884	$ 1	$ 1,884
Plastic PP#5	Recyclability Variable by Municipality	109	$ 8	$ 818
Plastic Mixed Plastics Rigid #3-#7	Recyclability Variable by Municipality	334	$ 2	$ 501
				$ 3,203
				$ 223,306

Figure 5: Example Recycling Market Values for 9.15.2025

Key materials such as cardboard, mixed paper, office paper, and aluminum are readily recyclable and typically have established end markets. Increased recovery of these commodities is achievable through expanded and more consistent access to recycling services, suggesting a potential service gap, particularly for commercial recycling.

In addition, fiber processed at the GFL MRF in Traverse City is marketed to Packaging Corporation of America (PCA), a paper (containerboard) manufacturer located in Filer City in Manistee County, helping to strengthen and sustain regional end-market demand.

Organic Material

Organic material includes edible surplus food, inedible food scraps, and yard debris such as leaves, brush, grass clippings and trimmings. In Michigan, yard clippings are prohibited from disposal in municipal solid waste landfills under Part 115 of the Natural Resources and Environmental Protection Act (NREPA) [5]. Despite this prohibition, waste characterization studies routinely indicate that yard materials still appear in disposed MCW streams (typically due to seasonal cleanouts, mixed loads,

[5] https://legislature.mi.gov/Laws/MCL?objectName=mcl-324-11514&utm

or limited access to convenient organics options). Within Manistee County, residents in **Manistee City** and **Filer Charter Township** have curbside yard waste collection programs; however, the tonnages collected through these programs are not currently available, limiting the County's ability to quantify organics diversion and track progress over time. Manistee City has a municipally-provided program and Filer Charter Township contracts for curbside yard waste collection.

SEEDS ORGANICS ANALYSIS

A 2021 report[6] prepared by RRS and commissioned by SEEDS Ecology & Education Centers and funded with a 2021 EGLE Market Development Grant, evaluated current prevention, rescue/recovery and recycling processing opportunities and applied feasibility of each option to each county in the region and modeled centralized composting and operating costs and a preliminary collection and transportation plan. It also projected GHG emission savings and job creation and identified actionable next steps for the region to support the organics circular economy. The study concluded that Manistee County generated an estimated 6,366 tons of organic waste per year with approximately 421tons diverted to permitted composting sites annually. Based on RRS's current model of landfilled MCW and the average MCW tons for the county, in 2024 RRS estimates that Manistee County generated approximately 6,900 tons of organic waste that was landfilled. **For planning purposes, Manistee County should estimate 6,366 – 6,900 tons of organic waste generated (food scraps, yard waste, brush, leaves, branches and trimmings) annually.**

SEEDS REPORT ESTIMATED ORGANICS GENERATION AND DIVERSION 2021

Figure 6 below summarizes the ten counties analyzed, showing their estimated annual generation of organic waste (food and yard waste) in tons, the amount currently diverted, and the additional tonnage that could potentially be diverted through various methods. If all identified strategies were implemented, Manistee County's overall organics diversion rate would reach 22.6%. The 2021 study noted that Antrim, Benzie, Charlevoix, Kalkaska, Manistee and Missaukee counties all have relatively small amount of organics collection and recommended that these counties focus efforts on food rescue initiatives (recovering edible food before disposal), education on food waste reduction, and promotion of backyard composting practices. Furthermore, the study identified the close proximity to existing composting operations in Sears, MI (Morgan Composting) could present an opportunity for increased organics collection. At the time, it was estimated that ~ 580 tons of food waste is generated per year from food stores within the county and ~204 tons per year from food processing operations.

[6] https://michiganrecycles.org/wp-content/uploads/2022/08/RRS-FINAL-REVISED-NW-Lower-MI-Regional-Organics-Strategy-Report.pdf

ANNUAL TONS YARD AND FOOD WASTE								
			Estimated Potential Diversion					
COUNTY	Generation	Current Diversion*	Prevention	Rescue/ Recovery	Recycle**	Centralized Composting	Tons Diversion	Percent Diversion
Antrim County	6,149	41	81	39	345	935	1,400	22.8%
Benzie County	5,101	108	62	30	360	686	1,138	22.3%
Charlevoix County	6,687	1,286	91	44	387	1,415	1,937	29.0%
Emmet County	8,006	1,048	236	127	678	2,806	3,847	48.0%
Grand Traverse County	19,074	4,003	319	302	1,551	8,301	10,473	54.9%
Kalkaska County	5,114	14	61	30	229	721	1,041	20.4%
Leelanau County	5,850	751	76	36	447	861	1,420	24.3%
Manistee County	6,366	421	85	41	321	992	1,438	22.6%
Missaukee County	4,608	1	52	25	194	561	832	18.1%
Wexford County	8,035	77	115	56	547	1,789	2,507	31.2%
TOTAL	**74,989**	**7,750**	**1,179**	**729**	**5,060**	**19,066**	**26,034**	**34.7%**

*Current Diversion tonnage is estimated based on 2021 survey data and 2019 EGLE Waste Data System (WDS) of reported volumes to permitted composting sites.
**Recycle includes backyard composting, community composting and animal feed. The estimated diversion by sub-category is included in the appendix.

Figure 6: Potential Organic Tonnage, SEEDS 2021

Demographic Data & Waste Generation

MCW GENERATION PROJECTIONS

Networks Northwest provided RRS with county-level demographic data obtained from the American Community Survey, the Bureau of Labor Statistics, and the Michigan Department of Technology, Management & Budget. These data include projected five-year population estimates through 2050. The table below applies both the state average MCW disposal rate of 4.6 pounds per person per day and the 6.76 pounds per person per day calculated from 2020 - 2024 reported landfill tonnages to illustrate the potential range of MCW volumes the county may need to manage in the coming decades.

	Projected County Population	Annual MCW TONS at 4.6 Lbs/PP/Day	Annual MCW TONS at 6.76 Lbs/PP/Day
2024	25,247	21,195	31,130
2025	25,782	21,644	31,790
2030	26,107	21,917	32,190
2035	26,254	22,040	32,372

2040	26,149	21,952	32,242
2045	25,764	21,629	31,767

Table 5: RRS Potential MCW Tonnage Projections

BUSINESS SECTOR DEMOGRAPHICS

Detailed business establishment and employment data for **2018 and 2023**, provided by Networks Northwest and originally sourced from Esri, further refine the understanding of Manistee County's commercial landscape and its implications for materials management planning. These data form the basis for Figure 7, Figure 8, and Figure 9 and highlight both growth trends and sector-specific recovery opportunities. The full 2018 and 2023 establishment and employment datasets are provided in the appendix.

Between 2018 and 2023, Manistee County experienced notable growth in the number of business establishments, particularly in sectors associated with higher waste generation and recoverable materials. **Retail Trade** increased from **87 to 91 establishments**, **Construction** from **64 to 87**, **Health Care and Social Assistance** from **44 to 80**, and **Accommodation and Food Services** from **61 to 78** establishments. Growth was also observed in **Manufacturing** (24 to 29 establishments) and **Administrative Support and Waste Management Services** (21 to 24 establishments). These trends indicate a diversifying and expanding business base, which has direct implications for both MCW generation and diversion potential.

Employment data further clarify where material recovery efforts may be most impactful. In **2023**, the largest employment sectors in Manistee County were **Retail Trade (1,075 jobs)**, **Manufacturing (999 jobs)**, and **Accommodation and Food Services (572 jobs)**. Construction employment increased substantially from **268 to 315 jobs**, while **Wholesale Trade** grew from **209 to 250 jobs**, and **Arts, Entertainment, and Recreation** increased from **174 to 227 jobs**. Although **Accommodation and Food Services employment declined slightly** between 2018 and 2023, the sector remains one of the County's largest employers and a significant generator of food waste.

From a materials management perspective, these 2023 data reinforce several priority opportunities identified in EGLE MMP guidance. The concentration of employment and establishments in Accommodation and Food Services aligns with waste characterization findings that food waste is one of the largest components of the MCW stream, underscoring the importance of **food waste prevention, food rescue, and organics diversion strategies** targeted to restaurants, hotels, and institutional food service operations.

Similarly, the scale and growth of Retail Trade, Manufacturing, and Wholesale Trade point to **corrugated cardboard** as a high-volume, readily recyclable material with strong recovery potential. These sectors collectively represent a large share of establishments and jobs and are well-suited for targeted commercial recycling initiatives, improved access to cardboard recycling, and outreach to private haulers and businesses. Further, local manufacturer, Packaging Corporation of America (PCA) in Filer City (Manistee County), would directly benefit from the additional collection of corrugated cardboard from the Northwest Michigan region.

Overall, the 2023 establishment and employment data support a planning approach that prioritizes sector-specific strategies, consistent with EGLE's emphasis on focusing resources where they will yield the greatest diversion impact. By aligning program

development with the County's evolving business profile, Manistee County can more effectively reduce disposal, increase recovery of high-value materials, and support progress toward its Materials Management Plan goals.

Figure 7: Industry and Employment Statistics, Courtesy Networks Northwest

MANISTEE COUNTY BUSINESS SECTORS BY NAICS CODE (# OF ESTABLISHMENTS) 2023

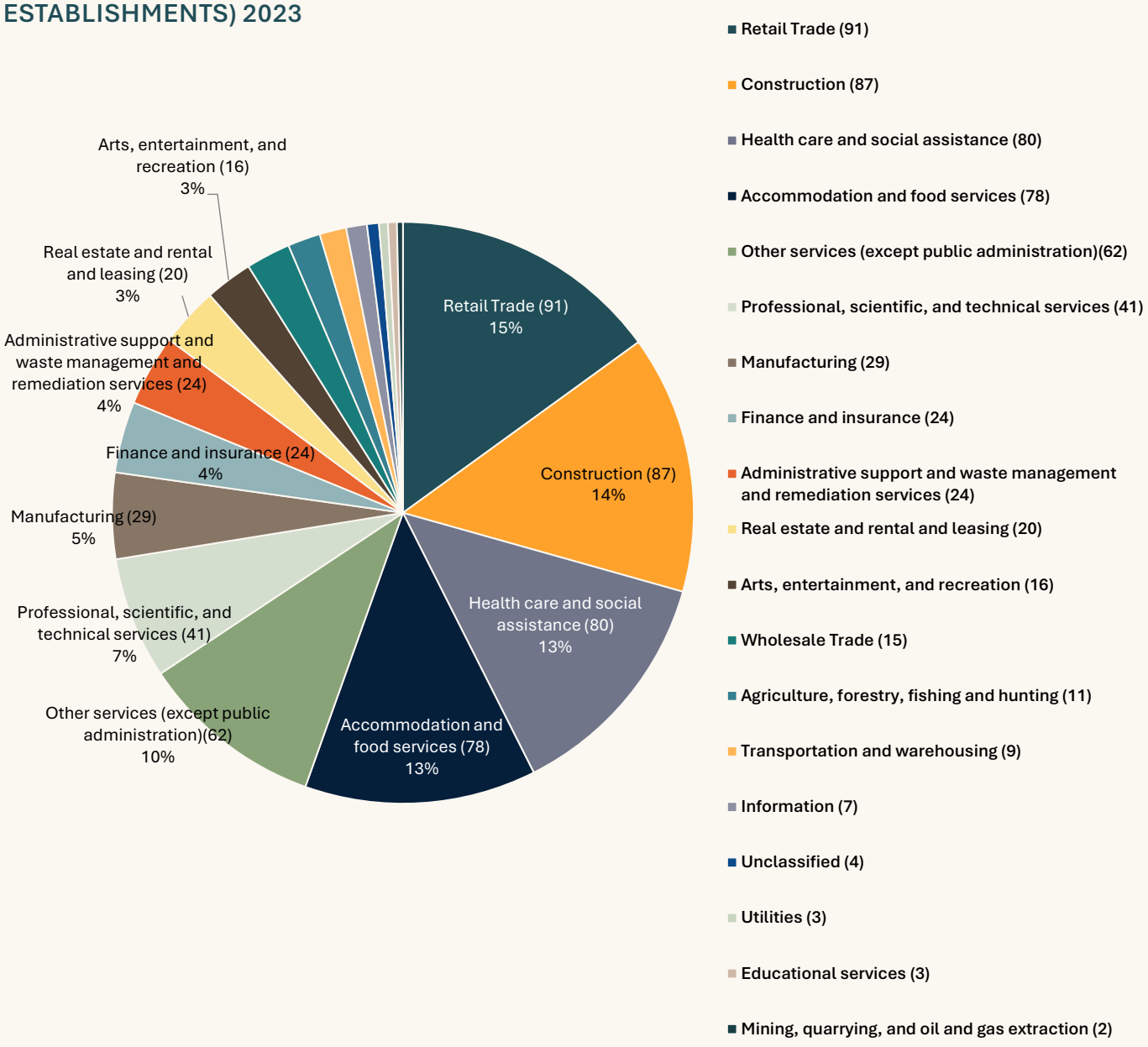


Figure 8: Manistee County Business Sectors by NAICS Code, # of Establishments. Data provided by Networks Northwest

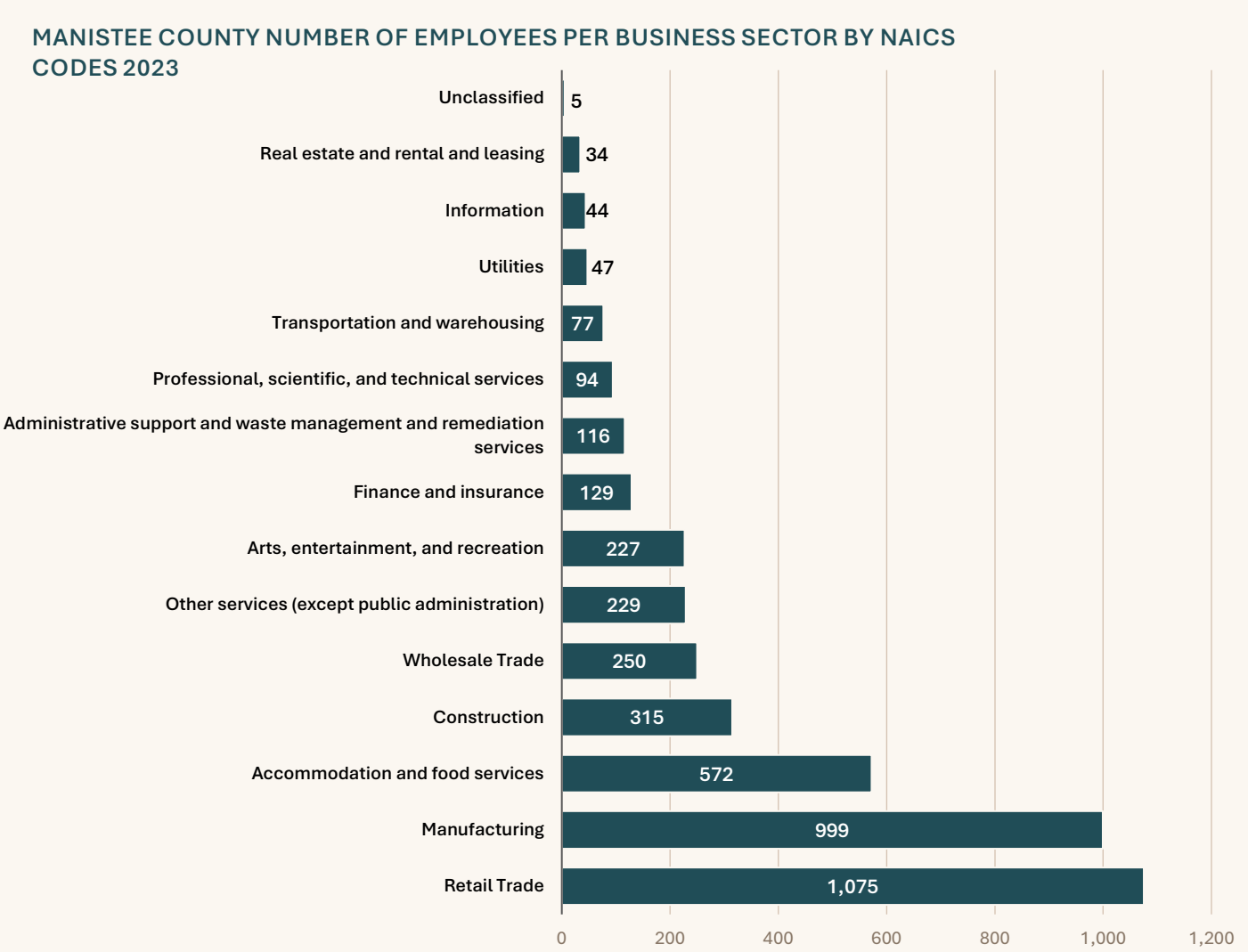


Figure 9: Manistee County # of Employees by NAICS Code, 2023. Data provided by Networks Northwest

Compliance with Part 115 and Benchmark Recycling Standards

Manistee County is in compliance with Michigan's **Part 115 Benchmark Recycling Standards**, which are intended to ensure that counties provide residents and businesses with reasonable access to recycling opportunities in support of the State's broader materials management goals. The County does not contain any designated urbanized areas and includes only one municipality, the **City of Manistee**, with a population exceeding 5,000 residents.

Effective July 1, 2025, the City of Manistee implemented a contracted curbside residential recycling program with Republic Services. With the addition of this program, Manistee County meets the Benchmark Recycling Standard for curbside recycling access. While residents in other municipalities may have the option to obtain curbside recycling services through subscription-based arrangements with private waste haulers, these services are not publicly documented or uniformly available across the county.

Manistee County's broader recycling system is supported through a combination of drop-off recycling sites funded by the Public Act 69 (PA 69) Recycling Program, municipally managed drop-off sites, and a public recycling drop-off location at the Republic Services Manistee County Landfill, which is accessible to all county residents.

CURBSIDE SERVICE TYPES

More broadly, curbside waste, recycling, and organics/yard waste collection programs can be categorized as:

1. **Municipal** – municipal staff collect material using municipal equipment.
2. **Contracted or franchised** – a municipality contracts with a single hauler to provide curbside service to all residents (funded through a variety of approaches, such as general funds, special assessments, utility-style fees, or billed service fees).
3. **Subscription (open-market)** – residents contract directly with the hauler of their choice for curbside services.
4. **No curbside program** – there is no verified curbside service being actively provided within the municipality (regardless of cost).

EGLE instructs counties to calculate curbside recycling access according to this formula:

$$\text{Curbside Recycling Access} = \frac{\text{Sum of single family dwellings which have curbside recycling access}}{\text{Total number of single family dwellings}} \times 100$$

Under Part 115, subscription or open-market service qualifies as "access" when residents are able to obtain curbside recycling through their chosen hauler. However, the statute does not establish any affordability criteria, such as rate caps or cost thresholds, meaning a community may be considered to have curbside access even if cost remains a practical barrier for some households. Specifically, the statute provides that curbside recycling qualifies when: "The curbside recycling is provided by the municipality or the resident has access to curbside recycling by the resident's chosen hauler."[7]

[7] https://www.legislature.mi.gov/documents/mcl/pdf/mcl-451-1994-ii-3-115.pdf

Currently, Manistee City is the only municipality in the county with a municipally managed curbside recycling program. While subscription-based recycling services may exist on a limited basis elsewhere, there are no haulers confirmed as providing curbside recycling service in other communities.

RECYCLING AND COMPOSTING ACCESS IN MANISTEE COUNTY

As noted above, Manistee City is currently the only municipality with a contracted curbside recycling program for traditional recyclables. Manistee City also provides municipal curbside yard waste collection, including brush, trimmings, and leaves[8]. Filer Charter Township offers curbside brush collection through a contracted hauler and provides leaf-only drop-off dumpsters for residents at Township Hall (2505 Filer City Road) and at Oak Hill Park[9].

Ten communities participate in the PA 69 Recycling Program, which funds local recycling drop-off services. These communities include: Arcadia Township; Bear Lake Township and the Village of Bear Lake; Brown Township; Cleon Township and the Village of Copemish; Dickson Township and the Village of Brethren; Maple Grove Township and the Village of Kaleva; Marilla Township; Onekama Township and the Village of Onekama; Pleasanton Township; and Springdale Township. Other communities, including the City of Manistee, Filer Township, Manistee Township, Norman Township, and Stronach Township, manage and fund recycling programs independently.

The PA 69 program accepts **paper; plastic bottles and containers #1, #2, #4, #5, and #7; metal cans and foil; paperboard; corrugated cardboard; and glass bottles and jars**. PA 69 drop-off locations include:

- **Arcadia Township Hall** – 3422 Lake Street
- **Kaleva** – 14420 Walta Street
- **Brown Township Hall** – 8233 Coates Highway
- **Onekama Township Hall** – 5435 Main Street
- **Copemish** – on Brown Street off West Cleon Street
- **Springdale Township Hall** – 14492 Glovers Lake Road

[8] https://www.manisteemi.gov/DocumentCenter/View/2448/Yard-Services

[9] https://filertwpmi.gov/services/yard-waste/#:~:text=The%20homeowner%20is%20responsible%20for,Please%20note%3A%20Under%20camera%20surveillance.

In addition, **cardboard-only collection trailers** (operated as fundraising efforts by local school organizations) are located at **Betsie Valley School**, **Old Brethren High School**, **Wellston Transfer Station**, as well as the **Kaleva (BARC)** drop-off site, and serve both residents and businesses.

With the implementation of curbside recycling in Manistee City in July 2025, the City removed the previously used **cardboard trailers at the Department of Public Works** and the **commingled recycling bin at Veterans Oak Grove Drive**. Downtown businesses not included in the residential curbside program continue to have access to **cardboard recycling dumpsters** at two downtown locations.

As the only municipality in the county with a population exceeding 5,000 residents, Manistee City is the sole community subject to the Part 115 Benchmark Recycling Standards. All Manistee County residents, regardless of municipality, have access to a private recycling drop-off site at the Republic Services Manistee County Landfill at 3890 Camp Road, Manistee and Waste Reduction Systems at 5848 N. Stiles Road, Ludington.

SUMMARY TABLE OF RECYCLING ACCESS BY COMMUNITY

COMMUNITY NAME	2020 CENSUS NAME	COMMUNITY POPULATION	# OF HOUSE HOLDS	POPULATION IN SINGLE FAMILY HOMES[10]	POPULATION IN MULTI FAMILY HOMES[11]	RECYCLING CURBSIDE SERVICE TYPE	RECYCLING DROP-OFF PROGRAM	DROP-OFF LOCATION
rcadia ownship	Arcadia CDP	308	164	308	0	No Curbside Program	PA69 Recycling Program	3422 Lake St. Arcadia
rcadia ownship	Arcadia township	348	119	348	0	No Curbside Program	PA69 Recycling Program	3422 Lake St. Arcadia
ear ake ownship	Bear Lake village	342	128	342	0	No Curbside Program	PA69 Recycling Program	Access to all PA69 Recycling Sites
ear ake ownship	Bear Lake township	1,490	562	1,490	0	No Curbside Program	PA69 Recycling Program	Access to all PA69 Recycling Sites
rown ownship	Brown township	704	307	704	0	No Curbside Program	PA69 Recycling Program	3233 Coates Highway Manistee
leon ownship	Copemish village	195	70	195	0	No Curbside Program	PA69 Recycling Program	On Brown St. off W. Cleon St. Copemish
leon ownship	Cleon township	867	342	867	0	No Curbside Program	PA69 Recycling Program	On Brown St. off W. Cleon St. Copemish

[10] Single-Family = 1-4 units, mobile homes and other types of housing.

[11] Multi-Family = 5 or more units.

ickson ownship	Brethren CDP	331	154	331	0	No Curbside Program	PA69 Recycling Program	Off Wingert St. behind Fire Dept. Brethren
ickson ownship	Dickson township	649	268	649	0	No Curbside Program	PA69 Recycling Program	Off Wingert St. behind Fire Dept. Brethren
iler harter ownship	Filer City CDP	136	55	136	0	No Curbside Program	No Program	Private drop-off facilities
iler harter ownship	Oak Hill CDP	545	244	545	0	No Curbside Program	No Program	Private drop-off facilities
iler harter ownship	Filer charter township	1,636	737	1,553	83	No Curbside Program	No Program	Private drop-off facilities
anistee ity	Manistee city	6,259	2,893	5,567	692	Contracted/Franchise	No Program	Private drop-off facilities
anistee ownship	Eastlake village	415	189	415	0	No Curbside Program	No Program	Private drop-off facilities
anistee ownship	Parkdale CDP	607	259	607	0	No Curbside Program	No Program	Private drop-off facilities
anistee ownship	Manistee township	3,000	859	2,982	18	No Curbside Program	No Program	Private drop-off facilities
aple rove ownship	Kaleva village	506	196	506	0	No Curbside Program	PA69 Recycling Program	Bay Area Recycling for Charities 14407 Industrial Dr. Kaleva
aple rove ownship	Maple Grove township	836	378	836	0	No Curbside Program	PA69 Recycling Program	Bay Area Recycling for Charities 14407 Industrial Dr. Kaleva
arilla ownship	Marilla township	398	166	398	0	No Curbside Program	PA69 Recycling Program	Access to all PA69 Recycling Sites
orman ownship	Norman township	1,313	596	1,309	4	No Curbside Program	unknown	1272 S. Seaman Rd. Wellston
orman ownship	Wellston CDP	254	121	254	0	No Curbside Program	unknown	1273 S. Seaman Rd. Wellston
nekama ownship	Onekama village	398	194	373	25	No Curbside Program	PA69 Recycling Program	5435 Main St. Onekama
nekama ownship	Onekama township	938	451	914	24	No Curbside Program	PA69 Recycling Program	5435 Main St. Onekama
leasanton ownship	Pleasanton township	871	384	871	0	No Curbside Program	PA69 Recycling Program	8958 Lumley Rd. Bear Lake
pringdale ownship	Springdale township	849	377	849	0	No Curbside Program	PA69 Recycling Program	Access to all PA69 Recycling Sites
tronach ownship	Stronach township	664	326	660	4	No Curbside Program	No Program	Private drop-off facilities
tronach ownship	Stronach CDP	169	61	165	4	No Curbside Program	No Program	Private drop-off facilities

Table 6: Summary of Recycling Access by Community

Data Currently Available

Bay Area Recycling for Community (BARC) has provided tonnage data for recyclable materials collected at the **ten PA69-funded drop-off locations** from **2020 through 2024**. The PA69 program serves approximately **10,030 residents**, representing about **40 percent of Manistee County's population**. Over this five-year period, an average of approximately **257 tons of recyclables** were collected annually through the PA69 system, which equates to roughly **0.14 pounds of recyclables collected per person per day**.

Beyond the PA69 program, **tonnage data are not available** for materials collected at privately managed recycling drop-off sites, including those operated by **Republic Services** or **Waste Reduction Systems**, nor for community recycling drop-offs managed outside of the PA69 framework. In addition, there is no available information regarding recyclable materials that may have been collected through **curbside programs** serving residents or commercial businesses, and no data reported for **industrial recycling activities** that may be occurring within the county. While the **City of Manistee** operates a curbside recycling collection program, corresponding tonnage data are not currently available.

Similarly, **yard waste collection programs** operated by **Manistee City** and **Filer Charter Township** do not have reported tonnage data. Tonnages of organic material delivered to municipal or private **composting or mulching facilities** are also not currently tracked or reported.

Due to these data gaps, Manistee County does not currently have a **measured recycling rate or diversion rate**. Establishing consistent, countywide tonnage reporting and tracking systems represents a key opportunity to quantify these missing material flows, calculate a documented diversion rate, and track progress toward the goals established through the MMP process.

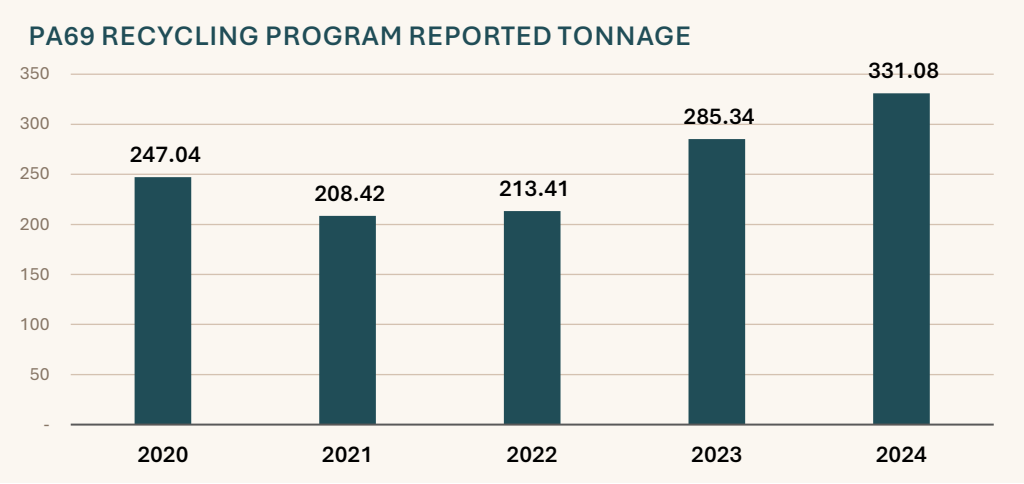


Figure 10: Annual Reported Tons of PA69 Drop-Off Recycling

Recycling Rate Estimates

RECYCLING RATE VS DIVERSION RATE

As noted previously, RRS estimates a Municipal and Commercial Waste (MCW) **Generation Rate** of approximately 4.6 to 6.8 pounds per person per day for planning purposes. This MCW generation rate represents the average quantity of waste disposed per person per day and is used to estimate total disposal system demand.

To evaluate recycling performance and calculate a measured Recycling Rate it is also necessary to quantify the **weight of material recycled.** It is important to understand that for the MMP process, as defined by EGLE, the term **"Recycling Rate"** incudes both traditional recyclables (packaging and paper) and organic material (food scraps and yard waste) that is recycled.

The term **"Diversion Rate"** accounts for additional material diverted from landfill via reuse, recovery, donation, co-generation, digestion or other processes along with traditional recycling and composting. In order to calculate a complete diversion rate, the county would need tonnage data for material diverted via these additional methods.

RECYCLING RATE = $\frac{\text{Total tons MSW Recycled and Composted}}{\text{Total tons of MSW Recycled, Composted, Landfilled, Incinerated}} \times 100$

Percent of waste recycled and composted

DIVERSION RATE = $\frac{\text{Total tons MSW Recycled, Composted, Diverted}}{\text{Total tons of MSW Recycled, Composted, Landfilled, Incinerated, Diverted}} \times 100$

Percent of waste diverted from disposal.
Including recycling, composting, reuse, recovery, donation, co-generation, digestion, etc.

Figure 11: Recycling and Diversion Rate Definitions, EGLE, "Setting Materials Management Goals"[12]

[12] https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Programs/MMD/Recycling/MMP-Goals-MRC-Presentation-Slides.pdf

RECYCLING RATE

In the absence of comprehensive, measured, and reported tonnages for recyclables collected through all drop-off systems, curbside programs and from commercial and institutional sources, proxy data may be used for planning purposes. RRS developed an estimation model during the statewide Mega Data Collection Project[13] to project recovered quantities using variables related to recycling access and recycling program design. The model draws on findings from The Recycling Partnership[14], which identifies characteristics of recycling programs that are associated with varying levels of material recovery per household.

The Recycling Partnership has identified several characteristics associated with high-performing residential recycling programs that capture higher quantities of material per household. These factors include:

- Curbside collection (rather than drop-off access),
- Use of collection carts instead of bins for curbside collection,
- Automatic enrollment and service delivery (residents receive recycling service with no action required) rather than opt-in participation, and
- Programs supported by public policy mechanisms (such as automatic service provisions or ordinances requiring haulers to offer curbside recycling alongside trash collection) compared with programs that lack supporting public action[15].

Based on the 2020 – 2023 Mega Data Project, the projected recycling rates are as follows:

- **Residential Recycling Rate Estimate (Recycling + Compost):** 16.6%
- **Commercial Recycling Rate Estimate:** 6.3%
- **Countywide Recycling Rate Estimate:** 11.3%

Since completion of the Mega Data Project, Manistee County has partial recycling tonnage data available for 2024, specifically from the PA 69 drop-off recycling program. However, the tonnage reported through PA 69 is lower than the amount of recycling estimated in Mega Data and represents only a portion of countywide recycling activity. As such, this dataset cannot be used to replace the Mega Data recycling estimate.

At the same time, state landfill reports indicate 2024 MCW disposal tonnage that is higher than what was estimated for Mega Data, reflecting a per-capita disposal rate above the Michigan statewide average. When combined with the lower reported

[13] https://www.michigan.gov/egle/about/organization/materials-management/materials-management-in-michigan/mega-data-collection-project

[14] https://recyclingpartnership.org/wp-content/uploads/2018/05/state-of-recycling-report-Jan2017.pdf

[15] https://recyclingpartnership.org/wp-content/uploads/2018/05/state-of-recycling-report-Jan2017.pdf

recycling tonnage, this would mathematically result in a significantly lower diversion rate. However, without confidence that the reported MCW tonnage accurately reflects waste generated by Manistee County residents and businesses, and without insight into how materials are categorized at the landfill, this figure cannot reliably replace the disposal assumptions used in Mega Data.

In addition, there are no measured, reported data on organic material recycling in Manistee County. Yard waste and food waste, both critical components of the recycling rate, are not consistently tracked across municipal programs, drop-off sites, or private composting or mulching facilities.

Because all three required inputs to calculate a measured diversion rate (traditional recycling tonnage, organic material recycling tonnage, and a reliable MCW disposal tonnage) are incomplete or inconsistent, there is currently no basis to update or replace the Mega Data diversion estimates. Accordingly, the **Mega Data countywide diversion rate of 11.3% remains the most appropriate planning estimate** for Manistee County at this time.

Recycling Data Gaps

Several significant data gaps limit Manistee County's ability to fully quantify recycling and diversion performance. Most notably, there is no reliable accounting of **commercial and institutional recycling tonnage** that may be collected directly by private haulers. Many businesses and institutions may be recycling materials through contracted services, but without standardized reporting requirements, these recovered materials are not reflected in countywide recycling rate calculations.

In addition, there is a lack of information regarding any contracted **curbside recycling services** and those that may be operating on a subscription basis for residential or commercial customers. Even limited or informal curbside collection can contribute meaningful tonnage to overall diversion, yet these materials remain unaccounted for in the absence of hauler reporting. Establishing consistent hauler reporting requirements would allow the County to capture this missing data and better understand the full scale of recycling activity occurring outside of publicly managed programs.

Similarly, **organic material diversion data**, including both food waste and yard waste, is incomplete. While some municipal yard waste programs are known to exist and organics may be managed through private composting or mulching facilities, tonnage data are not consistently tracked or reported. As a result, the County cannot calculate a fully **measured recycling rate or diversion rate** and must rely on estimates and partial datasets.

These gaps also limit the County's ability to quantify progress on **food waste reduction**, which is a key materials management priority from EGLE. Food waste is typically disposed of in the landfill as part of mixed MCW, and without a robust waste audit system there is no clear way to quantify how many tons of food waste are disposed in MCW over time. Alternatively, meaningful measurement can be achieved by **separating food waste at the source**, through food rescue and/or organized or backyard composting programs and **tracking the weight** of the rescued and composted material. Expanded source separation paired with consistent tonnage reporting would allow the County to quantify diversion more accurately and track reductions in landfilled food waste in a measurable way.

Improving landfill reporting consistency, expanding recycling and organics tonnage tracking, and establishing standardized reporting from municipal and private programs represent critical next steps that would allow the County to calculate a measured diversion rate and more accurately track progress toward Materials Management Plan goals in the future.

Hard-to-Recycle Materials and Collection Events

Manistee County manages hard-to-recycle materials primarily through **event-based collection programs** coordinated by the **Manistee Conservation District (MCD)** [16]. These programs provide residents with safe, compliant disposal options for materials that are not accepted through routine recycling or landfill systems and are documented through official Conservation District program webpages and annual event materials.

HOUSEHOLD HAZARDOUS WASTE (HHW)

The Manistee Conservation District coordinates an annual Household Hazardous Waste (HHW) collection event, typically held on the third Saturday in August, and open to Manistee County residents. The event accepts a wide range of household hazardous and specialty materials, including **electronics and appliances**, **oil and automotive fluids**, **oil-based paints**, **pesticides**, **pharmaceuticals**, **batteries**, **fluorescent bulbs**, **mercury-containing items**, **fire extinguishers**, and other household chemicals. Appliances containing refrigerants are accepted with a fee, while latex and acrylic paints are excluded, consistent with EGLE guidance.

Program reporting indicates that **64,224 pounds (approximately 32 tons) of hazardous waste were collected in 2024**[17], underscoring the importance of this program in protecting public health and preventing hazardous materials from entering the landfill or environment.

SCRAP TIRE RECYCLING

Scrap tires are managed through **separate, dedicated tire recycling events** also coordinated by the Manistee Conservation District. Tire collection events are **not held annually** but instead occur when **grant funding and processing capacity are available**, reflecting the higher costs and specialized handling requirements associated with tire recycling.

According to publicly reported information, the **Manistee County Green Team reported that 2,354 scrap tires were collected during a 3-day tire recycling event in September 2025**[18]. This figure highlights continued demand for periodic tire recycling opportunities in the county. Outside of event periods, residents are directed to approved private businesses that accept tires for a fee.

[16] https://www.manisteecd2.org/

[17] https://www.manisteecd2.org/uploads/b/705b14d0-1f95-11ec-92f9-2d3566a5d303/2025%20HHW%20Brochure_Manistee.pdf

[18] https://manisteesheriff.org/AgendaCenter/ViewFile/Agenda/_11052025-1199

OTHER HARD-TO-RECYCLE MATERIALS

For materials not addressed through HHW or tire recycling events, residents are directed to year-round disposal or recycling options where available. For example, electronics recycling is available through Bay Area Recycling for Community (BARC), and scrap metal and large appliances may be taken to private recyclers identified in county guidance materials. These outlets supplement county-sponsored programs but operate independently and do not consistently report tonnage data to the County.

At this time, **comprehensive historical tonnage data are not available** across all hard-to-recycle material streams, particularly for tires collected outside of HHW events, electronics managed through private recyclers, and other specialty materials. Expanding and standardizing reporting for these programs would strengthen the County's ability to quantify recovery, assess program effectiveness, and inform future Materials Management Plan implementation.

Construction & Demolition (C&D) Debris

Based on landfill reporting, C&D waste accounts for an average of just 5% of total landfill tonnage over the last 5 years as shown in Figure 1. Nearly 80% of the total 2024 tonnage was sent to the Manistee County Landfill, with slightly less than 20% going to the Wexford County Landfill. C&D debris includes anything used in the construction of roads, bridges and buildings. Typically, these materials include concrete, asphalt, wood (treated or blond), drywall, asphalt shingles, metals, rigid and film plastics, vinyl siding and windows, carpet and other flooring, ceiling tiles, cardboard and other paper, glass, and insulation.

While population and economic growth is a significant factor in the generation of C&D debris, most landfill reporting would attribute an average of between 20% and 40% of inbound tonnage from construction and demolition activities, with some landfills actively seeking C&D debris by offering discounted rates. According to US EPA reports, the amount of construction and demolition waste generated in the United States is more than twice that of MCW. This variance suggests that Manistee County's C&D tonnage may be under-reported. A true representation of the C&D debris generated in the county would require either reporting on an ongoing basis or periodic waste characterization studies that focus on C&D.[19] Some landfills actively seek out C&D debris and even offer discounted disposal rates. Sometimes the landfills are diverting clean wood and/or concrete for use on-site (after chipping, grinding, or crushing); others are diverting it from landfill entirely by sending it to local markets that can use it for landscaping, fuel, or road building aggregates.

C&D debris can be diverted from landfills at multiple points in the disposal chain. The most effective approach - yielding the cleanest material with the highest reuse or recycling value - is source separation at the construction site. Achieving this requires clear, consistent communication and convenient processes, whether through voluntary programs or mandatory policies. With

[19] C&D loads are typically excluded from most MSW/MCW waste characterization studies. While a waste characterization study may include a category for "C&D" it would be de minimis amounts that were co-collected in an MSW/MCW collection truck. A specific C&D characterization is needed to capture material coming in rolloff boxes from construction projects.

construction-related employment growing by over 17% between 2018 and 2023, the number of stakeholders requiring engagement is substantial - along with the opportunity to create meaningful impact through this network.

Alternatively, mixed C&D processing offers convenience by eliminating on-site separation, but recovered materials have lower value due to contamination and the cost of processing. Mechanical or conveyor-based sorting also produces fine debris such as drywall dust, dirt, and wood particles (referred to as 'fines') with little to no market value.

Markets exist for some C&D materials when prepared according to specification and generated at a consistent rate:

WOOD

Clean wood, including woody vegetation, untreated dimensional lumber, and pallets, would likely constitute sufficient tonnage on a regular basis to warrant separation and would result in meaningful and measurable impact on landfill-bound tonnage. Markets are likely to include:

- reuse of dimensional lumber 6 feet or longer and plywood/engineered boards at least 16 square feet that has not been painted or nailed
- landscaping for woodchips/mulch, with colorization potentially adding value
- energy sector, particularly where renewable energy inputs are sought as feedstock for energy production

SCRAP METAL

Though much of the scrap metal generated on construction sites is already recovered through informal collection by subcontractors and tradespeople, there could remain some fraction of scrap metal in the construction site debris that goes for disposal. A scrap metal container with clear labelling and discreetly positioned on the construction site would present an opportunity for anyone on the construction site to contribute any amount of metal for diversion. Local scrap metal companies would be interested in purchasing mixed or sorted metals from a construction site.

CARDBOARD (OCC)

A collection container for OCC generated at strategic junctures during the project timeline will enable recovery of clean cardboard from product installation, such as cabinetry, appliances, and furniture. This large format cardboard will require a large container, ideally with a lid to protect it from precipitation. Cardboard can typically be delivered loose to a buyer but will carry higher value if baled.

CONCRETE

A designation of "clean" concrete is typically made by vendors that accept and produce a higher standard "crusher-ready' aggregate material. "Mixed aggregate", containing pieces of brick, ceramic, or other engineered inert materials, such as plastics and compound materials is not considered clean. Rebar presents additional processing challenges for aggregate producers and therefore markets for concrete with rebar are often limited. Partners for concrete recycling include local excavation companies and aggregate manufacturers.

VINYL

Rigid vinyl can come from several sources in a building or renovation project: siding, piping/conduit, window frames, flooring, and fencing are common. These materials can be transported to a centralized collection point where they can be recycled into new vinyl products. Vinyl is typically not accepted at MRFs but specialty vinyl recyclers, like Fryman's Recycling in Dowagiac or others participating in Revinylize, the national vinyl recycling collaborative, may offer collection bins and pay the transportation costs in exchange for localized collection of rigid vinyl materials.

Storm Debris

At the request of Networks Northwest, RRS evaluated storm debris measurement and quantification methodologies to support Manistee County's preparedness for debris generated by major storms and severe weather events. Establishing baseline debris estimates is an important first step in emergency debris management planning, which is typically implemented through a countywide Emergency Operations Plan (EOP) and supporting annexes.

The Michigan State Police, Emergency Management & Homeland Security Division provides a **Local Disaster Debris Management Plan Template**[20] for counties, cities, and townships to adapt. The template positions disaster debris planning as a companion to the EOP and as a local counterpart to the State's Disaster Debris Management Plan. Adoption of local debris plans varies, and EGLE has noted that outside of hurricane-prone regions, many communities do not complete disaster debris pre-planning. As a result, the Materials Management Plan (MMP) process represents a timely opportunity to "connect the dots" by documenting the infrastructure, roles, and material pathways that emergency management will depend on during surge conditions.

RRS recommends aligning disaster debris planning with MMP planning because both efforts rely on the same underlying materials management system, facilities, collection/processing capacity, transportation logistics, and end markets, operating under different time horizons. Even without a finalized County or local Disaster Debris Management Plan, the MMP can formalize this linkage by capturing core operational elements that will be needed during an incident, including:

- **Sites:** Existing solid waste and recycling facilities, as well as candidate temporary debris staging and reduction sites, including key constraints (e.g., access, drainage, and traffic control). This enables emergency operations to begin with identified options rather than starting from zero.

[20] https://www.michigan.gov//media/Project/Websites/msp/EMHSD/Publications/Local_Disaster_Debris_Management_Plan_Template_2008_Final_Edition.pdf?rev=f548c2a196c248c69772fa733bc01714&utm

- **Capacity:** Normal throughput versus surge conditions, including overflow routing options. The County can also pre-define "activation triggers" tied to capacity constraints (e.g., transfer station queues exceeding a defined threshold for multiple days, or primary MRF downtime exceeding 48 hours).
- **Roles and responsibilities:** Identification of who supports the Emergency Operations Center (EOC) with materials management decisions, regulatory coordination, and communications.
- **Contractors and end markets:** Pre-identified pathways for hauling, grinding, C&D handling, white goods, and HHW management; recognizing that surge volumes may require intermediate staging and alternative destinations.
- **Public guidance hooks:** Pre-developed reuse- and recycling-first messaging where feasible, consistent with EGLE storm debris guidance, including separating materials and emphasizing recovery options when conditions allow.

RRS has developed preliminary storm debris estimates (in cubic yards) for multiple weather scenarios; these estimates are presented in the following subsections.

SCENARIO 1: ICE STORMS

The first scenario evaluates an ice storm producing between **0.25 inches and 1 inch of ice accumulation** with sustained winds between **10 and 30 mph**. The debris estimate uses roadway mileage as a key input, based on MDOT's published **System Length / Route Miles** metric[21], which for Manistee County is **1,251 miles.** In MDOT's reporting, System Length / Route Miles generally represent roadway centerline mileage (counting only one side of divided roads and excluding ramps) for public roads open to travel and certified by public road agencies; MDOT notes this dataset is GIS-based, tied to federal mileage certification processes, and available historically back to 1990.

Using the county's applicable route-mile input and the scenario assumptions above, RRS estimates that ice storms of these magnitudes could generate the approximate debris quantities below. These calculations are based on methodology laid out in a published 2011 study *Rapid Assessment of Tree Debris Following Urban Forest Ice Storms*[22], including a negative correlation between wind speed and debris volume (as wind speed increases less debris observed). FEMA guidance[23] indicates that ice and snowstorm debris streams are typically dominated by **vegetative debris** (downed limbs and trees), along with **overhead utility system components** associated with damaged lines and service infrastructure (see Table 8).

[21] https://www.michigan.gov/mdot/-/media/Project/Websites/MDOT/Programs/Planning/Asset-Management/HPMS/Statewide-Statistics-LS-County.pdf

[22] Hauer, Richard J.; Hauer, Angela J.; Hartel, Dudley R.; Johnson, Jill R. 2011. Rapid Assessment of Tree Debris Following Urban Forest Ice Storms. Arboriculture & Urban Forestry 37(5):236–246. https://www.srs.fs.usda.gov/pubs/ja/2011/ja_2011_hauer_001.pdf

[23] https://www.fema.gov/sites/default/files/2020-07/fema_325_public-assistance-debris-mgmt-plan_Guide_6-1-2007.pdf, Chapter 6

COUNTY NAME	SYSTEM MILES	WIND SPEED MPH	ICE THICKNESS (INCHES)	SCENARIO 1 DEBRIS ESTIMATE CUBIC YARDS
Manistee	1,251	10	0.25	121,958
		20	0.25	76,290
		30	0.25	30,623
		10	0.50	243,917
		20	0.50	152,581
		30	0.50	61,245
		10	0.75	365,875
		20	0.75	228,871
		30	0.75	91,868
		10	1.00	487,834
		20	1.00	305,162
		30	1.00	122,490

Table 7: RRS Estimated Ice Storm Debris Volumes CY

SCENARIO 2: SEVERE WEATHER EVENTS

Scenario 2 evaluates debris generation associated with **severe weather events**, with or without precipitation, characterized by **wind speeds ranging from 74 mph to 157+ mph**. At the upper end of this range, the scenario includes **tornado events**, which can produce highly variable and localized debris conditions. The debris estimates generated under this scenario incorporate multiple variables beyond wind speed, including **household density**, **vegetation cover**, and the **prevalence of commercial properties**, all of which influence both the quantity and composition of storm debris.

For Manistee County, the model inputs include **10,597 households**, a **Heavy vegetation** classification, and a **Light commercial property** designation. Heavy vegetation is typically associated with mature neighborhoods and wooded areas where dense tree canopy cover limits visibility of the ground or structures, increasing the likelihood of vegetative debris during severe wind events. The Light commercial property classification reflects a lower concentration of large commercial structures relative to residential land uses, which influences the proportion of construction and demolition (C&D) debris expected in the debris stream.

In addition to debris volume estimates, it is important to consider anticipated debris composition. FEMA guidance[24] describes typical tornado debris as including vegetative debris, construction and demolition (C&D) debris, personal property/household items, hazardous waste, household hazardous waste (HHW), white goods, and vehicles and vessels (see Figure 12).

[24] https://www.fema.gov/sites/default/files/2020-07/fema_325_public-assistance-debris-mgmt-plan_Guide_6-1-2007.pdf, Chapter 6

The resulting debris estimates, segmented by precipitation condition and wind speed category, are presented in the table below. These estimates are intended to support emergency planning by illustrating the potential range of debris volumes that could be generated under severe weather scenarios affecting Manistee County.

COUNTY	HOUSEHOLDS	COMMERCIAL PROPERTY	VEGETATION	WIND SPEED	PRECIPITATION	SCENARIO 2 DEBRIS ESTIMATE CUBIC YARDS
Manistee	10,147	Light	Heavy	74-95 MPH	None to Light	31,791
				74-95 MPH	Medium - Heavy	38,149
				96-110 MPH	None to Light	127,164
				96-110 MPH	Medium - Heavy	152,597
				111-129 MPH	None to Light	413,283
				111-129 MPH	Medium - Heavy	495,940
				130-156 MPH	None to Light	794,775
				130-156 MPH	Medium - Heavy	953,730
				157+ MPH	None to Light	1,271,640
				157+ MPH	Medium - Heavy	1,525,968

Table 8: RRS Estimated Severe Weather Debris Volumes CY

		Typical Debris Streams								
		Vegetative	Construction & Demolition (C&D)	Personal Property/ Household Items	Hazardous Waste	Household Hazardous Waste (HHW)	White Goods	Soil, Mud and Sand	Vehicles and Vessels	Putrescent
Types of Disasters	Hurricanes / Typhoons	X	X	X	X	X	X	X	X	X
	Tsunamis	X	X	X	X	X	X	X	X	X
	Tornadoes	X	X	X	X	X	X		X	X
	Floods	X	X	X	X	X	X	X	X	X
	Earthquakes		X	X		X	X	X		
	Wildfires	X		X		X	X	X		
	Ice Storms	X				X				

Figure 12: FEMA-325 "Figure 6.2 – Typical Debris Streams for Different Types of Disasters"[25]

Facility Inventory

Name	Address	Address	Description
Manistee County Landfill	3890 Camp Rd	Manistee	Type II Landfill
Manistee County Landfill	3890 Camp Road	Manistee	Processing & Transfer Facility
Maple Grove Township & Village of Kaleva Transfer Station	14407 Industrial Rd.	Kaleva	Processing & Transfer Facility
Dickson Township Transfer Station	Swihart Road	Dickson Township	Processing & Transfer Facility
Norman Township & Wellston Transfer Station	1273 Seaman Road	Wellston	Processing & Transfer Facility
Bay Area Recycling for Community (BARC)	14407 Industrial Rd.	Kaleva	Processing & Transfer Facility
Pleasanton Township Transfer Station	6007 Norconk Road	Bear Lake	Processing & Transfer Facility

[25] https://www.fema.gov/sites/default/files/2020-07/fema_325_public-assistance-debris-mgmt-plan_Guide_6-1-2007.pdf

Pleasanton Township Recycling Drop Off	8958 Lumley Road	Bear Lake	Other Source Separated Facility
PA-69 Drop-Off Site - Maple Grove Township & Village of Kaleva	14407 Industrial Blvd.	Kaleva	Other Source Separated Facility
PA-69 Drop-Off Site - Cleon Township & Village of Copemish	Brown St	Copemish	Other Source Separated Facility
PA-69 Drop-Off Site - Brown Township	8233 Coates Highway	Manistee	Other Source Separated Facility
PA-69 Drop-Off Site - Arcadia Township	3422 Lake St	Arcadia	Other Source Separated Facility
PA-69 Drop-Off Site - Dickson Township & Bretheren	Wingert St.	Bretheren	Other Source Separated Facility
PA-69 Drop-Off Site & PCA Cardboard Recycling Trailer Site - Onekama Township & Village of Onekama	5435 Main St	Onekama	Other Source Separated Facility
PCA Cardboard Recycling Trailer - Norman Township & Wellston Transfer Station	1273 S Seaman Road	Wellston	Other Source Separated Facility
PCA Cardboard Recycling Trailer - Old Brethren High School	4400 North High Bridge Road	Brethren	Other Source Separated Facility
PCA Cardboard Recycling Trailer - Bay Area Recycling for Charities	14407 Industrial Rd.	Kaleva	Other Source Separated Facility
PCA Cardboard Recycling Trailer - Betsie Valley School	17936 Cadillac Highway	Thompsonville	Other Source Separated Facility
Larry Bowling Metal Recycling	9347 13 Mile Rd.	Bear Lake	Other Source Separated Facility
Clean Sweep - Manistee County	8946 Chippewa Highway	Bear Lake	Other Source Separated Facility
Filer Charter Township Leaf Dumpster	2505 Filer City Road	Manistee	Other Organics Facility
City of Manistee Compost Facility	999 Adamczak Rd	Manistee	Compost Facility
TES Filer City Station	700 Mee St.	Manistee	Other Source Separated Facility

Table 9: Materials Management Infrastructure

Appendix

RRS MCW Composition Model

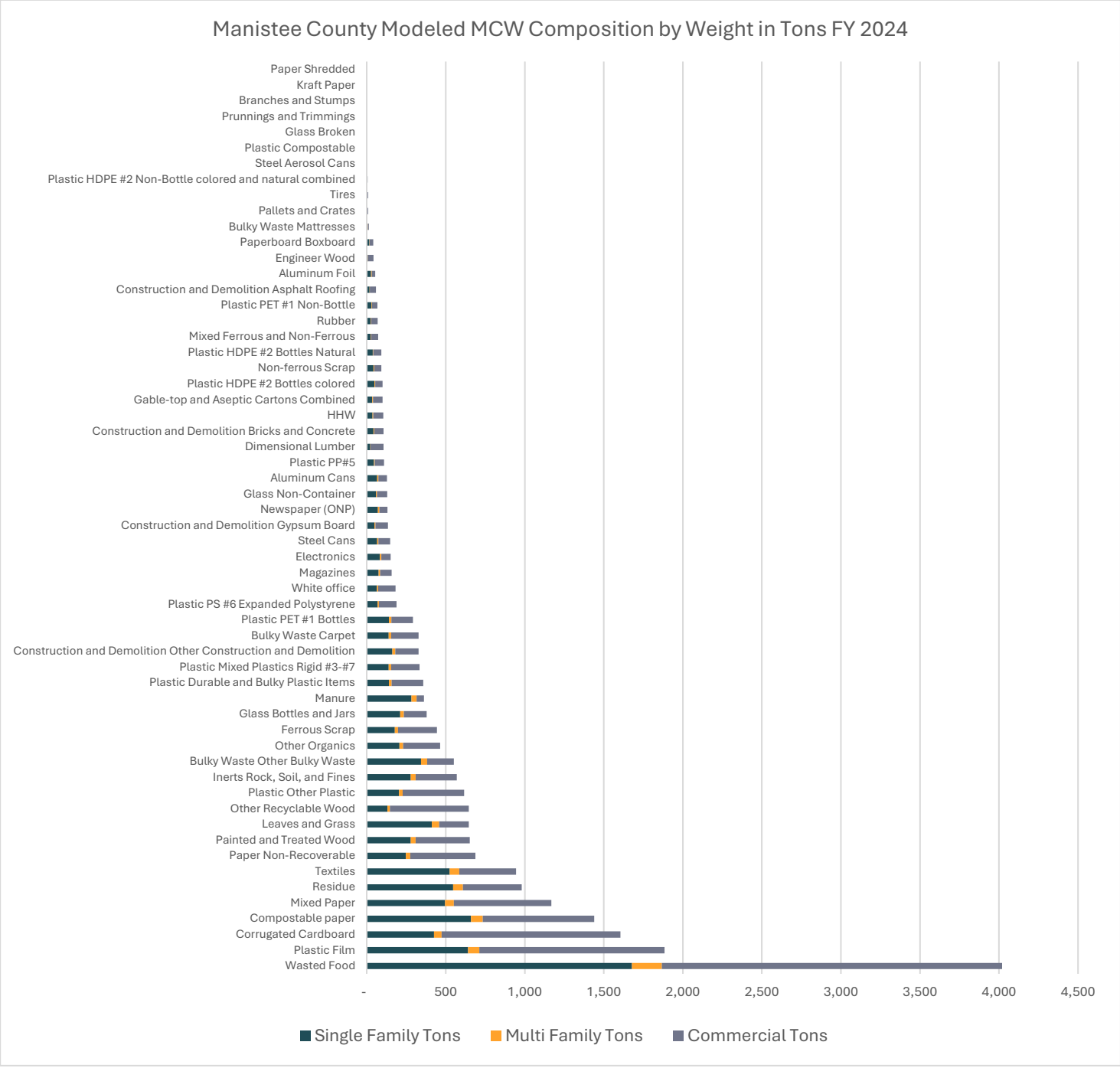


Figure 13: Manistee County RRS-Modeled MCW Composition 2024

Definitions of the Benchmark Recycling Standards

Michigan Legislature. (1994). Natural resources and environmental protection act, Act 451 of 1994, Part 115, § 11502. Retrieved from Michigan Legislature website: https://www.legislature.mi.gov/documents/mcl/pdf/mcl-451-1994-ii-3-115.pdf

(6) "Benchmark recycling standards" means all of the following requirements:

(a) By January 1, 2026, at least 90% of single-family dwellings in urban areas as identified by the most recent federal decennial census and, by January 1, 2028, at least 90% of single-family dwellings in municipalities with more than 5,000 residents have access to curbside recycling that meets all of the following criteria:

(*i*) One or more recyclable materials, as determined by the county's material management plan, that are typically collected through curbside recycling programs, are collected at least twice per month.

(*ii*) If recyclable materials are not collected separately, the mixed load is delivered to a solid waste processing and transfer facility and the recyclable materials are separated from material to be sent to a solid waste disposal area.

(*iii*) Recyclable materials collected are delivered to a materials recovery facility that complies with part 115 or are managed appropriately at an out-of-state recycling facility.

(*iv*) The curbside recycling is provided by the municipality or the resident has access to curbside recycling by the resident's chosen hauler.

(b) By January 1, 2032, the following additional criteria:

(*i*) In counties with a population of less than 100,000, there is at least 1 drop-off location for each 10,000 residents without access to curbside recycling at their dwelling, and the drop-off location is available at least 24 hours per month.

(*ii*) In counties with a population of 100,000 or more, there is at least 1 drop-off location for each 50,000 residents without access to curbside recycling at their dwelling, and the drop-off location is available at least 24 hours per month.

Material Disposed at Manistee County Landfill 2020 – 2024

Material Disposed at Manistee County Landfill, Identified by Type and County of Origin. State Landfill Reports.

	2020	2021	2022	2023	2024	Five Year Total	% of Five Year Total
ADC	**-**	**580**	**-**	**-**	**-**	**580**	**0.1%**
Benzie	-	-	-	-	-	-	
Grand Traverse	-	-	-	-	-	-	
Lake	-	-	-	-	-	-	
Leelanau	-	-	-	-	-	-	
Manistee	-	580	-	-	-	580	
Mason	-	-	-	-	-	-	
Wexford	-	-	-	-	-	-	
C&D	**6,728**	**4,445**	**5,680**	**7,483**	**7,820**	**32,155**	**5.1%**
Benzie	436	224	425	467	455	2,006	
Grand Traverse	93	32	25	11	108	269	
Lake	394	145	265	524	136	1,464	
Leelanau	-	3	-	12	13	29	
Manistee	3,425	2,616	3,096	4,453	4,585	18,175	
Mason	2,352	1,385	1,850	1,939	2,365	9,891	
Wexford	28	40	19	77	158	321	
IW	**70,542**	**24,631**	**30,344**	**63,629**	**50,703**	**239,848**	**38.2%**
Benzie	-	-	0	34	37	72	

Grand Traverse	2,310	-	-	-	9	2,319	
Lake	263	-	-	1	4	268	
Leelanau	-	-	-	-	-	-	
Manistee	66,691	24,129	29,710	61,945	49,559	232,034	
Mason	1,237	502	626	1,633	1,059	5,057	
Wexford	40	-	7	16	35	98	
MCW	**66,034**	**68,792**	**67,715**	**68,404**	**69,777**	**340,722**	**54.2%**
Benzie	4,901	6,232	6,230	5,315	4,678	27,356	
Grand Traverse	329	78	93	72	869	1,441	
Lake	1,630	2,498	2,723	2,657	2,895	12,403	
Leelanau	10	20	55	34	26	145	
Manistee	27,610	30,376	29,128	31,943	32,280	151,338	
Mason	28,846	25,409	25,299	24,236	24,843	128,634	
Wexford	2,708	4,179	4,186	4,145	4,186	19,405	
OTHER	**-**	**3,175**	**2,095**	**2,332**	**7,548**	**15,150**	**2.4%**
Benzie	-	999	10	-	2,468	3,476	
Grand Traverse	-	-	-	-	-	-	
Lake	-	-	-	-	-	-	
Leelanau	-	-	-	-	-	-	
Manistee	-	1,774	1,684	2,124	4,480	10,062	
Mason	-	402	217	209	594	1,421	

Wexford	-	-	184	-	7	191	
Grand Total	**143,303**	**101,622**	**105,833**	**141,848**	**135,848**	**628,455**	

BUSINESS SECTOR DEMOGRAPHICS, NUMBER OF ESTABLISHMENTS AND NUMBER OF JOBS

Datasets generated by Esri, provided by Networks Northwest

ESTABLISHMENTS

Industry	2018	2023
Management of companies and enterprises	N/A	N/A
Retail Trade	87	91
Construction	64	87
Health care and social assistance	44	80
Accommodation and food services	61	78
Other services (except public administration)	60	62
Professional, scientific, and technical services	29	41
Manufacturing	24	29
Finance and insurance	20	24
Administrative support and waste management and remediation services	21	24
Real estate and rental and leasing	11	20
Arts, entertainment, and recreation	12	16
Wholesale Trade	8	15
Agriculture, forestry, fishing and hunting	11	11
Transportation and warehousing	11	9
Information	9	7
Unclassified	4	4
Utilities	3	3
Educational services	4	3
Mining, quarrying, and oil and gas extraction	2	2

JOBS

Industry	2018	2023
Agriculture, forestry, fishing and hunting	N/A	N/A
Mining, quarrying, and oil and gas extraction	N/A	N/A
Management of companies and enterprises	N/A	N/A
Educational services	N/A	N/A
Health care and social assistance	N/A	N/A
Retail Trade	1,005	1,075
Manufacturing	928	999
Accommodation and food services	598	572
Construction	268	315
Wholesale Trade	209	250
Other services (except public administration)	223	229
Arts, entertainment, and recreation	174	227
Finance and insurance	125	129
Administrative support and waste management and remediation services	91	116
Professional, scientific, and technical services	82	94
Transportation and warehousing	64	77
Utilities	40	47
Information	58	44
Real estate and rental and leasing	30	34
Unclassified	6	5

Memo

TO: Mathew Cooke, Networks Northwest
FROM: Caitlyn Wouters and Kristen Wieland, RRS
DATE: January 9, 2026
RE: Missaukee County MMP Data Analysis - DRAFT

Introduction

The RRS team undertook a comprehensive analysis to support the five counties' waste management planning efforts. As part of this work, RRS developed a baseline data set based on known waste data, where available, and supplemented with modeled projections of waste generation and recovery potential. This data will serve as a foundational resource to guide each committee's decision-making on key planning and policy issues.

The baseline data will support the identification of strategies for meeting the Benchmark Recycling Standards, both in the near term and over the planning horizon. This memorandum presents a summary of the current materials generation and recovery conditions within Missaukee County. It incorporates modeled data prepared by RRS, along with any available actual data provided by the Networks Northwest planning agency or county MMP Committee participants. The information contained herein offers a comprehensive overview of the counties' materials management landscape to serve as a supporting component of the Materials Management Plans.

Recycling Rate

Based on this assessment, RRS estimates that **approximately 54% of landfilled MCW by weight from Missaukee County is either readily recyclable or compostable**. Based on the available data, as described in detail within this memo, RRS estimates Missaukee County is currently achieving the following countywide recycling rate (including traditional recycling and organics):

- **Countywide Recycling Rate Estimate:** 5.3% - 7.7%

Preliminary Opportunities

RRS has highlighted several key opportunities that should be discussed by the MMP Committee for potential goal setting in the next phase of the MMP development. These opportunities are described below, with additional detail provided throughout the memorandum.

While the data points discussed in this analysis are comprehensive and valuable for general understanding of the current recycling and diversion taking place and the general makeup of the waste stream, it is critical to note that the preliminary opportunities outlined below are based on the data and information that was provided to RRS or otherwise publicly available.

Reliable data is a critical component of MMP implementation. In the absence of data, we have supplemented with modeled data based on actual data from other similar regions to provide a starting point for discussion purposes and aid in goal setting. In the case of Missaukee County, RRS found the per capita MCW generation rate to be unusually low. An unusually low per-capita MCW rate may indicate that a portion of Missaukee County's MCW is being managed outside of the tonnage attributed to the county in the landfill report. For example, waste generated in the county but disposed at facilities that may be attributed to another county, or disposed through non-landfill pathways that are not captured in the reported landfilled tonnage (illegal burning or dumping). It may also reflect inconsistencies in landfill reporting and categorization practices (e.g., MCW being recorded under another category such as Industrial Waste or C&D). Finally, it is possible that the reported figure accurately reflects atypical disposal dynamics during the analysis period, though additional data and verification would be required to confirm this. Having actual community-level data is the only way to monitor progress toward goals and therefore should be considered in all future MMP Committee discussions to ensure impact can be measured during implementation of the MMP. Additional information about the modeling and methodology can be found in the RRS MCW Modeling section of this report.

Additional opportunities to fill data gap for Missaukee County include:

- To strengthen materials management and accurately measure progress toward the goals outlined in the Materials Management Plan, Missaukee County should implement consistent, countywide reporting and tracking systems. This includes clarifying and standardizing landfill reporting procedures, expanding the tracking of recycling and organic material collection across municipal, private, and commercial sources, and establishing uniform hauler reporting requirements. These actions will enable the County to capture currently missing data, calculate a documented recycling rate, and monitor material flows more effectively, ensuring a reliable foundation for future planning and performance evaluation.
- Food waste is typically disposed of in the landfill as part of mixed MCW, and without a robust waste audit system there is no clear way to quantify how many tons of disposed MCW are food waste over time. Alternatively, meaningful measurement can be achieved by separating food waste at the source, through food rescue and/or composting programs, and tracking the weight of diverted material. Expanded source separation paired with consistent tonnage reporting would allow the County to quantify diversion more accurately and track reductions in landfilled food waste in a measurable way.
- At present, comprehensive tonnage data for hard-to-recycle materials (e.g., HHW, bulky items, tires, electronics, mattresses) collected through events, municipal clean-up days, or private services are not consistently available. Establishing consistent reporting of participation and material quantities collected would significantly improve the County's ability to quantify recovery, identify priority material streams, and track progress toward Materials Management Plan goals.

The **Benchmark Recycling Standard** is partially met in Missaukee County through the Missaukee County Recycling Center, located at 6240 W. Sanborn Road, Lake City, Michigan. This facility serves as the County's primary drop-off location for traditional recyclables and represents the core of the County's recycling access under Part 115. One additional drop-off location should be added to meet the Benchmark Recycling Standard. Additionally, improved documentation of existing services will provide a greater measure of impact that will contribute to buy-in from the community. Routinely surveying recyclers will ensure the Center is meeting their needs and engage a committed group of citizens.

The top six materials with diversion significance, by weight, in the county present a prime opportunity for meaningful and measurable impact in the 5-year planning window:

1. Wasted food - discarded food scrap byproducts that are not consumed by humans or food that was edible but ended up wasted - comprises over 1,539 tons of landfill-bound materials generated in Missaukee County. This category of waste is not only the most significant by weight but is also significant in its potential social and economic value directly within the County. Good food can be redistributed to people in need instead of sent to landfills, thereby supporting the needs of residents through existing food distribution networks. Food that is unsuitable for redistribution can be processed locally through basic backyard composting to generate a soil amendment for use directly by the homeowner. A more sophisticated collection system that aggregates residential and commercial food waste along with other agricultural waste could be processed at a privately operated composting facility or anaerobic digester operator (potentially through a public-private partnership) to generate a large amount of compost to regenerate soils in the entire county and region and support local agriculture. As noted in a 2021 SEEDS study, Antrim, Benzie, Charlevoix, Kalkaska, Manistee and Missaukee counties all have relatively small amount of organics collection and recommended that these counties focus efforts on food rescue initiatives (recovering edible food before disposal), education on food waste reduction, and promotion of backyard composting practices. Furthermore, the study identified the close proximity to existing composting operations in Sears, MI (Morgan Composting) could present an opportunity for increased organics collection.

2. Plastic film totals over 722 tons of landfill-bound materials generated in Missaukee County. From residential sources, these typically include plastic shopping bags, grocery bags, and dry-cleaning bags. From commercial sources, these thin, flexible plastics could include stretch wrapping used to stabilize pallets and cases, greenhouse and agricultural bale wrapping, shipping pouches and bubble wrap among others. While not typically accepted in single stream recycling programs due to the low value and difficulty in marketing it post-processing, drop-off programs and commercial plastic film collection programs can keep these plastics clean and dry, resulting in significant volumes of valuable material that has strong end market potential.

3. Corrugated cardboard has become a significant waste material type in recent years due to the shift in online purchasing. RRS estimates Missaukee County is landfilling more than 615 tons of cardboard from both residential commercial sources. Cardboard was formerly generated primarily at retail establishments and was sometimes collected for recycling. While online purchasing trends have shifted some tons away from the commercial waste stream and into the residential waste stream, 70% of the cardboard remains in the commercial stream, creating opportunities for increased recovery in both. Local manufacturer, Packaging Corporation of America (PCA) in Filer City (Manistee County), would directly benefit from the additional collection of corrugated cardboard from the Northwest Michigan region.

4. Compostable paper refers to paper products that are typically unsuitable for recycling due to their low quality or because they are often soiled during use, such as paper plates, napkins, facial tissues, and paper towels. When

combined with food scraps, this compostable paper could be a valuable input to either composting or anaerobic digestion when done at a commercial scale. This fraction of the waste stream comprises nearly 551 tons in the county.

5. Mixed paper, estimated at over 447 tons in the county, is a general grade of clean but varied qualities of mixed fiber materials including mail, office paper, paper bags, books, magazines, greeting cards, index cards, cereal boxes, etc. This paper is often the largest output, by volume, of single stream recycling facilities and has strong Midwest markets ready to accept more material for production of new paper products.

6. Textiles are a significant waste category in Missaukee County, comprising over 362 tons in our model. Clothing, towels, rope, household linen, leather products, and other similar products that are either discarded out of convenience or due to rips, excessive wear, or are otherwise unsuitable for reuse. Local resale stores could be ideal partners to evaluate additional textile recovery opportunities to get more usable textiles into the hands of people who need them, keeping them out of landfills.

Materials that are readily marketable but currently being landfilled offer strong diversion potential due to established recycling channels and typically yield positive economic returns and should be prioritized for enhanced recovery in the Missaukee Materials Management Plan. While not represented in the top six categories by weight, the following materials have consistent value and market demand and are ubiquitous in the waste stream, making them natural opportunities for increased recovery across the region.

Listed in order from highest-lowest potential yield, these materials include:

- **mixed paper** (as identified above, 447 tons)
- **ferrous metal** (170 tons)
- **#1 PET plastic** (bottle and non-bottle) (138 tons)
- **#2 HDPE plastic** (colored and natural) (73 tons)
- **white office paper** (70 tons)
- **magazines** (60 tons)
- **steel cans** (57 tons)
- **newspaper** (50 tons)
- **aluminum cans** (49 tons)
- **#5 PP plastic** (42 tons)
- **polycoated paper cups and cartons** (39 tons)

The materials listed below can be **difficult to recycle due to their bulkiness, weight or other challenges** but are generally frequently requested by community members for recycling and disposal options. As such, RRS recommends these be considered in the development of Missaukee County's MMP:

Construction and demolition (C&D) materials – primarily clean lumber, pallets, cardboard, concrete, and scrap metal - represent a high-volume opportunity for landfill diversion and reuse. Many of these materials have market value, and reuse programs like Habitat ReStore or other local programs provide both social and environmental benefits. However, current waste characterization studies exclude most C&D debris, meaning its true volume is underrepresented and not well understood. A dedicated study is needed to quantify and stratify C&D materials to develop effective recovery strategies and estimate recovery amounts.

Glass bottles and jars, estimated at 145 tons annually in Missaukee County, are endlessly recyclable but require clean separation from contaminants to maintain quality. Mixed collection often leads to contamination, reduced yield, and degradation of other recyclables. When local markets are accessible, clean glass can retain material and economic value; otherwise, it may be diverted to lower value uses like landfill cover. Developing a system to aggregate clean glass for efficient delivery could unlock recycling potential.

Expanded polystyrene (EPS) foam is rarely accepted in curbside recycling because it's difficult to process in automated facilities. When source-separated, it can be recycled but requires densification to improve shipping efficiency and market value. Missaukee County discards an estimated 72 tons annually, indicating a strong opportunity for recovery if a collection network and basic processing infrastructure are developed.

Electronics (e-waste) have become pervasive in modern life thanks to technological advancements that make them smaller and more affordable, but these same innovations lead to rapid obsolescence, driving consumers to replace them frequently. Since they are not banned from landfills, computers, cell phones, printers, toasters, coffee pots, and many more devices can be found in the waste stream, with some containing batteries that pose fire and environmental risks. If recycled, precious metals, scrap metal, and rigid plastics can be recovered and diverted from landfills. Residents routinely seek out a permanent collection program to provide ongoing benefits and convenience.

Batteries, especially lithium-ion, are increasingly common in consumer products and pose serious disposal risks. Improperly discarded batteries can ignite fires in collection vehicles, processing facilities, or during shipment, making safe handling and recycling critical. While not quantified in the model, battery collection is a public safety issue that should be addressed to protect people, infrastructure, and the environment.

Mattresses are hard to dispose of, causing illegal dumping and landfill issues due to their bulk and springs. Though Missaukee County generates only an estimated 5 tons annually, a local recycler (BARC) offers a solution through community partnership that should be explored.

Scrap tires are banned from Michigan landfills but can be recycled into products like rubber mulch, road additives, or energy sources. They are often illegally dumped, creating health risks from mosquito breeding and a public nuisance for public agencies. Missaukee County has one authorized scrap tire collection site[1] that is listed as an end user, National Energy of McBain, and could be a partner in hosting periodic collection events that are key to safe disposal and environmental protection.

Storm debris can place significant strain on landfill capacity and, depending on the severity of the event, may generate large volumes of material that could be diverted from disposal if adequate infrastructure and systems are in place. RRS recommends integrating disaster debris planning with MMP development, as both rely on the same foundational

[1] Michigan Scrap Tire Collection Sites and Scrap Tire Processors | EGLE Maps & Data

materials management framework - facilities, collection and processing capacity, transportation logistics, and end markets - though they operate on different timelines. Even without a finalized County or local Disaster Debris Management Plan, the MMP can establish this connection by documenting the core operational elements needed during an emergency.

Commercial recyclables present an opportunity for high volumes of targeted materials to be recovered but services are often limited for commercial routes. The 2023 establishment and employment data support a planning approach that prioritizes sector-specific strategies, consistent with EGLE's emphasis on focusing resources where they will yield the greatest diversion impact. By aligning program development with the County's evolving business profile, Missaukee County can more effectively reduce disposal, increase recovery of high-value materials, and support progress toward its Materials Management Plan goals.

- The scale of employment in Manufacturing and Retail Trade points to corrugated cardboard, packaging materials, and pallets as priority recyclable commodities. Growth in Transportation and Warehousing further reinforces the importance of capturing packaging materials generated through logistics and distribution activities.
- Additionally, while smaller in scale than in more urban counties, the growth in Accommodation and Food Services indicates opportunities for food waste prevention, food rescue, and organics diversion, particularly from restaurants and food service establishments. The prominence of agriculture-related employment also suggests opportunities for coordination around organic material management, including food scraps and agricultural residuals, where appropriate and consistent with existing regulations.

State Landfill Report

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) requires quarterly reporting of all materials landfilled within the state. This reporting, documented through the *Annual Report of Solid Waste Landfilled in Michigan*[2], provides actual data on waste disposed of at Michigan landfills. The dataset includes the total tonnage of waste, identified by county of origin, and classifies materials into broad waste categories.

These categories include **Municipal and Commercial Waste (MCW)**, such as household waste, commercial waste, garbage, regulated medical waste, and municipal solid waste incinerator ash; **Industrial Waste (IW)**, including ashes, auto shredder residue, cement kiln dust, coal ash, food processing residuals, foundry sand, and industrial sludge; **Construction and Demolition (C&D)**, including asbestos waste, scrap wood, and treated or untreated wood; **Other Waste**, such as contaminated soils and technologically enhanced naturally occurring radioactive materials (TENORM); and **Alternative Daily Cover (ADC)**, materials such as chipped tires, ash, foundry sand, sludge, or contaminated soils approved for landfill cover use.

[2] https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Legislative/MMD/Part-115/Report-FY24-Landfilled-Solid-Waste.pdf?rev=b1a8a575d427406f8a4ad4fb4de0ff47&hash=430D8389FB9BEE4BA4AA6D076DCC50F7

The annual report also includes estimates of remaining landfill capacity. However, it does not account for waste generated in Michigan and disposed of out of state, nor does it provide detailed quantities of specific materials within each category. In addition, the assignment of broad categories (MCW, C&D, ADC, IW, and Other) is not necessarily consistent across the state and may vary by facility and even by individual scale operator. This is particularly relevant for mixed loads that contain multiple material types (e.g., both MCW and C&D), where the total weight of a container or load is typically attributed to a single category, potentially obscuring the true distribution of materials.

For this analysis, RRS reviewed EGLE's reported data covering fiscal years 2020 through 2024.

TOTAL TONS LANDFILLED IN MI GENERATED FROM ANTRIM, CHARLEVOIX, MANISTEE, MISSAUKEE AND WEXFORD COUNTIES

Table 1 below presents the aggregated total tons of all material categories (MCW, IW, C&D, ADC, and Other) landfilled in Michigan and attributed to each county in the past fiscal year. It is important to note that these figures represent tonnage as reported. While the data reflects the best available information, it is possible that some materials were reported under incorrect category types or mixed loads were categorized under a single type.

2024	Tons from Charlevoix	242,114.42
2024	Tons from Manistee	93,033.15
2024	Tons from Antrim	78,111.39
2024	Tons from Wexford	58,665.15
2024	Tons from Missaukee	29,706.13

Table 1: Total Tons Landfilled in MI from Each County 2024

MISSAUKEE COUNTY

TOTAL TONS LANDFILLED BY TYPE

Table 2 and Figure 1 below present the total tons of landfilled material in each of the five broad categories attributed to Missaukee County on the annual landfill reports from 2020 to 2024. On average from 2020 – 2024, the largest share by weight is Industrial Waste (IW) at 57%, followed by Municipal and Commercial Waste (MCW) at 31%.

According to demographic data provided by Networks Northwest, originally sourced from the American Community Survey, Missaukee County had an estimated population of 15,156 in 2023. This corresponds with an estimated MCW disposal rate of approximately **3.45 pounds per person per day** based on the 5-year average reported tonnage, which is lower than expected. For comparison, the **state average reported by EGLE is 4.64 pounds per person per day**.

An unusually low per-capita MCW rate may indicate that a portion of Missaukee County's MCW is being managed outside of the tonnage attributed to the county in the landfill report. For example, waste generated in the county but disposed at facilities that may be attributed to another county or disposed through non-landfill pathways that are not captured in the reported landfilled tonnage (illegal burning or dumping). It may also reflect inconsistencies in landfill reporting and categorization practices (e.g., MCW being recorded under another category such as Industrial Waste or C&D). Finally, it is possible that the reported figure accurately reflects atypical disposal dynamics during the analysis period, though additional data and

verification would be required to confirm this. **For planning purposes, the county should anticipate an MCW generation rate that falls between the reported average 3.45 pounds per person per day and the state average of 4.64 pounds per person per day.**

REPORTED LANDFILL WASTE TYPE, TONS[3]	2020	2021	2022	2023	2024	AVERAGE 2020 - 2024	% OF TOTAL AVERAGE
ADC	551.00	373.00	53.00	869.22	22.30	374	1.2%
C&D	4,080.00	1,724.00	3,555.00	1,639.67	1,906.77	2,581	8.5%
IW	16,134.00	17,185.00	16,776.00	20,362.29	16,816.43	17,455	57.3%
MCW	9,821.00	10,443.67	9,841.00	9,067.38	8,542.20	9,543	31.3%
OTHER	10.00	-	3.00	40.00	2,418.43	494	1.6%
Grand Total	**30,596**	**29,726**	**30,228**	**31,979**	**29,706**	**30,447**	

Table 2: Michigan Landfill Waste Disposed by Missaukee County by Type 2020 - 2024

[3] Fiscal years 2020 – 2022 were reported in cubic yards, converted to tons here using EGLE's standard 3 CY : 1 ton ratio.

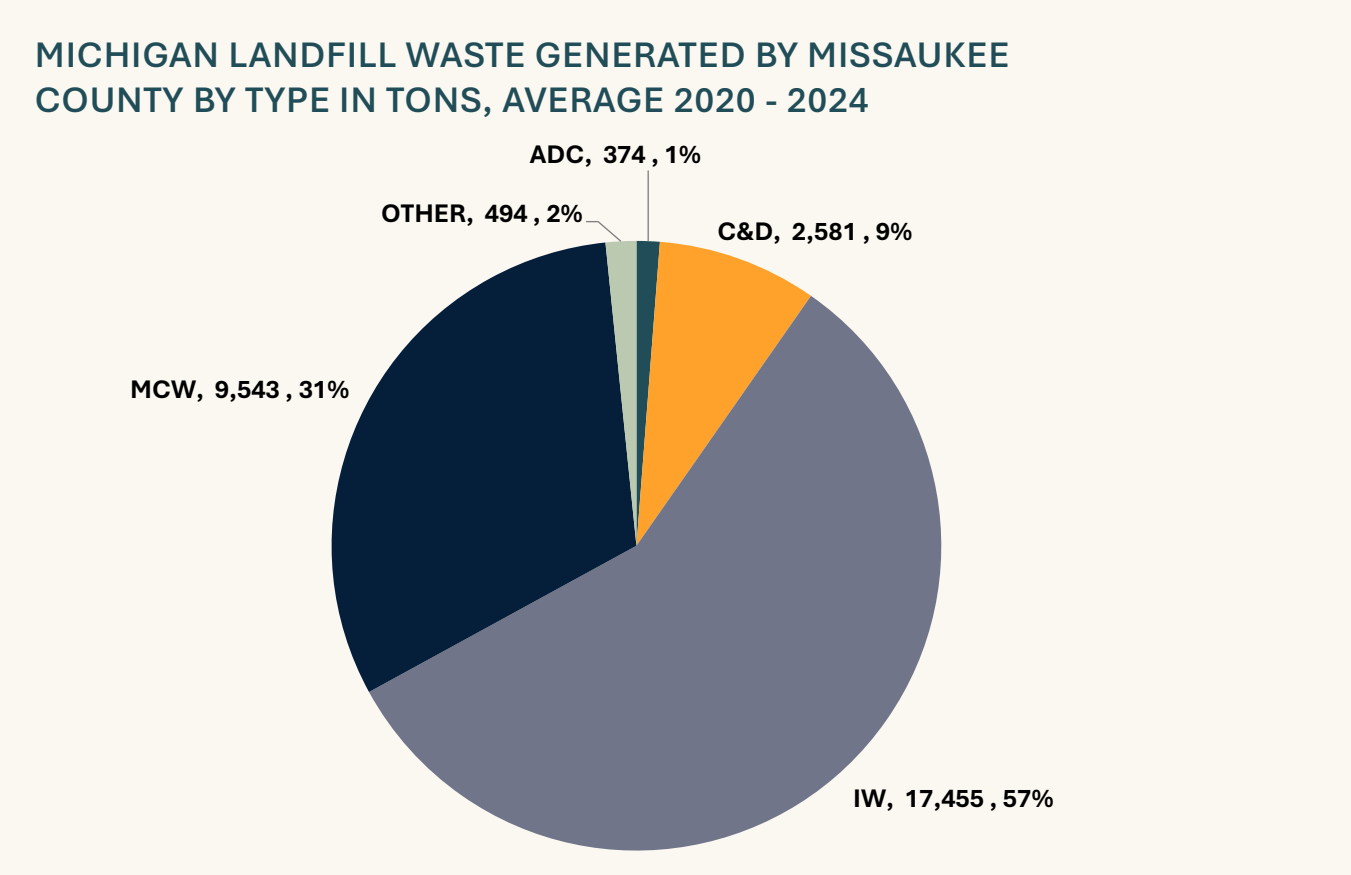


Figure 1: Michigan Landfill Waste Generated by Missaukee County by Type in Tons, Average 2020 - 2024

DISPOSAL FACILITIES RECEIVING LANDFILLED MATERIAL FROM MISSAUKEE COUNTY IN FY 2024

Table 3 below lists the disposal facilities that received landfilled materials originating from Missaukee County in 2024 and provides corresponding quantities, by material type, reported in tons. Table 4 presents information on landfill capacity at each location, reported in cubic yards. The remaining years of capacity are presented as a range for each facility: one value is self-reported by the landfills, and the other is calculated by EGLE by dividing the remaining capacity by the amount of capacity used in FY 2024. Differences between these two values account for the range in remaining years of capacity shown in the table.

	Tons	Northern Oaks Recycling and Disposal Facility (Clare County)	Wexford County Landfill (Wexford County)
ADC	22	-	22
C&D	1,907	370	1,536
IW	16,816	16,702	114
MCW	8,542	1,075	7,468
OTHER	2,418	2,343	75
Grand Total	**29,706**	**20,490**	**9,216**

Table 3: Landfills Receiving Waste from Missaukee County in 2024

	Northern Oaks Recycling and Disposal Facility (Clare County)	Wexford County Landfill (Wexford County)
Remaining Capacity (CY)	5,594,701	15,820,706
Capacity Used in 2024 (CY)	113,360	366,293
Est Years of Remaining Capacity	49 - 56	43 - 46

Table 4: Estimated Remaining Landfill Capacity

RRS MCW Modeling

The RRS Municipal and Commercial Waste (MCW) Characterization Model is designed to identify potential recovery opportunities within the MCW stream, broken down by specific material types and generating sectors, including single-family residential, multi-family residential, and commercial sources. The model was developed using multiple waste characterization and capture rate studies conducted over the past five years, including studies specific to Michigan as well as broader research from the Midwestern United States. This model is intended as a planning tool to help the County understand which specific materials are being landfilled within the MCW stream, thereby identifying the greatest opportunities and potential tons available for recovery.

The model estimates the composition of MCW by dividing it into approximately 50 distinct material categories, expressed as percentages of the total waste stream. These percentages are then applied to the average tons of landfilled MCW attributed to Missaukee County from 2020 - 2024 (8,542) as reported to EGLE to estimate the tonnage of each material category disposed. Additionally, the model uses aggregated data to differentiate between waste generated by commercial businesses and residential sources. Within the residential sector, housing data from the 2020 U.S. Census is incorporated to allocate tonnages between single-family and multi-family residences.

The approximately 50 material categories were also ranked according to their ease of recovery. The rankings are as follows:

1. **Readily Recyclable** – materials that are almost universally accepted in existing curbside recycling programs. Examples include cardboard, plastics #1-2, aluminum cans.

2. **Compostable** – materials that break down naturally, including food waste, yard waste, brush, and leaves.

3. **Recyclability Variable by Municipality** – materials that are sometimes accepted in established curbside recycling programs. Examples include HHW, plastic films, textiles.

4. **Minimal Access for Recycling/Specialty Recycling** – materials that may be recyclable through drop-off or specialized programs, such as bulky waste, tires, and polystyrene.

5. **Not Recyclable** – materials that are currently not recyclable through existing programs.

Based on this assessment, RRS estimates that approximately 54% of landfilled MCW by weight from Missaukee County is either readily recyclable or compostable. This approach provides a detailed, data-driven foundation for evaluating material-specific recovery potential and informing county-level planning efforts.

RRS LANDFILLED MCW RECYCLABILITY MODEL BY WEIGHT IN TONS

Figure 2 below illustrates the recyclability of municipal and commercial waste (MCW) by weight for materials currently landfilled, based on an estimated MCW tonnage of 8,542; the amount of MCW attributed to Missaukee County on the 2024 EGLE Landfill Report. It highlights the potential opportunities to divert waste from landfill toward higher-value outcomes, such as established recycling programs or composting initiatives.

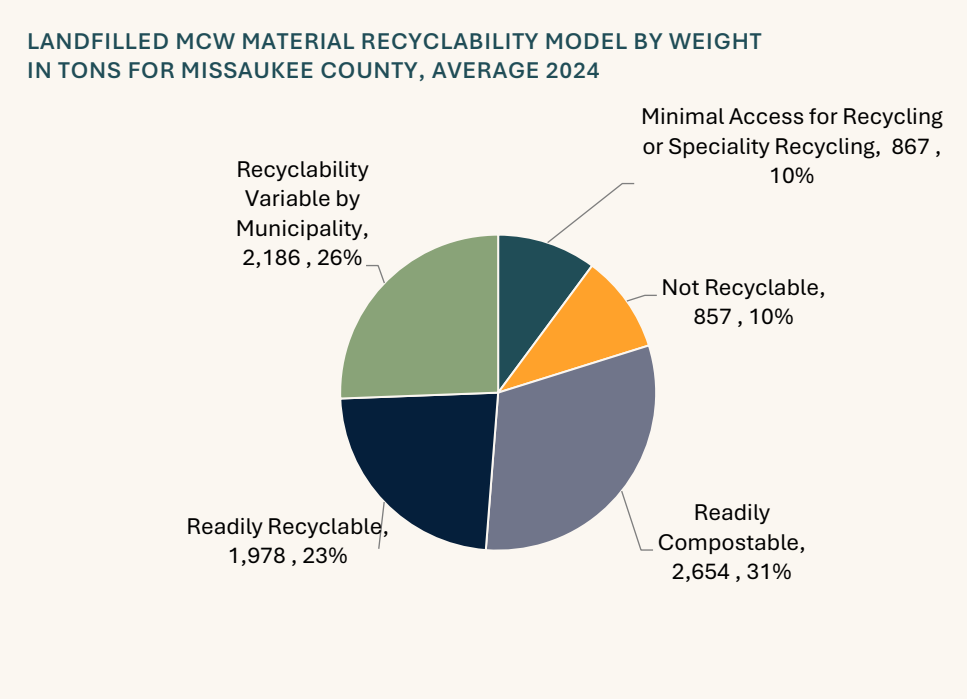


Figure 2: RRS Model, Landfilled MCW Recyclability by Weight in Tons

RRS MCW COMPOSITION MODEL BY WEIGHT

Figure 3 below outlines the 25 most prevalent materials within the MCW stream by weight, as identified by the RRS model. It also illustrates the proportional generation of each material by single-family households, multi-family households, and the commercial sector. The tonnage and relative proportions of these materials provide valuable insights for planners to target key materials for diversion efforts as discussed previously in the Preliminary Opportunities section. Clearly, wasted food represents a significant opportunity to both increase diversion and reduce overall waste through food rescue and composting. In addition, the large quantity of compostable paper further increases the potential feedstock for expanded composting infrastructure. The model also indicates a strong potential to increase recovery of corrugated cardboard and plastic films, particularly within the commercial sector, where these materials represent a larger share of total generation. Textile waste also

represents a significant tonnage and therefore presents an opportunity to expand or encourage textile reuse and donation outlets within the county.

A full depiction of all 50+ materials and their anticipated composition in the waste composition model can be found in the Appendix.

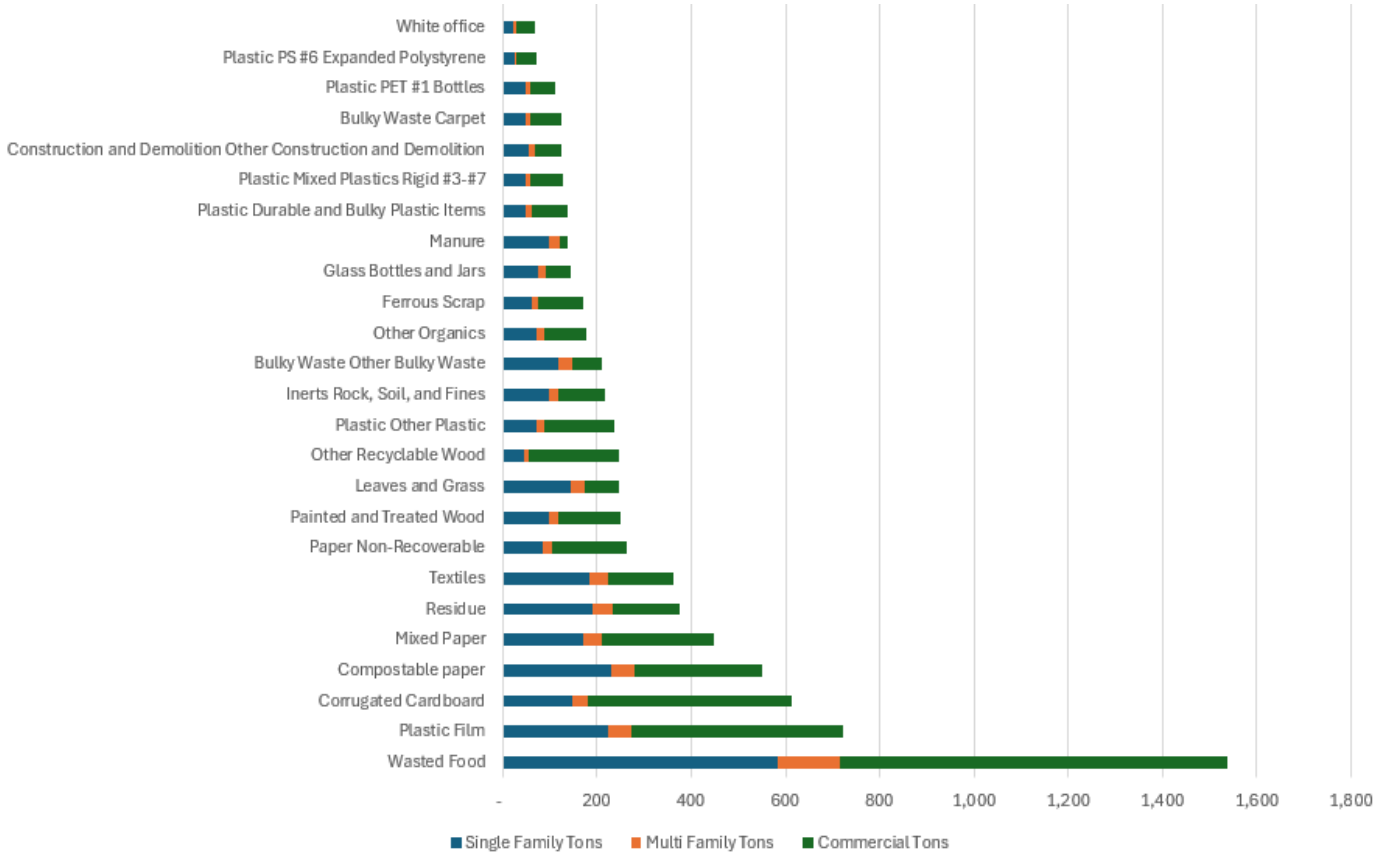


Figure 3: RRS Modeled MCW Composition by Weight

POTENTIAL ECONOMIC OPPORTUNITY

When approached strategically, materials management plans present significant economic opportunities for the county. Recovered materials, often considered "waste," can be valuable resources when properly sorted and processed, serving as key inputs for various industries. The following table illustrates the potential economic value of materials currently being landfilled by residents and businesses in Missaukee County. It provides a breakdown of Missaukee's MCW tonnage into specific material categories, based on the RRS model. Additionally, commodity values for each material were sourced from Recyclingmarkets.net, a trusted industry resource, to demonstrate the potential value of these landfilled materials if they were properly captured, sorted, and prepared for market (e.g., baled). While this analysis serves as an illustration of potential value, it is recognized that achieving a 100% capture rate for all landfilled recyclables is unlikely. Furthermore, the snap-shot values presented reflect a relatively low commodities market, so the estimated value should be considered somewhat conservative.

Even under these conservative assumptions, the analysis indicates that approximately $85,000 in "Readily Recyclable" materials from Missaukee County are currently landfilled each year.

Type Modeled	Ease of recoverability	Total Tons	Recyclingmarkets. net value 9.15.25	Est Market Value of Tons
Corrugated Cardboard	Readily Recyclable	615	$ 65	$ 39,947
Mixed Paper	Readily Recyclable	447	$ 35	$ 15,658
Steel Cans	Readily Recyclable	57	$ 160	$ 9,117
White office	Readily Recyclable	70	$ 125	$ 8,709
Aluminum Cans	Readily Recyclable	49	$ 80	$ 3,905
Magazines	Readily Recyclable	60	$ 35	$ 2,111
Newspaper (ONP)	Readily Recyclable	50	$ 35	$ 1,755
Plastic HDPE #2 Bottles Natural	Readily Recyclable	35	$ 46	$ 1,630
Plastic PET #1 Bottles	Readily Recyclable	112	$ 6	$ 643
Paperboard Boxboard	Readily Recyclable	16	$ 35	$ 563
Plastic HDPE #2 Bottles colored	Readily Recyclable	38	$ 3	$ 96
Plastic HDPE #2 Non-Bottle colored and natural combined	Readily Recyclable	2	$ 1	$ 1
				$ 84,134
Plastic Film	Recyclability Variable by Municipality	722	$ 1	$ 722
Plastic PP#5	Recyclability Variable by Municipality	42	$ 8	$ 315
Plastic Mixed Plastics Rigid #3-#7	Recyclability Variable by Municipality	128	$ 2	$ 192
				$ 1,229
				$ 85,362

Figure 4: Example Recycling Market Values for 9.15.2025

Organic Material

Organic material includes edible surplus food, inedible food scraps, and yard debris such as leaves, brush, grass clippings and trimmings. In Michigan, yard clippings are prohibited from disposal in municipal solid waste landfills under Part 115 of the Natural Resources and Environmental Protection Act (NREPA) [4]. Despite this prohibition, waste characterization studies routinely indicate that yard materials still appear in disposed MCW streams (typically due to seasonal cleanouts, mixed loads, or limited access to convenient organics options). There are no known municipal or contracted curbside organics (yard waste) collection programs in Missaukee County.

[4] https://legislature.mi.gov/Laws/MCL?objectName=mcl-324-11514&utm

SEEDS ORGANICS ANALYSIS

A 2021 report[5] prepared by RRS and commissioned by SEEDS Ecology & Education Centers and funded with a 2021 EGLE Market Development Grant, evaluated current prevention, rescue/recovery and recycling processing opportunities and applied feasibility of each option to each county in the region and modeled centralized composting and operating costs and a preliminary collection and transportation plan. It also projected GHG emission savings and job creation and identified actionable next steps for the region to support the organics circular economy. The study concluded that Missaukee County generated an estimated 4,608 tons of organic waste per year with only approximately 1 ton diverted to permitted composting sites annually. Based on RRS's current model of landfilled MCW and the average MCW tons for the county, in 2024 RRS estimates that Missaukee County generated approximately 2,654 tons of organic waste that was landfilled. **For planning purposes, Missaukee County should estimate 2,654 – 6,900 tons of organic waste generated (food scraps, yard waste, brush, leaves, branches and trimmings) annually.**

SEEDS REPORT ESTIMATED ORGANICS GENERATION AND DIVERSION 2021

Figure 5 below summarizes the ten counties analyzed, showing their estimated annual generation of organic waste (food and yard waste) in tons, the amount currently diverted, and the additional tonnage that could potentially be diverted through various methods. If all identified strategies were implemented, Missaukee County's overall organics diversion rate would reach18.1%. The 2021 study noted that Antrim, Benzie, Charlevoix, Kalkaska, Manistee and Missaukee counties all have relatively small amount of organics collection and recommended that these counties focus efforts on food rescue initiatives (recovering edible food before disposal), education on food waste reduction, and promotion of backyard composting practices. Furthermore, the study identified the close proximity to existing composting operations in Sears, MI (Morgan Composting) could present an opportunity for increased organics collection. At the time, it was estimated that ~ 293 tons of food waste is generated per year from food stores within the county and ~96 tons per year from bars and restaurants.

[5] https://michiganrecycles.org/wp-content/uploads/2022/08/RRS-FINAL-REVISED-NW-Lower-MI-Regional-Organics-Strategy-Report.pdf

ANNUAL TONS YARD AND FOOD WASTE								
			Estimated Potential Diversion					
COUNTY	Generation	Current Diversion*	Prevention	Rescue/ Recovery	Recycle**	Centralized Composting	Tons Diversion	Percent Diversion
Antrim County	6,149	41	81	39	345	935	1,400	22.8%
Benzie County	5,101	108	62	30	360	686	1,138	22.3%
Charlevoix County	6,687	1,286	91	44	387	1,415	1,937	29.0%
Emmet County	8,006	1,048	236	127	678	2,806	3,847	48.0%
Grand Traverse County	19,074	4,003	319	302	1,551	8,301	10,473	54.9%
Kalkaska County	5,114	14	61	30	229	721	1,041	20.4%
Leelanau County	5,850	751	76	36	447	861	1,420	24.3%
Manistee County	6,366	421	85	41	321	992	1,438	22.6%
Missaukee County	4,608	1	52	25	194	561	832	18.1%
Wexford County	8,035	77	115	56	547	1,789	2,507	31.2%
TOTAL	**74,989**	**7,750**	**1,179**	**729**	**5,060**	**19,066**	**26,034**	**34.7%**

*Current Diversion tonnage is estimated based on 2021 survey data and 2019 EGLE Waste Data System (WDS) of reported volumes to permitted composting sites.
**Recycle includes backyard composting, community composting and animal feed. The estimated diversion by sub-category is included in the appendix.

Figure 5: Potential Organic Tonnage, SEEDS 2021

Demographic Data & Waste Generation

MCW GENERATION PROJECTIONS

Networks Northwest provided RRS with county-level demographic data obtained from the American Community Survey, the Bureau of Labor Statistics, and the Michigan Department of Technology, Management & Budget. These data include projected five-year population estimates through 2050. The table below applies both the state average MCW disposal rate of 4.64 pounds per person per day and the 3.45 pounds per person per day calculated from 2020 - 2024 reported landfill tonnages to illustrate the potential range of MCW volumes the county may need to manage in the coming decades.

YEAR	PROJECTED COUNTY POPULATION	ANNUAL MCW TONS AT 3.45 LBS/PP/DAY	ANNUAL MCW TONS AT 4.64 LBS/PP/DAY
2024	15,156	9,543	12,834
2025	15,427	9,714	13,064

2030	15,630	9,842	13,235
2035	15,696	9,883	13,291
2040	15,624	9,838	13,230
2045	15,365	9,675	13,011
2050	15,104	9,510	12,790

Table 5: RRS Potential MCW Tonnage Projections

BUSINESS SECTOR DEMOGRAPHICS

Detailed business establishment and employment data for 2018 and 2023, provided by Networks Northwest and originally sourced from Esri, further refine the understanding of Missaukee County's commercial landscape and its implications for materials management planning. These data form the basis for Figure 6, Figure 7, and Figure 8 and highlight growth trends and sector-specific recovery opportunities. The full 2018 and 2023 establishment and employment datasets are provided in the appendix.

Between **2018 and 2023**, Missaukee County experienced **moderate growth** in the number of business establishments, with notable increases across several key sectors. **Agriculture, Forestry, Fishing, and Hunting** increased from **46 to 55 establishments**, remaining one of the County's most prevalent sectors. **Retail Trade** grew from **30 to 40 establishments**, **Construction** from **56 to 61**, and **Manufacturing** from **25 to 32** establishments. Growth was also observed in **Transportation and Warehousing** (22 to 29 establishments), **Administrative Support and Waste Management Services** (6 to 11), and **Accommodation and Food Services** (15 to 18). These trends reflect a gradual expansion of the County's business base, with implications for both MCW generation and diversion opportunities.

Employment data provides additional insight into material generation patterns. In **2023**, the largest employment sectors in Missaukee County include **Agriculture, Forestry, Fishing, and Hunting (877 jobs)**, **Manufacturing (697 jobs)**, **Retail Trade (572 jobs)**, and **Transportation and Warehousing (198 jobs)**. Employment in **Accommodation and Food Services** increased from **110 to 145 jobs**, while **Administrative Support and Waste Management Services** also grew modestly from **21 to 25 jobs.**

From a materials management perspective, these 2023 data reinforce several priority opportunities identified in EGLE MMP guidance. The scale of employment in **Manufacturing** and **Retail Trade** points to **corrugated cardboard, packaging materials, and pallets** as priority recyclable commodities. Growth in **Transportation and Warehousing** further reinforces the importance of capturing packaging materials generated through logistics and distribution activities.

Additionally, while smaller in scale than in more urban counties, the growth in **Accommodation and Food Services** indicates opportunities for **food waste prevention, food rescue, and organics diversion**, particularly from restaurants and food service establishments. The prominence of **agriculture-related employment** also suggests opportunities for coordination around **organic material management**, including food scraps and agricultural residuals, where appropriate and consistent with existing regulations.

Overall, the 2023 establishment and employment data support a planning approach that prioritizes sector-specific strategies, consistent with EGLE's emphasis on focusing resources where they will yield the greatest diversion impact. By aligning program

development with the County's evolving business profile, Missaukee County can more effectively reduce disposal, increase recovery of high-value materials, and support progress toward its Materials Management Plan goals.

Figure 6: Industry and Employment Statistics, Courtesy Networks Northwest

MISSAUKEE COUNTY BUSINESS SECTORS BY NAICS CODE (# OF ESTABLISHMENTS)

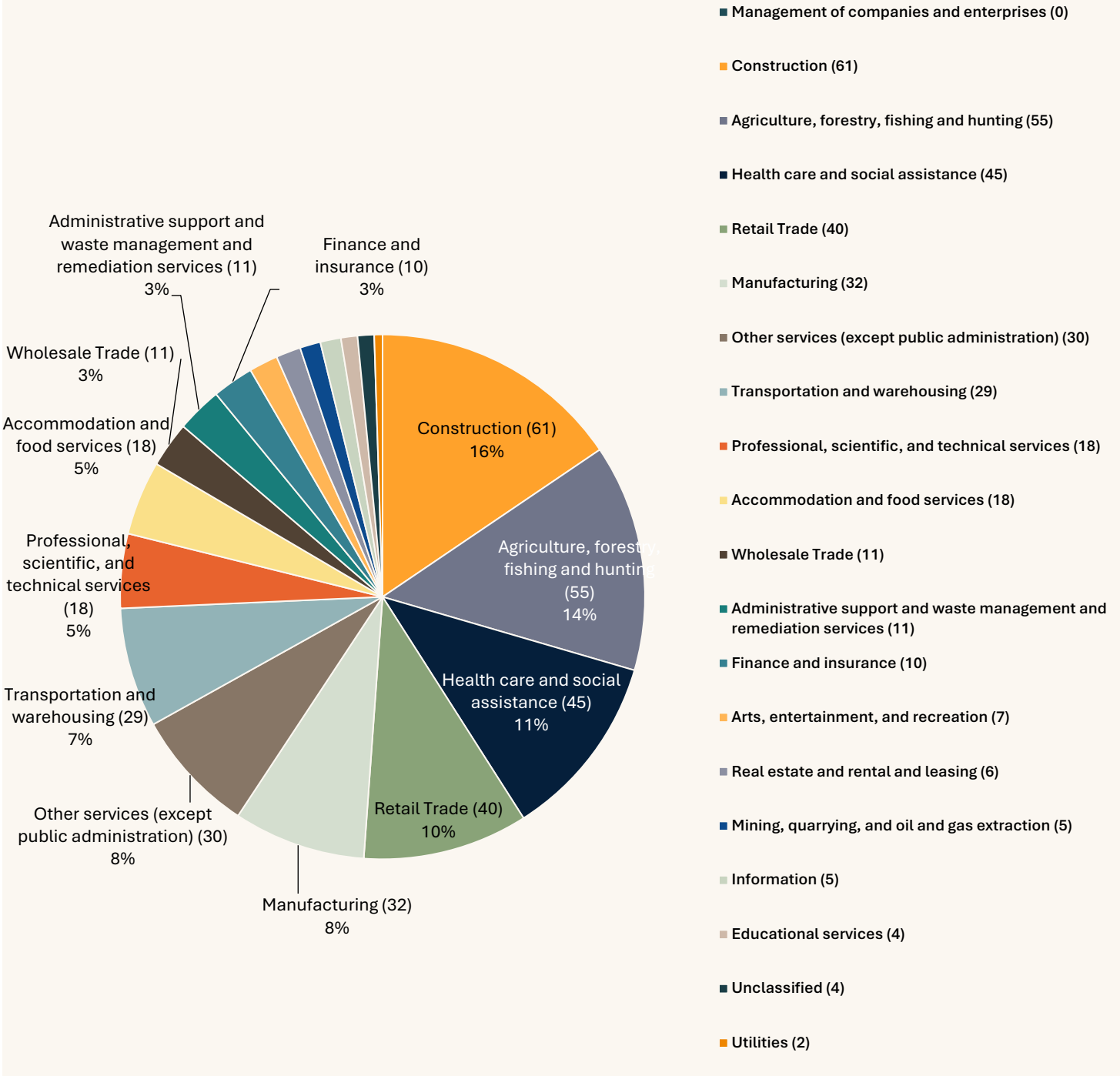


Figure 7: Missaukee County Business Sectors by NAICS Code, # of Establishments. Data provided by Networks Northwest

MISSAUKEE COUNTY NUMBER OF EMPLOYEES PER BUSINESS SECTOR BY NAICS CODES 2023

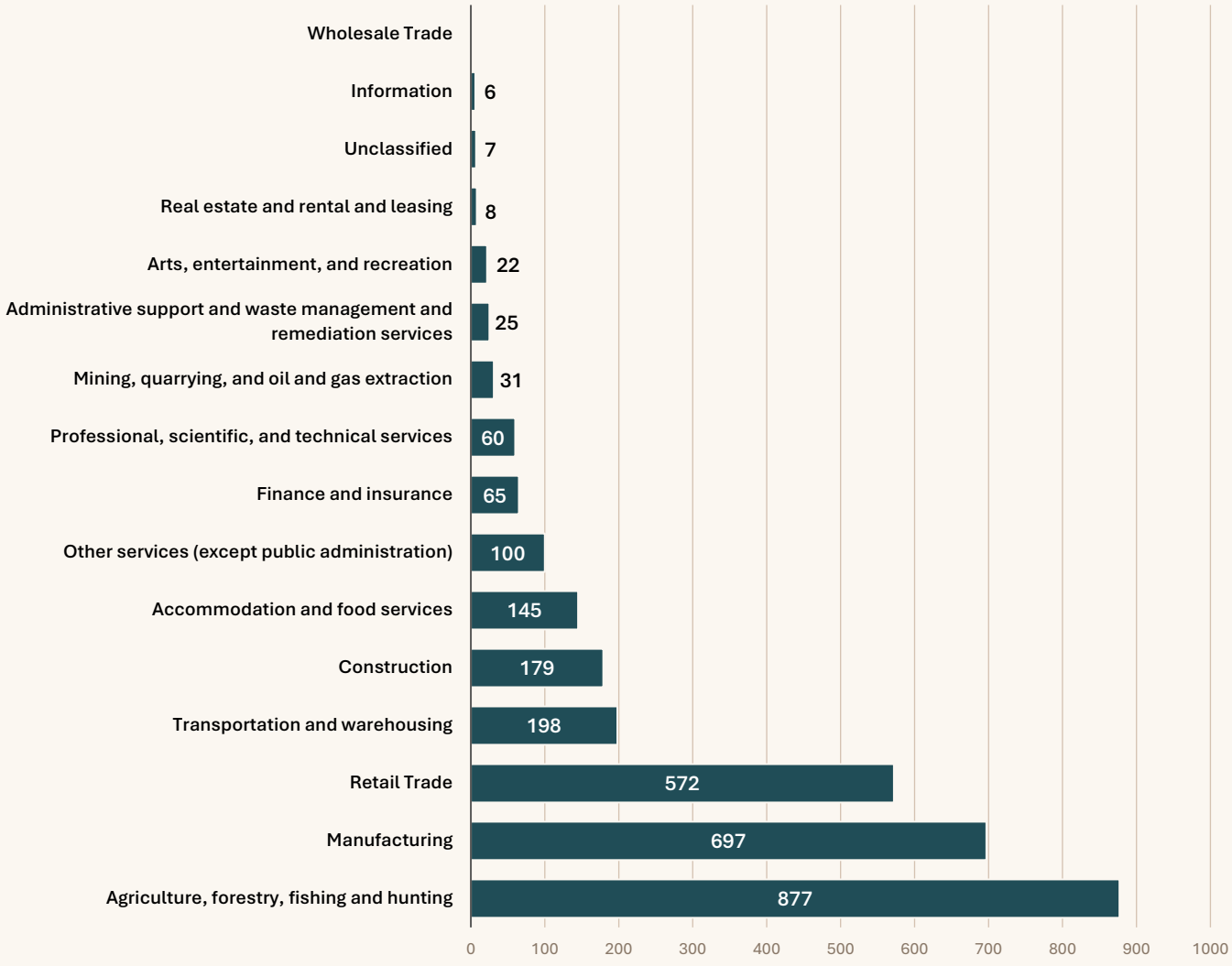


Figure 8: Missaukee County # of Employees by NAICS Code, 2023. Data Provided by Networks Northwest

Compliance with Part 115 and Benchmark Recycling Standards

Missaukee County is partially in compliance with Michigan's **Part 115 Benchmark Recycling Standards**, which are intended to ensure that counties provide residents and businesses with reasonable access to recycling opportunities in support of the State's broader materials management goals. Missaukee County does not contain any designated urbanized areas and has no municipalities with populations exceeding **5,000 residents**. As a result, the first two benchmark recycling standards related to urbanized areas and large municipalities do not apply.

The applicable benchmark standard for Missaukee County is Part 115's requirement that, by January 1, 2032, counties with populations under 100,000 provide at least one recycling drop-off location for every 10,000 residents without access to curbside recycling, with each drop-off location available for a minimum of 24 hours per month. According to the 2020 U.S. Census, Missaukee County has a population of **15,048 residents**, requiring **at least two** qualifying recycling drop-off location to meet this standard. Missaukee County partially meets this requirement through the **Missaukee County Recycling Center**, located at **6240 W. Sanborn Road, Lake City, Michigan**. This facility serves as the County's primary drop-off location for traditional recyclables and represents the core of the County's recycling access under Part 115. One additional drop-off location should be added to meet the Benchmark Recycling Standard.

CURBSIDE SERVICE TYPES

More broadly, curbside waste, recycling, and organics/yard waste collection programs can be categorized as:

1. **Municipal** – municipal staff collect material using municipal equipment.
2. **Contracted or franchised** – a municipality contracts with a single hauler to provide curbside service to all residents (funded through a variety of approaches, such as general funds, special assessments, utility-style fees, or billed service fees).
3. **Subscription (open-market)** – residents contract directly with the hauler of their choice for curbside services.
4. **No curbside program** – there is no verified curbside service being actively provided within the municipality (regardless of cost).

EGLE instructs counties to calculate curbside recycling access according to this formula:

$$\text{Curbside Recycling Access} = \frac{\text{Sum of single family dwellings which have curbside recycling access}}{\text{Total number of single family dwellings}} \times 100$$

At this time, there is one documented curbside recycling program operating within Missaukee County in McBain City, although details of its structure are unclear. Some residents may be able to obtain curbside recycling service through **subscription-based arrangements with private waste haulers**; however, these services are not publicly documented or uniformly available across the county.

Under Part 115, subscription or open-market service qualifies as "access" when residents are able to obtain curbside recycling through their chosen hauler. However, the statute does not establish any affordability criteria, such as rate caps or cost thresholds, meaning a community may be considered to have curbside access even if cost remains a practical barrier for some households. Specifically, the statute provides that curbside recycling qualifies when: "The curbside recycling is provided by the municipality or the resident has access to curbside recycling by the resident's chosen hauler."[6]

RECYCLING AND COMPOSTING ACCESS IN MISSAUKEE COUNTY

Missaukee County residents currently rely on the **Missaukee County Recycling Center in Lake City** as the County's primary access point for recycling. Based on County and Conservation District information, the Recycling Center accepts common **traditional recyclables**, including:

- *Glass bottles, Plastics #1-5 & #7, Cardboard, Paper, Tin, Steel, Aluminum Foil and Trays and other items*[7].

At this time, there is a single publicly documented curbside recycling program and no documented yard waste programs, and there is limited publicly available information regarding yard waste or food waste composting services operated by municipalities within the county. Yard waste management is believed to occur primarily through **self-haul, backyard composting, or private arrangements**, though tonnage data are not available.

In addition, Missaukee County residents have access to certain special collection programs administered by County departments and partner agencies, such as medication disposal through the Missaukee County Sheriff's Department and periodic household hazardous waste or cleanup events coordinated with regional partners. These programs support safe material management but are not counted toward recycling rate calculations under Part 115.

Overall, Missaukee County meets the applicable **Part 115 Benchmark Recycling Standard** through its centrally located recycling drop-off facility. As the County advances its Materials Management Plan, opportunities exist to evaluate expanded recycling and organics access, improve documentation of existing services, and assess whether additional drop-off capacity or program enhancements would better serve residents and support long-term diversion goals.

[6] https://www.legislature.mi.gov/documents/mcl/pdf/mcl-451-1994-ii-3-115.pdf

[7] https://www.missaukee.org/departments/recycling/index.php

SUMMARY TABLE OF RECYCLING ACCESS BY COMMUNITY

COMMUNITY NAME	2020 CENSUS NAME	COMMUNITY POPULATION	# OF HOUSE HOLDS	POPULATION IN SINGLE FAMILY HOMES[8]	POPULATION IN MULTI FAMILY HOMES[9]	RECYCLING CURBSIDE SERVICE TYPE	RECYCLING DROP-OFF PROGRAM
Aetna	Aetna township	429	175	429	0	No Curbside Program	Missaukee County Recycling Center
Bloomfield	Bloomfield township	574	216	574	0	No Curbside Program	Missaukee County Recycling Center
Butterfield	Butterfield township	473	196	473	0	No Curbside Program	Missaukee County Recycling Center
Clam Union	Clam Union township	724	265	724	0	No Curbside Program	Missaukee County Recycling Center
Enterprise	Enterprise township	174	80	174	0	No Curbside Program	Missaukee County Recycling Center
Forest	Forest township	1183	488	1183	0	No Curbside Program	Missaukee County Recycling Center
Holland	Holland township	221	106	221	0	No Curbside Program	Missaukee County Recycling Center
Jennings	Jennings	229	82	229	0	No Curbside Program	Missaukee County Recycling Center
Lake City	Lake City	829	329	768	61	No Curbside Program	Missaukee County Recycling Center
McBain	McBain city	636	250	453	183	Contracted/ Franchise	Missaukee County Recycling Center
Norwich	Norwich township	631	274	631	0	No Curbside Program	Missaukee County Recycling Center
Pioneer	Pioneer township	508	199	508	0	No Curbside Program	Missaukee County Recycling Center
Reeder	Reeder township	1199	458	1199	0	No Curbside Program	Missaukee County Recycling Center
Caldwell	Caldwell township	1394	538	1394	0	No Curbside Program	Missaukee County Recycling Center
Lake	Lake township	2598	1065	2525	73	No Curbside Program	Missaukee County Recycling Center
Richland	Richland township	1489	549	1489	0	No Curbside Program	Missaukee County Recycling Center
Riverside	Riverside township	1123	382	1111	12	No Curbside Program	Missaukee County Recycling Center
West Branch	West Branch township	452	196	452	0	No Curbside Program	Missaukee County Recycling Center

[8] Single-Family = 1-4 units, mobile homes and other types of housing.

[9] Multi-Family = 5 or more units.

Falmouth	Falmouth CDP	182	71	182	0	No Curbside Program	Missaukee County Recycling Center

Table 6: Summary of Recycling Access by Community

Data Currently Available

Missaukee County Recycling has provided **drop-off recycling tonnage data for 2023 and 2024**, disaggregated by material type, as summarized in Figure 9. Over this period, the drop-off program collected **154.31 tons in 2023** and **138.21 tons in 2024**, with **corrugated cardboard** accounting for the majority of material collected by weight. This is consistent with regional trends and reflects the relatively high density and recoverability of cardboard compared to other recyclable materials.

Plastics are collected and marketed separately by resin type (**PET**, **HDPE Natural**, and **HDPE Colored**) but are presented as a single category in Figure 9 for clarity. Similarly, **newspaper** and **mixed office paper** are marketed separately but are combined into one category here. The 2023 data includes one load of newspaper that was rejected, presumably due to contamination; however, additional details regarding the rejection were not available. Some materials collected through the program generate modest revenue, with HDPE Natural reported as the highest-value commodity, followed by HDPE Colored and PET bottles.

Using the estimated **2024 county population of 15,156**, the reported 2024 drop-off tonnage equates to approximately **11 pounds of recyclables collected per person per year** through the County's drop-off program.

There is no reported data on the tonnage of recyclables that may be collected curbside from residents or commercial businesses, or that may be collected as part of an industrial recycling program in the county.

There is at least **one municipally operated curbside yard waste collection program** in the county, located in the City of McBain. However, **no tonnage data is currently available** for this program. Similarly, tonnage data is not available for any **drop-off composting programs** that may exist within the county, nor for **organic materials managed through backyard composting** or other informal diversion practices.

Due to these data gaps, particularly the lack of measured tonnages for organics and any curbside recycling services, Missaukee County does not currently have a **measured recycling rate**. Establishing consistent, countywide tonnage reporting and tracking systems represents a key opportunity to quantify these missing material flows, calculate a documented diversion rate, and track progress toward the goals established through the MMP process.

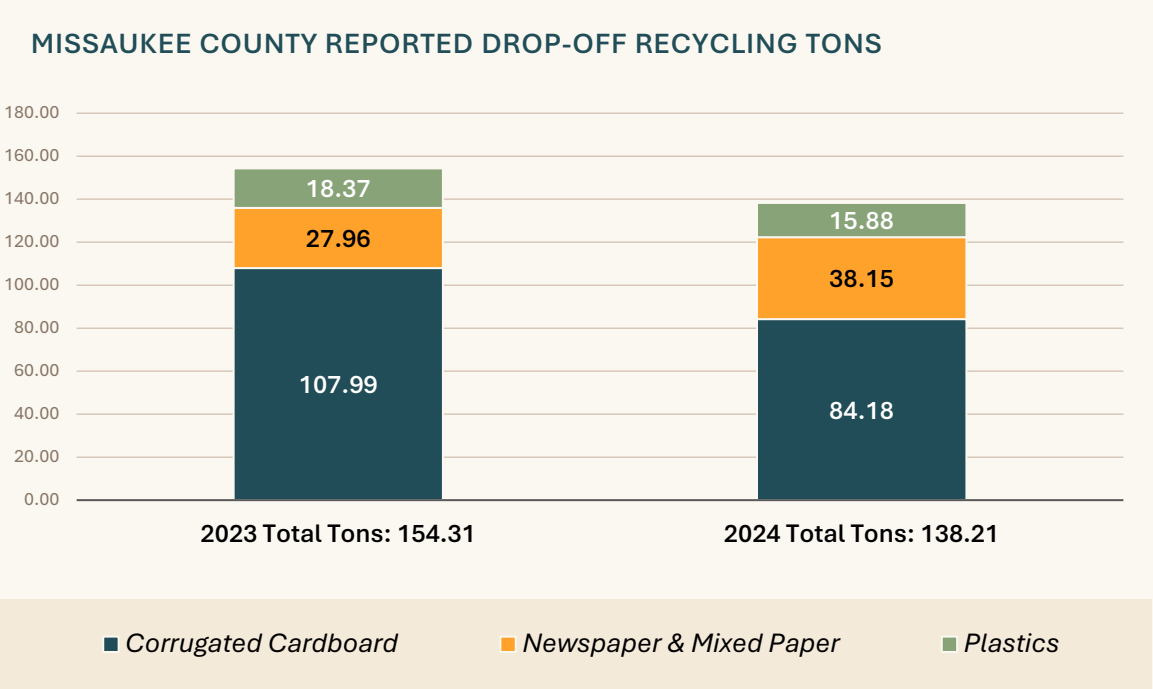


Figure 9: Annual Reported Tons, Missaukee County Drop-Off Recycling

Recycling Rate Estimates

RECYCLING RATE VS DIVERSION RATE

As noted previously, RRS estimates a Municipal and Commercial Waste (MCW) generation rate between the reported 3.45 pounds per person per day to the state average of 4.64 pounds per person per day. This MCW generation rate represents the average quantity of waste disposed per person per day and is used to estimate total disposal system demand.

To evaluate recycling performance and calculate a measured Recycling Rate it is also necessary to quantify the **weight of material recycled.** It is important to understand that for the MMP process, as defined by EGLE, the term **"Recycling Rate"** incudes both traditional recyclables (packaging and paper) and organic material (food scraps and yard waste).

The term **"Diversion Rate"** accounts for additional material diverted from landfill via reuse, recovery, donation, co-generation, digestion or other processes along with traditional recycling and composting. In order to calculate a complete diversion rate, the county would need tonnage data for material diverted via these additional methods.

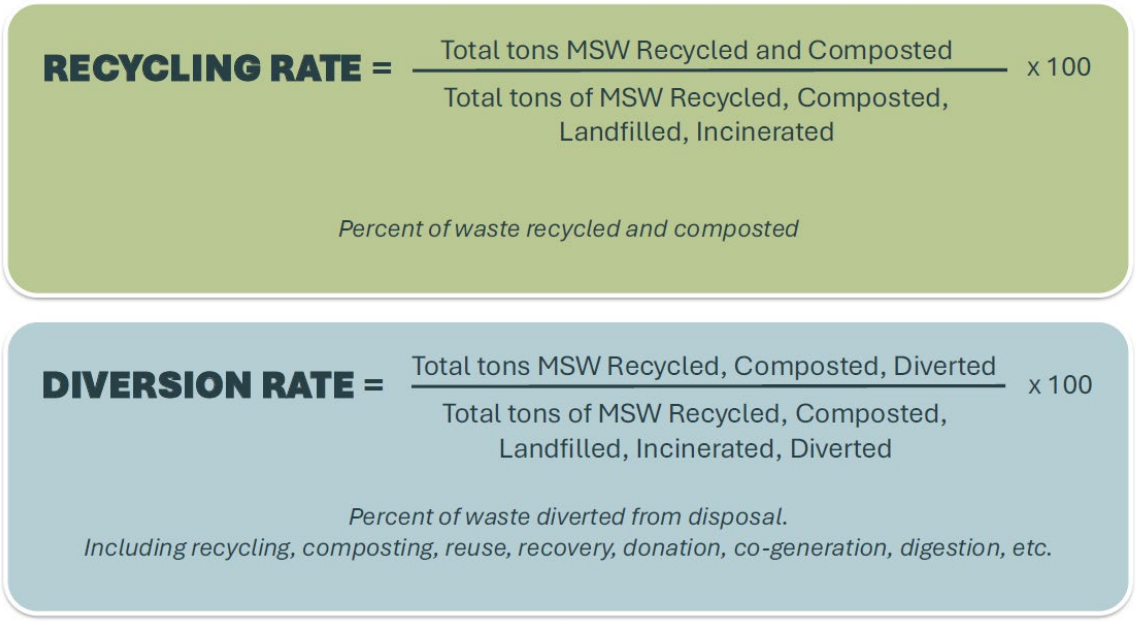


Figure 10: Recycling and Diversion Rate Definitions, EGLE, "Setting Materials Management Goals"[10]

RECYCLING RATE

In the absence of comprehensive, measured, and reported tonnages for recyclables collected through all drop-off systems, curbside programs and from commercial and institutional sources, proxy data may be used for planning purposes. RRS developed an estimation model during the statewide Mega Data Collection Project[11] to project recovered quantities using variables related to recycling access and recycling program design. The model draws on findings from The Recycling Partnership[12], which identifies characteristics of recycling programs that are associated with varying levels of material recovery per household.

The Recycling Partnership has identified several characteristics associated with high-performing residential recycling programs that capture higher quantities of material per household. These factors include:

- Curbside collection (rather than drop-off access),
- Use of collection carts instead of bins for curbside collection,

[10] https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Programs/MMD/Recycling/MMP-Goals-MRC-Presentation-Slides.pdf

[11] https://www.michigan.gov/egle/about/organization/materials-management/materials-management-in-michigan/mega-data-collection-project

[12] https://recyclingpartnership.org/wp-content/uploads/2018/05/state-of-recycling-report-Jan2017.pdf

- Automatic enrollment and service delivery (residents receive recycling service with no action required) rather than opt-in participation, and
- Programs supported by public policy mechanisms (such as automatic service provisions or ordinances requiring haulers to offer curbside recycling alongside trash collection) compared with programs that lack supporting public action[13].

Based on the 2020 – 2023 Mega Data Project, the projected recycling rates are as follows:

- **Residential Recycling Rate Estimate (Recycling + Compost):** 16.6%
- **Commercial Recycling Rate Estimate:** 4.1%
- **Countywide Recycling Rate Estimate:** 10.2%

Since completion of the Mega Data Project, Missaukee County has **partial recycling tonnage data available for 2024**, specifically from the County's drop-off recycling program, totaling **138.21 tons**. While reported tonnages of recycled organic materials are not available, applying the Mega Data estimate of approximately **576 tons per year of organics recycling** results in an estimated **714 tons recycled in 2024** (138 tons of traditional recyclables plus 576 tons of organics).

The reported tonnage of **MCW disposed in 2024 is 8,542 tons**. Using this disposal figure, the resulting countywide recycling rate would be approximately **7.7%**, which is lower than the **10.2%** projected during the Mega Data Project. However, this disposal tonnage corresponds to an implied disposal rate of approximately **3.45 pounds per person per day**, which is unusually low when compared with statewide norms.

Given this discrepancy, it is more appropriate for planning purposes to apply the **Michigan statewide average MCW disposal rate of 4.6 pounds per person per day**, which corresponds to an estimated **12,834 tons of MCW disposed annually** in Missaukee County. Using the estimated **714 tons recycled** and **12,834 tons landfilled**, the countywide recycling rate for 2024 is estimated at approximately **5.3%**.

It is important to emphasize that this figure remains an **estimate**. The calculated recycling rate may be artificially low if reported drop-off recycling tonnages underrepresent actual activity, or if there is unreported collection of curbside recyclables, organic materials, or commercial and industrial recyclables. The recycling rate is also sensitive to potential misreporting or inconsistent categorization of MCW disposal data at the landfill.

Missaukee County has a clear opportunity to improve the accuracy of future recycling calculations by **clarifying and standardizing landfill reporting procedures** and by establishing systems to **consistently track and report all recycling and organic material collection**, including municipal, private, and commercial sources. Improving landfill reporting consistency,

[13] https://recyclingpartnership.org/wp-content/uploads/2018/05/state-of-recycling-report-Jan2017.pdf

expanding recycling and organics tonnage tracking, and standardizing reporting across programs represent critical next steps that would allow the County to calculate a **measured recycling rate** and more effectively track progress toward the goals established in the Materials Management Plan.

MISSAUKEE COUNTY	TOTAL WASTE GENERATION (TONS)	TOTAL DIVERSION (TONS)	TOTAL REQUIRING DISPOSAL (TONS)	DIVERSION RATE
Mega Data Estimates, 2020-2023	14,191	1,441	12,750	**10.15%**
Updated Estimate 2024: Reported MCW and Recycling Tons. Estimated Organics Tons.	9,256	714	8,542	**7.72%**
Updated Estimate 2024: Reported Recycling Tons and State Average MCW per Capita Tons.	13,548	714	12,834	**5.27%**

Table 7: Estimated Diversion Rates

Recycling Data Gaps

Several significant data gaps limit Missaukee County's ability to fully quantify recycling and diversion performance. Most notably, there is no reliable accounting of **commercial and institutional recycling tonnage** that may be collected directly by private haulers. Many businesses and institutions may be recycling materials through contracted services, but without standardized reporting requirements, these recovered materials are not reflected in countywide diversion calculations. Establishing consistent **hauler reporting requirements** would allow the County to capture this missing data and better understand the full scale of recycling activity occurring outside of publicly managed programs.

In addition, there is a lack of information regarding any contracted **curbside recycling services** and those that may be operating on a subscription basis for residential or commercial customers. Even limited or informal curbside collection can contribute meaningful tonnage to overall diversion, yet these materials remain unaccounted for in the absence of hauler reporting. Similarly, **organic material diversion data**, including both food waste and yard waste, is unavailable. While some municipal yard waste programs are known to exist and organics may be managed through private composting or mulching facilities, tonnage data are not consistently tracked or reported. As a result, the County cannot calculate a fully **measured recycling rate** and must rely on estimates and partial datasets.

These gaps also limit the County's ability to quantify progress on **food waste reduction**, which is a key materials management priority from EGLE. Food waste is typically disposed of in the landfill as part of mixed MCW, and without a robust waste audit system there is no clear way to quantify how many tons of disposed MCW are food waste over time. Alternatively, meaningful measurement can be achieved by **separating food waste at the source**, through food rescue and/or composting programs, and **tracking the weight** of diverted material. Expanded source separation paired with consistent tonnage reporting would allow the County to quantify diversion more accurately and track reductions in landfilled food waste in a measurable way.

Hard-to-Recycle Materials and Collection Events

Missaukee County manages hard-to-recycle materials primarily through **event-based collection programs** coordinated by the **Missaukee County Recycling Center**. These programs provide residents with safe, compliant disposal options for materials that are not accepted through routine recycling or landfill systems. Program information and event details are communicated through the County website and the Recycling Center's public Facebook page[14].

HOUSEHOLD HAZARDOUS WASTE (HHW)

The Missaukee County Recycling Center coordinates an **annual Household Hazardous Waste (HHW) collection event**, as documented through its public communications. In **2025**, the HHW event was held on **June 6**. Accepted materials included **aerosols, automotive fluids, batteries, cleaners, corrosives, fertilizers, fire extinguishers, fluorescent bulbs, herbicides, medical waste, mercury-containing items, paints, pesticides, smoke detectors, and solvents**.

In addition to HHW materials, the 2025 event also provided collection opportunities for **paper shredding**, **mattresses and box springs**, **electronics**, **scrap tires**, and **white goods/appliances**, expanding resident access to specialty material management beyond hazardous waste alone.

SCRAP TIRE RECYCLING

Scrap tires are managed through separate, dedicated tire recycling events, also coordinated by the Missaukee County Recycling Center. In 2025, a tire collection event was held on October 18, during which an estimated 750 tires were collected, as reported by the Recycling Center. Public information indicates that scrap tire recycling is supported in part through EGLE Scrap Tire Grant funding in combination with the County **recycling millage.**

OTHER HARD-TO-RECYCLE MATERIALS

The Missaukee County Recycling Center accepts **boat shrink wrap** during normal business hours, providing a year-round disposal option for this material.

At the municipal level, the **City of McBain** hosts a **Clean-Up Day for bulky household waste**[15], most recently held on **May 17, 2025**, allowing residents to dispose of large items not accepted through routine services. Other communities within the County may host similar clean-up opportunities; however, these programs are not consistently documented at the county level. Other municipalities may offer similar services but they are not well documented.

[14] https://www.facebook.com/MissaukeeRecycles

[15] https://cms4files.revize.com/mcbain/Information%20letter%20for%20residents%202025.pdf

To support proper disposal of pharmaceutical waste, the **Missaukee County Sheriff's Office** maintains a **24/7 prescription drug drop box**, providing residents with a secure option for disposing of unused or expired medications that are not suitable for landfill disposal or wastewater systems.

At present, comprehensive tonnage data for hard-to-recycle materials (e.g., HHW, bulky items, tires, electronics, mattresses) collected through events, municipal clean-up days, or private services are not consistently available. Establishing consistent reporting of participation and material quantities collected would significantly improve the County's ability to quantify recovery, identify priority material streams, and track progress toward Materials Management Plan goals.

Construction & Demolition Debris

Based on landfill reporting, C&D waste accounts for an average of 9% of total landfill tonnage over the last 5 years as shown in Table 2 above. C&D debris includes anything used in the construction of roads, bridges and buildings. Typically, these materials include concrete, asphalt, wood (treated or blond), drywall, asphalt shingles, metals, rigid and film plastics, vinyl siding and windows, carpet and other flooring, ceiling tiles, cardboard and other paper, glass, and insulation.

While population and economic growth is a significant factor in the generation of C&D debris, most landfill reporting would attribute an average of between 20% and 40% of inbound tonnage from construction and demolition activities, with some landfills actively seeking C&D debris by offering discounted rates. According to US EPA reports, the amount of construction and demolition waste generated in the United States is more than twice that of MCW. This variance suggests that Missaukee County's C&D tonnage may be under-reported. A true representation of the C&D debris generated in the county would require either reporting on an ongoing basis or periodic waste characterization studies that focus on C&D.[16] Some landfills actively seek out C&D debris and even offer discounted disposal rates. Sometimes the landfills are diverting clean wood and/or concrete for use on-site (after chipping, grinding, or crushing); others are diverting it from landfill entirely by sending it to local markets that can use it for landscaping, fuel, or road building aggregates.

C&D debris can be diverted from landfills at multiple points in the disposal chain. The most effective approach - yielding the cleanest material with the highest reuse or recycling value - is source separation at the construction site. Achieving this requires clear, consistent communication and convenient processes, whether through voluntary programs or mandatory policies. Alternatively, mixed C&D processing offers convenience by eliminating on-site separation, but recovered materials have lower value due to contamination and the cost of processing. Mechanical or conveyor-based sorting also produces fine debris such as drywall dust, dirt, and wood particles (referred to as 'fines') with little to no market value.

Markets exist for some C&D materials when prepared according to specification and generated at a consistent rate:

[16] C&D loads are typically excluded from most MSW/MCW waste characterization studies. While a waste characterization study may include a category for "C&D" it would be de minimis amounts that were co-collected in an MSW/MCW collection truck. A specific C&D characterization is needed to capture material coming in rolloff boxes from construction projects.

WOOD

Clean wood, including woody vegetation, untreated dimensional lumber, and pallets, would likely constitute sufficient tonnage on a regular basis to warrant separation and would result in meaningful and measurable impact on landfill-bound tonnage. Markets are likely to include:

- reuse of dimensional lumber 6 feet or longer and plywood/engineered boards at least 16 square feet that has not been painted or nailed
- landscaping for woodchips/mulch, with colorization potentially adding value
- energy sector, particularly where renewable energy inputs are sought as feedstock for energy production

SCRAP METAL

Though much of the scrap metal generated on construction sites is already recovered through informal collection by subcontractors and tradespeople, there could remain some fraction of scrap metal in the construction site debris that goes for disposal. A scrap metal container with clear labelling and discreetly positioned on the construction site would present an opportunity for anyone on the construction site to contribute any amount of metal for diversion. Local scrap metal companies would be interested in purchasing mixed or sorted metals from a construction site.

CARDBOARD (OCC)

A collection container for OCC generated at strategic junctures during the project timeline will enable recovery of clean cardboard from product installation, such as cabinetry, appliances, and furniture. This large format cardboard will require a large container, ideally with a lid to protect it from precipitation. Cardboard can typically be delivered loose to a buyer but will carry higher value if baled.

CONCRETE

A designation of “clean” concrete is typically made by vendors that accept and produce a higher standard “crusher-ready’ aggregate material. “Mixed aggregate”, containing pieces of brick, ceramic, or other engineered inert materials, such as plastics and compound materials is not considered clean. Rebar presents additional processing challenges for aggregate producers and therefore markets for concrete with rebar are often limited. Partners for concrete recycling include local excavation companies and aggregate manufacturers.

VINYL

Rigid vinyl can come from several sources in a building or renovation project: siding, piping/conduit, window frames, flooring, and fencing are common. These materials can be transported to a centralized collection point where they can be recycled into new vinyl products. Vinyl is typically not accepted at MRFs but specialty vinyl recyclers, like Fryman’s Recycling in Dowagiac or others participating in Revinylize, the national vinyl recycling collaborative, may offer collection bins and pay the transportation costs in exchange for localized collection of rigid vinyl materials.

Storm Debris

At the request of Networks Northwest, RRS evaluated storm debris measurement and quantification methodologies to support Missaukee County's preparedness for debris generated by major storms and severe weather events. Establishing baseline debris estimates is an important first step in emergency debris management planning, which is typically implemented through a countywide Emergency Operations Plan (EOP) and supporting annexes.

The Michigan State Police, Emergency Management & Homeland Security Division provides a **Local Disaster Debris Management Plan Template**[17] for counties, cities, and townships to adapt. The template positions disaster debris planning as a companion to the EOP and as a local counterpart to the State's Disaster Debris Management Plan. Adoption of local debris plans varies, and EGLE has noted that outside of hurricane-prone regions, many communities do not complete disaster debris pre-planning. As a result, the Materials Management Plan (MMP) process represents a timely opportunity to "connect the dots" by documenting the infrastructure, roles, and material pathways that emergency management will depend on during surge conditions.

RRS recommends aligning disaster debris planning with MMP planning because both efforts rely on the same underlying materials management system, facilities, collection/processing capacity, transportation logistics, and end markets, operating under different time horizons. Even without a finalized County or local Disaster Debris Management Plan, the MMP can formalize this linkage by capturing core operational elements that will be needed during an incident, including:

- **Sites:** Existing solid waste and recycling facilities, as well as candidate temporary debris staging and reduction sites, including key constraints (e.g., access, drainage, and traffic control). This enables emergency operations to begin with identified options rather than starting from zero.
- **Capacity:** Normal throughput versus surge conditions, including overflow routing options. The County can also pre-define "activation triggers" tied to capacity constraints (e.g., transfer station queues exceeding a defined threshold for multiple days, or primary MRF downtime exceeding 48 hours).
- **Roles and responsibilities:** Identification of who supports the Emergency Operations Center (EOC) with materials management decisions, regulatory coordination, and communications.
- **Contractors and end markets:** Pre-identified pathways for hauling, grinding, C&D handling, white goods, and HHW management; recognizing that surge volumes may require intermediate staging and alternative destinations.

[17] https://www.michigan.gov//media/Project/Websites/msp/EMHSD/Publications/Local_Disaster_Debris_Management_Plan_Template_2008_Final_Edition.pdf?rev=f548c2a196c248c69772fa733bc01714&utm

- **Public guidance hooks:** Pre-developed reuse- and recycling-first messaging where feasible, consistent with EGLE storm debris guidance, including separating materials and emphasizing recovery options when conditions allow.

RRS has developed preliminary storm debris estimates (in cubic yards) for multiple weather scenarios; these estimates are presented in the following subsections.

SCENARIO 1: ICE STORMS

The first scenario evaluates an ice storm producing between **0.25 inches and 1 inch of ice accumulation** with sustained winds between **10 and 30 mph**. The debris estimate uses roadway mileage as a key input, based on MDOT's published **System Length / Route Miles** metric[18], which for Missaukee County is **924 miles.** In MDOT's reporting, System Length / Route Miles generally represent roadway centerline mileage (counting only one side of divided roads and excluding ramps) for public roads open to travel and certified by public road agencies; MDOT notes this dataset is GIS-based, tied to federal mileage certification processes, and available historically back to 1990.

Using the county's applicable route-mile input and the scenario assumptions above, RRS estimates that ice storms of these magnitudes could generate the approximate debris quantities below. These calculations are based on methodology laid out in a published 2011 study *Rapid Assessment of Tree Debris Following Urban Forest Ice Storms*[19], including a negative correlation between wind speed and debris volume (as wind speed increases less debris observed). FEMA guidance[20] indicates that ice and snowstorm debris streams are typically dominated by **vegetative debris** (downed limbs and trees), along with **overhead utility system components** associated with damaged lines and service infrastructure (see Table 8).

COUNTY NAME	SYSTEM MILES	WIND SPEED MPH	ICE THICKNESS (INCHES)	SCENARIO 1 DEBRIS ESTIMATE CUBIC YARDS
Missaukee	924	10	0.25	90,082
		20	0.25	56,350
		30	0.25	22,619
		10	0.50	243,917
		20	0.50	152,581
		30	0.50	45,237
		10	0.75	365,875
		20	0.75	228,871
		30	0.75	67,856

[18] https://www.michigan.gov/mdot/-/media/Project/Websites/MDOT/Programs/Planning/Asset-Management/HPMS/Statewide-Statistics-LS-County.pdf

[19] Hauer, Richard J.; Hauer, Angela J.; Hartel, Dudley R.; Johnson, Jill R. 2011. Rapid Assessment of Tree Debris Following Urban Forest Ice Storms. Arboriculture & Urban Forestry 37(5):236–246. https://www.srs.fs.usda.gov/pubs/ja/2011/ja_2011_hauer_001.pdf

[20] https://www.fema.gov/sites/default/files/2020-07/fema_325_public-assistance-debris-mgmt-plan_Guide_6-1-2007.pdf, Chapter 6

		10	1.00	487,834
		20	1.00	225,400
		30	1.00	90,474

Table 8: RRS Estimated Ice Storm Debris Volumes CY

SCENARIO 2: SEVERE WEATHER EVENTS

Scenario 2 evaluates debris generation associated with **severe weather events**, with or without precipitation, characterized by **wind speeds ranging from 74 mph to 157+ mph**. At the upper end of this range, the scenario includes **tornado events**, which can produce highly variable and localized debris conditions. The debris estimates generated under this scenario incorporate multiple variables beyond wind speed, including **household density**, **vegetation cover**, and the **prevalence of commercial properties**, all of which influence both the quantity and composition of storm debris.

For Missaukee County, the model inputs include **5,923 households**, a **Heavy vegetation** classification, and a **Light commercial property** designation. Heavy vegetation is typically associated with mature neighborhoods and wooded areas where dense tree canopy cover limits visibility of the ground or structures, increasing the likelihood of vegetative debris during severe wind events. The Light commercial property classification reflects a lower concentration of large commercial structures relative to residential land uses, which influences the proportion of construction and demolition (C&D) debris expected in the debris stream.

In addition to debris volume estimates, it is important to consider anticipated debris composition. FEMA guidance[21] describes typical tornado debris as including vegetative debris, construction and demolition (C&D) debris, personal property/household items, hazardous waste, household hazardous waste (HHW), white goods, and vehicles and vessels (see Figure 8).

The resulting debris estimates, segmented by precipitation condition and wind speed category, are presented in the Table 9. These estimates are intended to support emergency planning by illustrating the potential range of debris volumes that could be generated under severe weather scenarios affecting Missaukee County.

COUNTY	HOUSEHOLDS	COMMERCIAL PROPERTY	VEGETATION	WIND SPEED	PRECIPITATION	SCENARIO 2 DEBRIS ESTIMATE CUBIC YARDS
Missaukee	5,923	Light	Heavy	74-95 MPH	None to Light	17,769
				74-95 MPH	Medium - Heavy	21,323
				96-110 MPH	None to Light	71,076
				96-110 MPH	Medium - Heavy	85,291

[21] https://www.fema.gov/sites/default/files/2020-07/fema_325_public-assistance-debris-mgmt-plan_Guide_6-1-2007.pdf, Chapter 6

				111-129 MPH	None to Light	230,997
				111-129 MPH	Medium - Heavy	277,196
				130-156 MPH	None to Light	444,225
				130-156 MPH	Medium - Heavy	533,070
				157+ MPH	None to Light	710,760
				157+ MPH	Medium - Heavy	852,912

Table 9: RRS Estimated Severe Weather Debris Volumes CY

		Typical Debris Streams								
		Vegetative	Construction & Demolition (C&D)	Personal Property/ Household Items	Hazardous Waste	Household Hazardous Waste (HHW)	White Goods	Soil, Mud and Sand	Vehicles and Vessels	Putrescent
Types of Disasters	Hurricanes / Typhoons	X	X	X	X	X	X	X	X	X
	Tsunamis	X	X	X	X	X	X	X	X	X
	Tornadoes	X	X	X	X	X	X		X	X
	Floods	X	X	X	X	X	X	X	X	X
	Earthquakes		X	X		X	X	X		
	Wildfires	X		X		X	X	X		
	Ice Storms	X				X				

Figure 11: FEMA-325 "Figure 6.2 – Typical Debris Streams for Different Types of Disasters"[22]

[22] https://www.fema.gov/sites/default/files/2020-07/fema_325_public-assistance-debris-mgmt-plan_Guide_6-1-2007.pdf

Facility Inventory

Name	Address	Address	Description
Missaukee County Recycling Center	6240 W. Sanborn Road	Lake City	Materials Recovery Facility
Missaukee County Recycling Center	6240 W. Sanborn Road	Lake City	Other Source Separated Facility
Missaukee County HHW and Tire Collection Event	1199 N. Morey Rd.	Lake City	Other Source Separated Facility
City of McBain Department of Public Works	111 N Roland St.	McBain	Other Source Separated Facility
Missaukee County Sheriff Department	110 Pine Street	Lake City	Other Source Separated Facility
National Energy of McBain	6751 W GERWOUDE DR	McBain	Other Source Separated Facility

Table 10: Materials Management Infrastructure

Appendix

RRS MCW Composition Model

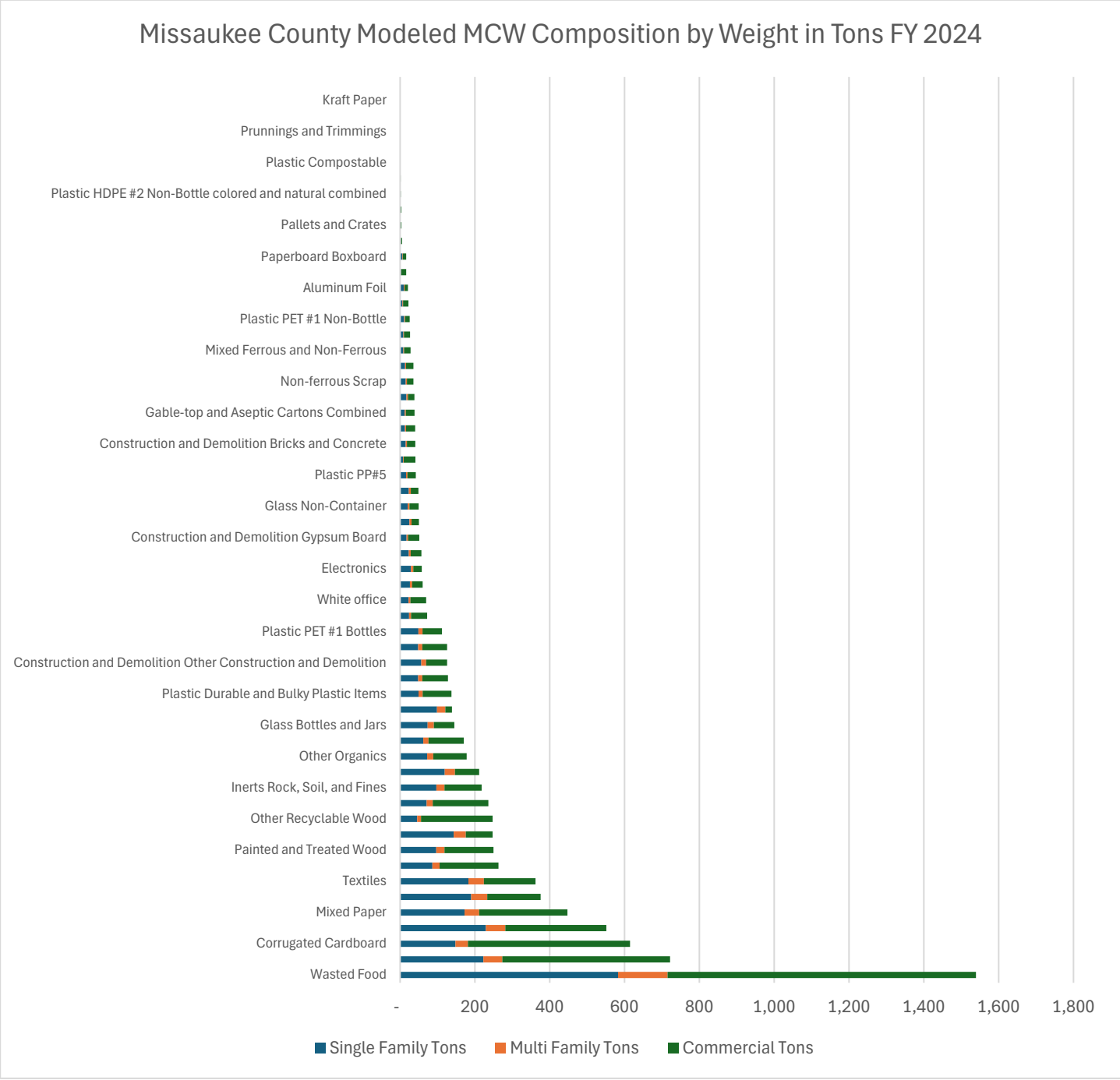


Figure 12: Missaukee County RRS-Modeled MCW Composition 2024

Definitions of the Benchmark Recycling Standards

Michigan Legislature. (1994). Natural resources and environmental protection act, Act 451 of 1994, Part 115, § 11502. Retrieved from Michigan Legislature website: https://www.legislature.mi.gov/documents/mcl/pdf/mcl-451-1994-ii-3-115.pdf

(6) "Benchmark recycling standards" means all of the following requirements:

(a) By January 1, 2026, at least 90% of single-family dwellings in urban areas as identified by the most recent federal decennial census and, by January 1, 2028, at least 90% of single-family dwellings in municipalities with more than 5,000 residents have access to curbside recycling that meets all of the following criteria:

(*i*) One or more recyclable materials, as determined by the county's material management plan, that are typically collected through curbside recycling programs, are collected at least twice per month.

(*ii*) If recyclable materials are not collected separately, the mixed load is delivered to a solid waste processing and transfer facility and the recyclable materials are separated from material to be sent to a solid waste disposal area.

(*iii*) Recyclable materials collected are delivered to a materials recovery facility that complies with part 115 or are managed appropriately at an out-of-state recycling facility.

(*iv*) The curbside recycling is provided by the municipality or the resident has access to curbside recycling by the resident's chosen hauler.

(b) By January 1, 2032, the following additional criteria:

(*i*) In counties with a population of less than 100,000, there is at least 1 drop-off location for each 10,000 residents without access to curbside recycling at their dwelling, and the drop-off location is available at least 24 hours per month.

(*ii*) In counties with a population of 100,000 or more, there is at least 1 drop-off location for each 50,000 residents without access to curbside recycling at their dwelling, and the drop-off location is available at least 24 hours per month.

BUSINESS SECTOR DEMOGRAPHICS, NUMBER OF ESTABLISHMENTS AND NUMBER OF JOBS

Provided by Networks Northwest

ESTABLISHMENTS

Industry	2018	2023
Management of companies and enterprises	N/A	N/A
Retail Trade	87	91
Construction	64	87
Health care and social assistance	44	80
Accommodation and food services	61	78
Other services (except public administration)	60	62
Professional, scientific, and technical services	29	41
Manufacturing	24	29
Finance and insurance	20	24
Administrative support and waste management and remediation services	21	24
Real estate and rental and leasing	11	20
Arts, entertainment, and recreation	12	16
Wholesale Trade	8	15
Agriculture, forestry, fishing and hunting	11	11
Transportation and warehousing	11	9
Information	9	7
Unclassified	4	4
Utilities	3	3
Educational services	4	3
Mining, quarrying, and oil and gas extraction	2	2

JOBS

Industry	2018	2023
Agriculture, forestry, fishing and hunting	N/A	N/A
Mining, quarrying, and oil and gas extraction	N/A	N/A
Management of companies and enterprises	N/A	N/A
Educational services	N/A	N/A
Health care and social assistance	N/A	N/A
Retail Trade	1,005	1,075
Manufacturing	928	999
Accommodation and food services	598	572
Construction	268	315
Wholesale Trade	209	250
Other services (except public administration)	223	229
Arts, entertainment, and recreation	174	227
Finance and insurance	125	129
Administrative support and waste management and remediation services	91	116
Professional, scientific, and technical services	82	94
Transportation and warehousing	64	77
Utilities	40	47
Information	58	44
Real estate and rental and leasing	30	34
Unclassified	6	5

Memo

TO: Mathew Cooke, Networks Northwest
FROM: Caitlyn Wouters and Kristen Wieland, RRS
DATE: January 8, 2026
RE: Wexford County MMP Data Analysis - **DRAFT**

Introduction

The RRS team undertook a comprehensive analysis to support the five counties' waste management planning efforts. As part of this work, RRS developed a baseline data set based on known waste data, where available, and supplemented with modeled projections of waste generation and recovery potential. This data will serve as a foundational resource to guide each committee's decision-making on key planning and policy issues.

The baseline data will support the identification of strategies for meeting the Benchmark Recycling Standards, both in the near term and over the planning horizon. This memorandum presents a summary of the current materials generation and recovery conditions within Wexford County. It incorporates modeled data prepared by RRS, along with any available actual data provided by the Networks Northwest planning agency or county MMP Committee participants. The information contained herein offers a comprehensive overview of the counties' materials management landscape to serve as a supporting component of the Materials Management Plans.

Recycling Rate

Based on this assessment, RRS estimates that **approximately 54% of landfilled municipal and commercial waste (MCW) by weight from Wexford County is either readily recyclable or compostable**. Based on the available data, as described in detail within this memo, RRS estimates Wexford County is currently achieving the following countywide recycling rate (including traditional recycling and organics):

- **Countywide Recycling Rate Estimate:** 11.5%

Preliminary Opportunities

RRS has highlighted several key opportunities that should be discussed by the MMP Committee for potential goal setting in the next phase of the MMP development. These opportunities are described below, with additional detail provided throughout the memorandum.

While the data points discussed in this analysis are comprehensive and valuable for general understanding of the current recycling and diversion taking place and the general makeup of the waste stream, it is critical to note that the preliminary opportunities outlined below are based on the data and information that was provided to RRS or otherwise publicly available.

In the absence of data, we have supplemented with modeled data based on actual data from other similar regions to provide a starting point for discussion purposes and aid in goal setting. Having actual **community-level data** is the only way to monitor progress toward goals and therefore should be considered in all future MMP Committee discussions to ensure impact can be measured during implementation of the MMP. Additional information about the modeling and methodology can be found in the RRS MCW Modeling section of this report.

Benchmark Recycling Standards specified in Part 115 require counties with populations under 100,000 to provide at least one recycling drop-off location for every 10,000 residents without access to curbside recycling by January 1, 2032. With approximately 23,000 residents lacking verified curbside recycling access, Wexford County must add three qualifying drop-off locations unless curbside recycling access can be verified or expanded. In the absence of additional confirmed drop-off sites or verified curbside access beyond Cadillac, the County should plan to either establish additional drop-off facilities that meet Part 115 criteria or formalize and expand curbside recycling access for single-family residences.

In addition to drop-off recycling access, Benchmark Recycling Standards require municipalities with populations over 5,000 residents to ensure curbside recycling service is available to at least 90 percent of single-family households by January 1, 2028. The City of Cadillac directs residents to curbside recycling services provided by Ms. Green Shredding & Recycling While residents in other municipalities may also obtain curbside recycling through subscription-based arrangements with Ms. Green or other private haulers, these services are not publicly documented, verified countywide, or uniformly available, limiting their applicability for compliance determination.

The top six materials with diversion significance, by weight, in the county present a prime opportunity for meaningful and measurable impact in the 5-year planning window:

1. **Wasted food -** discarded food scrap byproducts that are not consumed by humans or food that was edible but ended up wasted - comprises over 4,800 tons of landfill-bound materials from Wexford County. This category of waste is not only the most significant by weight but is also significant in its potential social, environmental, and economic value directly within Wexford County. Good food can be redistributed to people in need instead of sent to landfills, thereby supporting the needs of residents through existing food distribution networks. Food that is unsuitable for redistribution can be processed locally through basic backyard composting to generate a soil amendment for use directly by the homeowner. A more sophisticated collection system that aggregates residential and commercial food waste along with other agricultural waste could be processed at a privately operated composting facility or anaerobic digester operator (potentially through a public-private partnership) to generate a large amount of compost to regenerate soils in the entire county and region and support local agriculture. As noted in the following analysis, the proximity to existing composting operations in Sears, MI (Morgan Composting) could present an opportunity for increased organics collection.

2. **Plastic film** totals nearly 2,300 tons of landfill-bound materials leaving Wexford County. From residential sources, these typically include plastic shopping bags, grocery bags, and dry-cleaning bags. From commercial sources, these thin, flexible plastics could include stretch wrapping used to stabilize pallets and cases, greenhouse and agricultural bale wrapping, shipping pouches and bubble wrap among others. While not typically accepted in single stream recycling programs due to the low value and difficulty in marketing it post-processing, drop-off programs and

commercial plastic film collection programs can keep these plastics clean and dry, resulting in significant volumes of valuable material that has strong end market potential.

3. Corrugated cardboard has become a significant waste material type in recent years due to the shift in online purchasing. RRS estimates Wexford County is landfilling nearly 2,000 tons of cardboard from both residential commercial sources. Cardboard was formerly generated primarily at retail establishments and was sometimes collected for recycling. While online purchasing trends have shifted some tons away from the commercial waste stream and into the residential waste stream, 70% of the cardboard remains in the commercial stream, creating opportunities for increased recovery in both. Local manufacturer, Packaging Corporation of America (PCA) in Filer City (Manistee County), would directly benefit from the additional collection of corrugated cardboard from the Northwest Michigan region.

4. Compostable paper refers to paper products that are typically unsuitable for recycling due to their low quality or because they are often soiled during use, such as paper plates, napkins, facial tissues, and paper towels. When combined with food scraps, this compostable paper could be a valuable input to either composting or anaerobic digestion when done at a commercial scale. This fraction of the waste stream comprises over 1,700 tons in the county.

5. Mixed paper, estimated at over 1,400 tons in the county, is a general grade of clean but varied qualities of mixed fiber materials including mail, office paper, paper bags, books, magazines, greeting cards, index cards, cereal boxes, etc. This paper is often the largest output, by volume, of single stream recycling facilities and has strong Midwest markets ready to accept more material for production of new paper products.

6. Textiles are a significant waste category in Wexford County, comprising over 1,100 tons in our model. Clothing, towels, rope, household linen, leather products, and other similar products that are either discarded out of convenience or due to rips, excessive wear, or are otherwise unsuitable for reuse. Local resale stores could be ideal partners to evaluate additional textile recovery opportunities to get more usable textiles into the hands of people who need them, keeping them out of landfills.

Materials that are readily marketable but currently being landfilled offer strong diversion potential due to established recycling channels and typically yield positive economic returns and should be prioritized for enhanced recovery in the Wexford Materials Management Plan. While not represented in the top six categories by weight, the following materials have consistent value and market demand and are ubiquitous in the waste stream, making them natural opportunities for increased recovery across the region.

These materials include (listed in order from highest-lowest potential yield):

- **mixed paper** (as identified above, 1,408 tons)
- **ferrous metal** (536 tons)
- **#1 PET plastic** (bottle and non-bottle) (432 tons)
- **#2 HDPE plastic** (colored and natural) (126 tons)
- **white office paper** (219 tons)
- **magazines** (190 tons)
- **steel cans** (179 tons)
- **newspaper** (158 tons)
- **aluminum cans** (154 tons)
- **#5 PP plastic** (131 tons)
- **polycoated paper cups and cartons** (121 tons)

The materials listed below can be **difficult to recycle due to their bulkiness, weight or other challenges** but are generally frequently requested by community members for recycling and disposal options. As such, RRS recommends these be considered in the development of Wexford County's MMP:

Construction and demolition (C&D) materials – primarily clean lumber, pallets, cardboard, concrete, and scrap metal - represent a high-volume opportunity for landfill diversion and reuse. Many of these materials have market value, and reuse programs like Habitat ReStore provide both social and environmental benefits. However, current waste characterization studies exclude most C&D debris, meaning its true volume is underrepresented and not well understood. A dedicated study is needed to quantify and stratify C&D materials to develop effective recovery strategies and estimate recovery amounts.

Glass bottles and jars, estimated at 456 tons landfilled annually in Wexford County, are endlessly recyclable but require clean separation from contaminants to maintain quality. Mixed collection often leads to contamination, reduced yield, and degradation of other recyclables. When local markets are accessible, clean glass can retain material and economic value; otherwise, it may be diverted to lower value uses like landfill cover. Developing a system to aggregate clean glass for efficient delivery could unlock recycling potential.

Expanded polystyrene (EPS) foam is rarely accepted in curbside recycling because it's difficult to process in automated facilities. When source-separated, it can be recycled but requires densification to improve shipping efficiency and market value. Wexford County discards an estimated 228 tons annually, indicating a strong opportunity for recovery if a collection network and basic processing infrastructure are developed.

Electronics (e-waste) have become pervasive in modern life thanks to technological advancements that make them smaller and more affordable, but these same innovations lead to rapid obsolescence, driving consumers to replace them frequently. Since they are not banned from landfills, computers, cell phones, printers, toasters, coffee pots, and many more devices can be found in the waste stream, with some containing batteries that pose fire and environmental risks. If recycled, precious metals, scrap metal, and rigid plastics can be recovered and diverted from landfills. Residents routinely seek out a permanent collection program to provide ongoing benefits and convenience.

Batteries, especially lithium-ion, are increasingly common in consumer products and pose serious disposal risks. Improperly discarded batteries can ignite fires in collection vehicles, processing facilities, or during shipment, making safe handling and recycling critical. While not quantified in the model, battery collection is a public safety issue that should be addressed to protect people, infrastructure, and the environment.

Mattresses are hard to dispose of, causing illegal dumping and landfill issues due to their bulk and springs. Wexford County generates 16 tons annually, but a local recycler (BARC) offers a solution through community partnership.

Scrap tires are banned from Michigan landfills but can be recycled into products like rubber mulch, road additives, or energy sources. They are often illegally dumped, creating health risks from mosquito breeding and a public nuisance

for public agencies. With no documented scrap tire collection sites in Wexford County, periodic collection events are key to safe disposal and environmental protection.

Storm debris can place significant strain on landfill capacity and, depending on the severity of the event, may generate large volumes of material that could be diverted from disposal if adequate infrastructure and systems are in place. RRS recommends integrating disaster debris planning with MMP development, as both rely on the same foundational materials management framework - facilities, collection and processing capacity, transportation logistics, and end markets - though they operate on different timelines. Even without a finalized County or local Disaster Debris Management Plan, the MMP can establish this connection by documenting the core operational elements needed during an emergency.

Commercial recyclables present an opportunity for high volumes of targeted materials to be recovered but services are often limited for commercial routes. Employment data shows that aligning strategies with Wexford County's business profile ensures maximum diversion impact and supports progress toward Materials Management Plan goals.

- Accommodation and Food Services contribute heavily to **food waste**, making prevention, rescue, and organics diversion critical for restaurants, hotels, and grocery-related businesses.
- Retail, Manufacturing, Transportation, and Wholesale sectors generate large volumes of **corrugated cardboard**, offering strong recycling potential through targeted programs and improved infrastructure.

State Landfill Report

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) requires quarterly reporting of all materials landfilled within the state. This reporting, documented through the *Annual Report of Solid Waste Landfilled in Michigan*[1], provides actual data on waste disposed of at Michigan landfills. The dataset includes the total tonnage of waste, identified by county of origin, and classifies materials into broad waste categories.

These categories include **Municipal and Commercial Waste (MCW)**, such as household waste, commercial waste, garbage, regulated medical waste, and municipal solid waste incinerator ash; **Industrial Waste (IW)**, including ashes, auto shredder residue, cement kiln dust, coal ash, food processing residuals, foundry sand, and industrial sludge; **Construction and Demolition (C&D)**, including asbestos waste, scrap wood, and treated or untreated wood; **Other Waste**, such as contaminated soils and technologically enhanced naturally occurring radioactive materials (TENORM); and **Alternative Daily Cover (ADC)**, materials such as chipped tires, ash, foundry sand, sludge, or contaminated soils approved for landfill cover use.

[1] https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Legislative/MMD/Part-115/Report-FY24-Landfilled-Solid-Waste.pdf?rev=b1a8a575d427406f8a4ad4fb4de0ff47&hash=430D8389FB9BEE4BA4AA6D076DCC50F7

The annual report also includes estimates of remaining landfill capacity. However, it does not account for waste generated in Michigan and disposed of out of state, nor does it provide detailed quantities of specific materials within each category. In addition, the assignment of broad categories (MCW, C&D, ADC, IW, and Other) is not necessarily consistent across the state and may vary by facility and even by individual scale operator. This is particularly relevant for mixed loads that contain multiple material types (e.g., both MCW and C&D), where the total weight of a container or load is typically attributed to a single category, potentially obscuring the true distribution of materials.

For this analysis, RRS reviewed EGLE's latest reported data covering fiscal year 2024.

TOTAL TONS LANDFILLED IN MI GENERATED FROM ANTRIM, CHARLEVOIX, MANISTEE, MISSAUKEE AND WEXFORD COUNTIES

The table below presents the aggregated total tons of all material categories (MCW, IW, C&D, ADC, and Other) landfilled in Michigan and attributed to each county in the past fiscal year. It is important to note that these figures represent tonnage as reported. While the data reflects the best available information, it is possible that some materials were reported under incorrect category types or mixed loads were categorized under a single type.

2024	Tons from Charlevoix	242,114.42
2024	Tons from Manistee	93,033.15
2024	Tons from Antrim	78,111.39
2024	Tons from Wexford	58,665.15
2024	Tons from Missaukee	29,706.13

Table 1: Total Tons Landfilled in MI from Each County 2024

WEXFORD COUNTY

TOTAL TONS LANDFILLED BY TYPE

Table 2 and Figure 1 below present the total tons of landfilled material in each of the five broad categories attributed to Wexford County on the annual landfill report for Fiscal Year 2024. The largest share by weight is Municipal and Commercial Waste (MCW) at 46% followed by Industrial Waste (IW) at 22%.

According to demographic data provided by Networks Northwest, originally sourced from the American Community Survey, Wexford County had an estimated population of 33,868 in 2023. This corresponds with an estimated MCW disposal rate of approximately **4.35 pounds per person per day**, which aligns with the state average reported by EGLE of 4.64 pounds per person per day.

TYPE	TONS LANDFILLED
ADC	9,125.60
C&D	8,922.66
IW	12,847.09
MCW	26,874.93

OTHER	894.87
Grand Total	**58,665.15**

Table 2: Michigan Landfill Waste Generated by Wexford County by Type in Tons, 2024

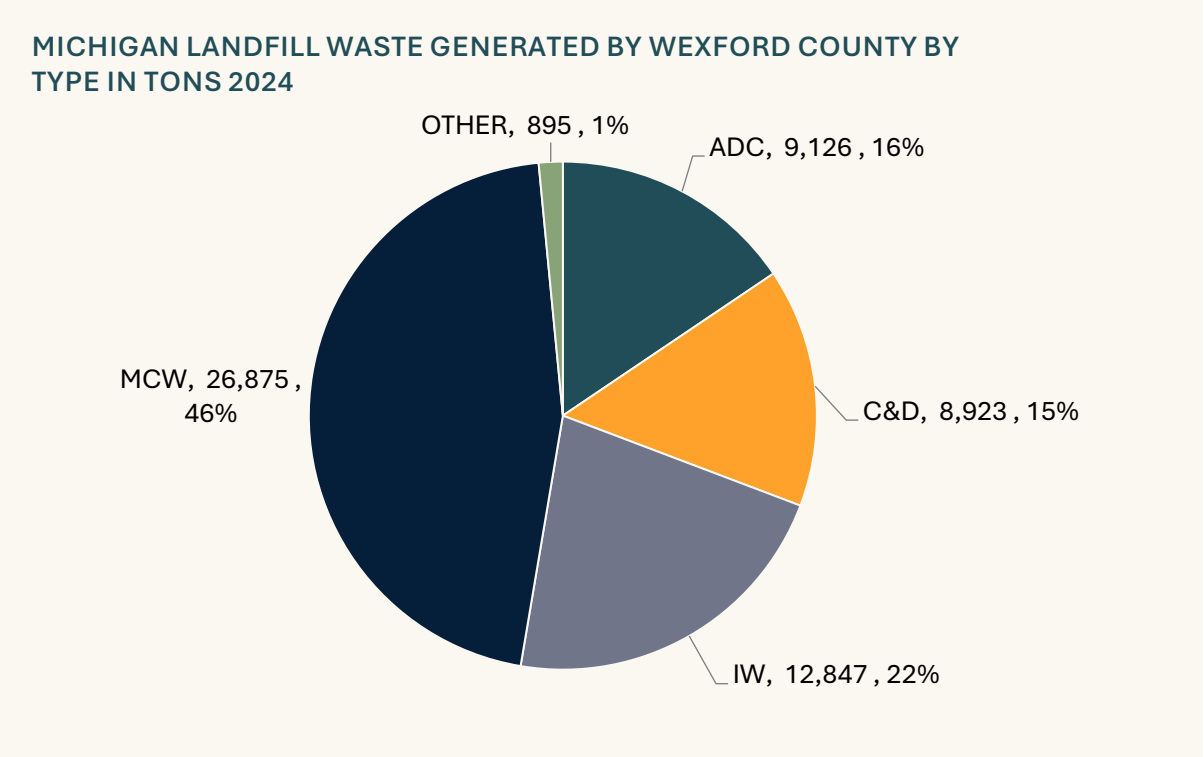


Figure 1: Michigan Landfill Waste Generated by Wexford County by Type in Tons 2024

DISPOSAL FACILITIES RECEIVING LANDFILLED MATERIAL FROM WEXFORD COUNTY IN FY 2024

Table 3 below lists the disposal facilities that received landfilled materials originating from Wexford County in 2024 and provides corresponding quantities, by material type, reported in tons. Table 4 presents information on landfill capacity at each location, reported in cubic yards. The remaining years of capacity are presented as a range for each facility: one value is self-reported by the landfills, and the other is calculated by EGLE by dividing the remaining capacity by the amount of capacity used in FY 2024. Differences between these two values account for the range in remaining years of capacity shown in the table.

Landfills Receiving Waste from Wexford County 2024				
	Tons Generated	**Wexford County Landfill (Wexford County)**	**Manistee County Landfill (Manistee County)**	**Northern Oaks Recycling and Disposal Facility (Clare County)**
ADC	9,125	9,126	-	-
C&D	8,922	8,923	158	37
IW	12,847.09	12,847	35	-

MCW	26,874.93	26,875	4,186	1,424
OTHER	894.87	895	7	868
Grand Total	**58,665.15**	**58,665**	**4,386**	**2,330**

Table 3: Landfills Receiving Waste from Wexford County in 2024

	Wexford County Landfill (Wexford County)	Northern Oaks Recycling and Disposal Facility (Clare County)	Manistee County Landfill (Manistee)
Remaining Capacity (CY)	15,820,706	5,592,701	7,617,704
Capacity Used in 2024 (CY)	366,293	113,360	156,057
Est Years of Remaining Capacity	43 - 46	49 - 56	49

Table 4: Estimated Remaining Landfill Capacity in 2024

Wexford County Landfill

The Wexford County Landfill Inc is a licensed solid waste landfill and solid waste transfer facility located at 990 US 131 North in Manton Michigan and is regulated under Michigan's Part 115 solid waste program through EGLE. The facility is privately owned and is operated by GFL.

Figure 2 presents the materials received at the Wexford County Landfill in **2024**, reported in tons and attributed by **county of origin**. The data include all reported landfill material categories, including Industrial Waste (IW), Construction and Demolition (C&D), Municipal and Commercial Waste (MCW), Alternative Daily Cover (ADC), and Other.

Over this period, the Wexford County Landfill received a total of 324,068 tons, the **majority of which (40%) was generated in Grand Traverse County**. The landfill also served as the primary disposal destination for material generated within Wexford County (Table 3). From all counties, MCW represents the largest share of total reported tonnage received by the landfill, totaling approximately 246,242 tons, or **76% of the total**, shown in Figure 3.

ORIGIN OF WASTE LANDFILLED IN WEXFORD COUNTY FY 2024 IN TONS

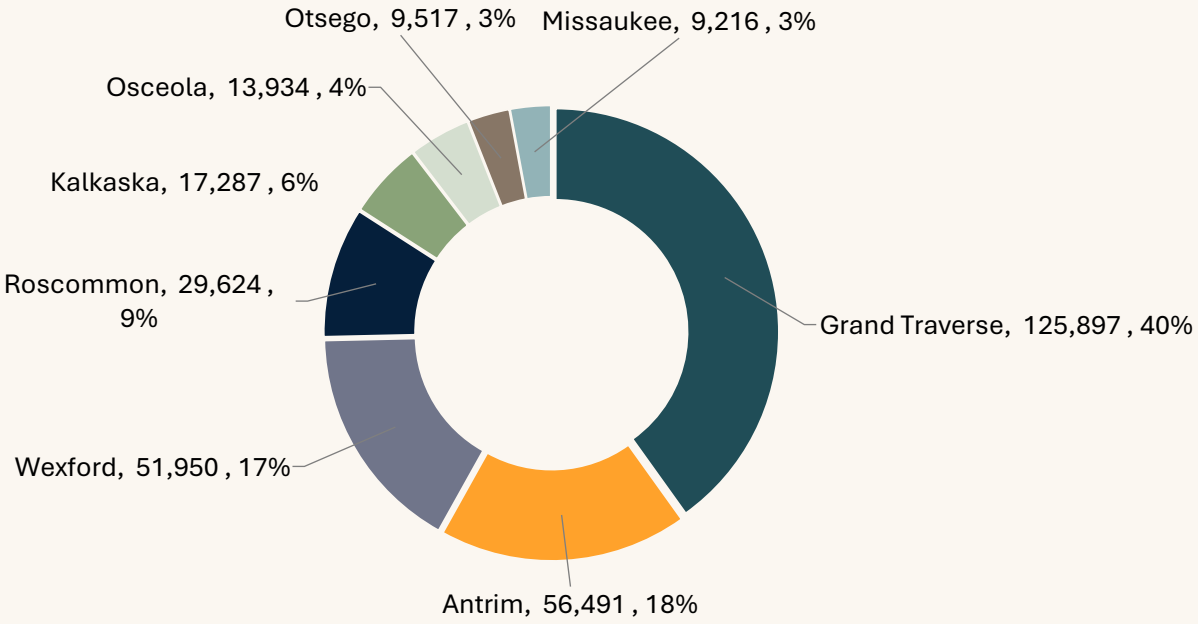


Figure 2: Origin of Waste Landfilled at Wexford County Landfill in 2024 in Tons

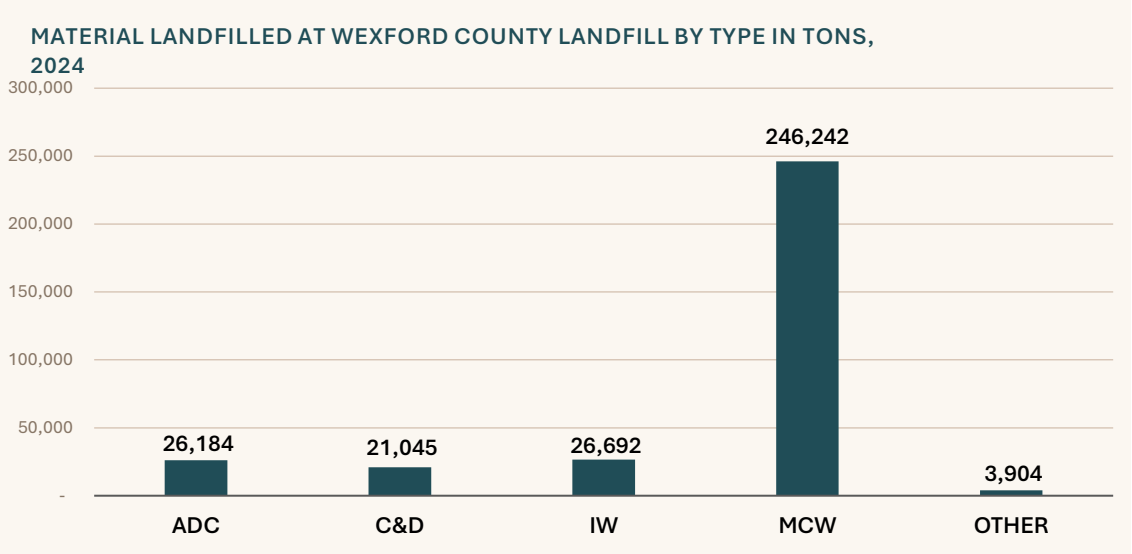


Figure 3: Material Landfilled at Wexford County Landfill by Type in Tons, 2024

RRS MCW Modeling

The RRS Municipal and Commercial Waste (MCW) Characterization Model is designed to identify potential recovery opportunities within the MCW stream, broken down by specific material types and generating sectors, including single-family residential, multi-family residential, and commercial sources. The model was developed using multiple waste characterization and capture rate studies conducted over the past five years, including studies specific to Michigan as well as broader research from the Midwestern United States. This model is intended as a planning tool to help the County understand which specific materials are being landfilled within the MCW stream, thereby identifying the greatest opportunities and potential tons available for recovery.

The model estimates the composition of MCW by dividing it into approximately 50 distinct material categories, expressed as percentages of the total waste stream. These percentages are then applied to the total tons of landfilled MCW attributed to Wexford County in 2024 (26,875) as reported to EGLE to estimate the tonnage of each material category disposed. Additionally, the model uses aggregated data to differentiate between waste generated by commercial businesses and residential sources. Within the residential sector, housing data from the 2020 U.S. Census is incorporated to allocate tonnages between single-family and multi-family residences.

The approximately 50 material categories were also ranked according to their ease of recovery. The rankings are as follows:

1. **Readily Recyclable** – materials that are almost universally accepted in existing curbside recycling programs. Examples include cardboard, plastics #1-2, aluminum cans.

2. **Compostable** – materials that break down naturally, including food waste, yard waste, brush, and leaves.

3. **Recyclability Variable by Municipality** – materials that are sometimes accepted in established curbside recycling programs. Examples include HHW, plastic films, textiles.

4. **Minimal Access for Recycling/Specialty Recycling** – materials that may be recyclable through drop-off or specialized programs, such as bulky waste, tires, and polystyrene.

5. **Not Recyclable** – materials that are currently not recyclable through existing programs.

Based on this assessment, RRS estimates that approximately 54% of landfilled MCW by weight from Wexford County is either readily recyclable or compostable. This approach provides a detailed, data-driven foundation for evaluating material-specific recovery potential and informing county-level planning efforts.

RRS LANDFILLED MCW RECYCLABILITY MODEL BY WEIGHT IN TONS

Figure 4 below illustrates the recyclability of municipal and commercial waste (MCW) by weight for materials currently landfilled, based on an estimated MCW tonnage of 26,875; the amount of MCW attributed to Wexford County on the 2024 EGLE Landfill Report. It highlights the potential opportunities to divert waste from landfill toward higher-value outcomes, such as established recycling programs or composting initiatives.

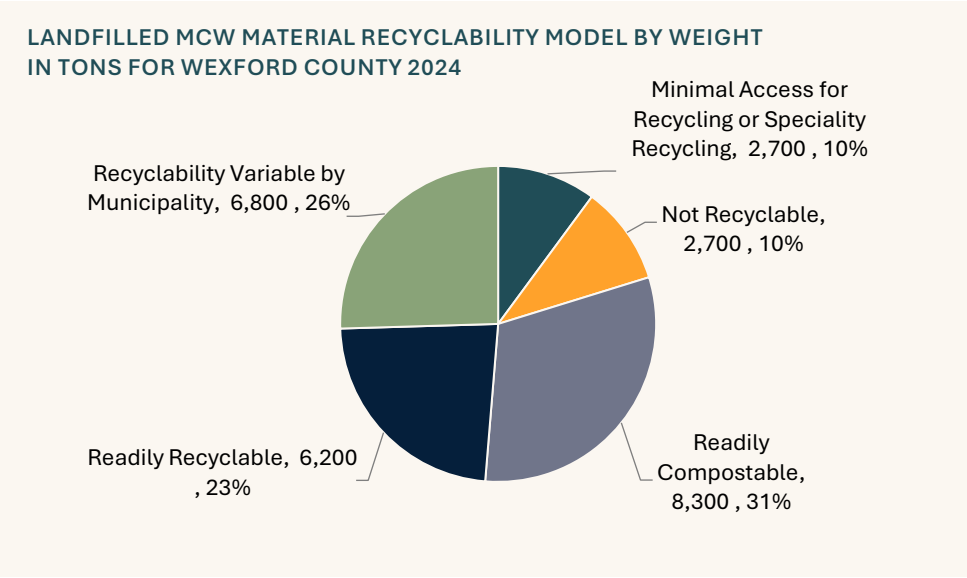


Figure 4: RRS Model, Landfilled MCW Recyclability by Weight in Tons

RRS MCW COMPOSITION MODEL BY WEIGHT

Figure 5 below outlines the 25 most prevalent materials within the MCW stream by weight, as identified by the RRS model. It also illustrates the proportional generation of each material by single-family households, multi-family households, and the commercial sector. The tonnage and relative proportions of these materials provide valuable insights for planners to target key materials for diversion efforts as discussed previously in the Preliminary Opportunities section. Wasted food represents a significant opportunity to both increase diversion and reduce overall waste through food rescue and composting. In addition,

the large quantity of compostable paper further increases the potential feedstock for expanded composting infrastructure. The model also indicates a strong potential to increase recovery of corrugated cardboard and plastic films, particularly within the commercial sector, where these materials represent a larger share of total generation. Textile waste also represents a significant tonnage and therefore presents an opportunity to expand or encourage textile reuse and donation outlets within the county.

A full depiction of all 50+ materials and their anticipated composition in the waste composition model can be found in the Appendix.

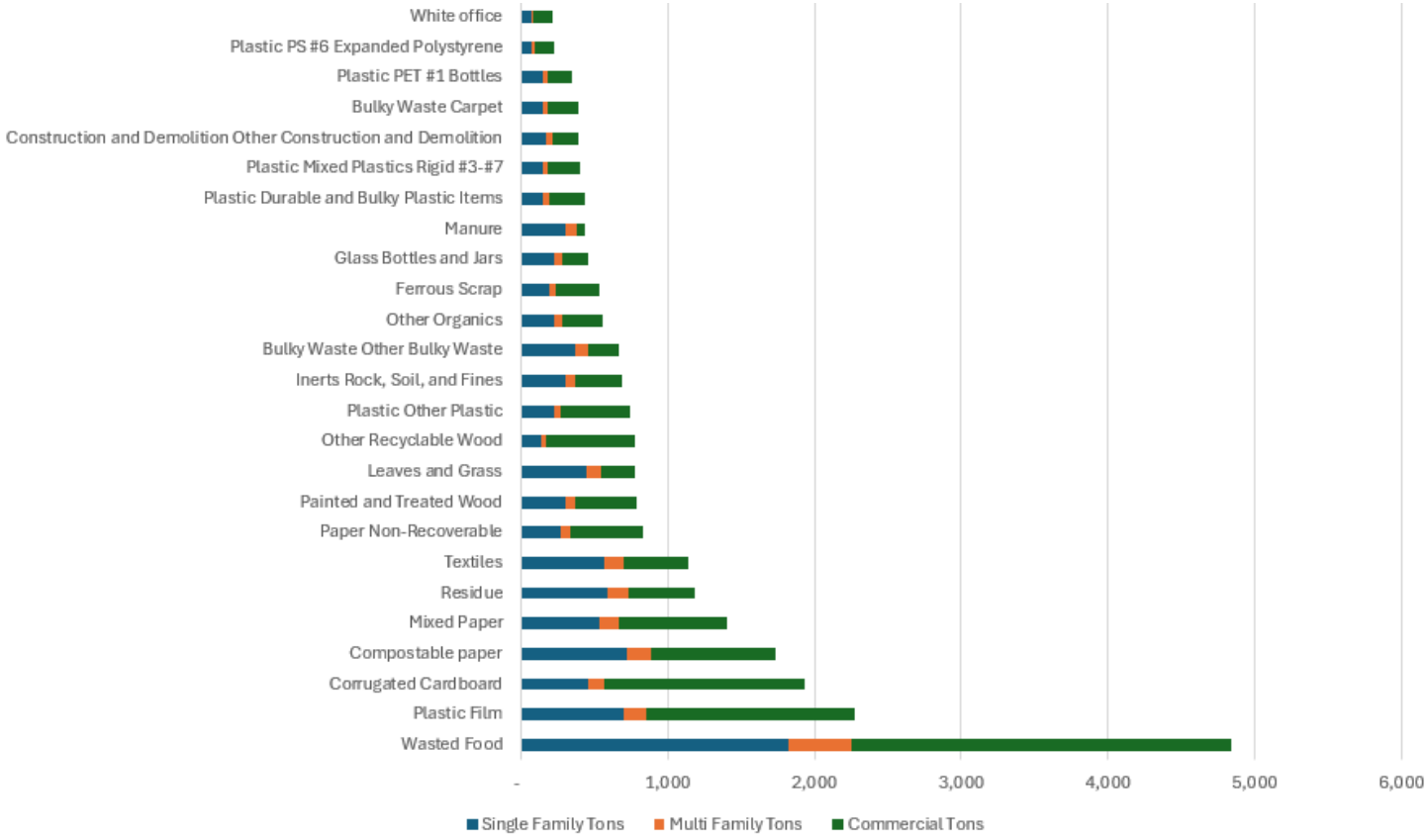


Figure 5: RRS Modeled MCW Composition by Weight

POTENTIAL ECONOMIC OPPORTUNITY

When approached strategically, materials management plans present significant economic opportunities for the county. Recovered materials, often considered "waste," can be valuable resources when properly sorted and processed, serving as key inputs for various industries. The following table illustrates the potential economic value of materials currently being landfilled by residents and businesses in Wexford County. It provides a breakdown of Wexford's estimated MCW tonnage into specific material categories, based on the RRS model. Additionally, commodity values for each material were sourced from Recyclingmarkets.net, a trusted industry resource, to demonstrate the potential value of these landfilled materials if they were properly captured, sorted, and prepared for market (e.g., baled). While this analysis serves as an illustration of potential value,

it is recognized that achieving a 100% capture rate for all landfilled recyclables is unlikely. Furthermore, the snap-shot values presented reflect a relatively low commodities market, so the estimated value should be considered somewhat conservative. **Even under these conservative assumptions, the analysis indicates that more than $260,000 in "Readily Recyclable" materials from Wexford County are currently landfilled each year.**

Type Modeled	Ease of recoverability	Total Tons	Recyclingmarkets.net value 9.15.25	Est Market Value of Tons
Corrugated Cardboard	Readily Recyclable	1,934	$ 65	$ 125,682
Mixed Paper	Readily Recyclable	1,408	$ 35	$ 49,263
Steel Cans	Readily Recyclable	179	$ 160	$ 28,684
White office	Readily Recyclable	219	$ 125	$ 27,401
Aluminum Cans	Readily Recyclable	154	$ 80	$ 12,285
Magazines	Readily Recyclable	190	$ 35	$ 6,642
Newspaper (ONP)	Readily Recyclable	158	$ 35	$ 5,521
Plastic HDPE #2 Bottles Natural	Readily Recyclable	111	$ 46	$ 5,127
Plastic PET #1 Bottles	Readily Recyclable	352	$ 6	$ 2,023
Paperboard Boxboard	Readily Recyclable	51	$ 35	$ 1,771
Plastic HDPE #2 Bottles colored	Readily Recyclable	120	$ 3	$ 301
Plastic HDPE #2 Non-Bottle colored and natural combined	Readily Recyclable	6	$ 1	$ 3
				$ 264,702
Plastic Film	Recyclability Variable by Municipality	2,270	$ 1	$ 2,270
Plastic PP#5	Recyclability Variable by Municipality	131	$ 8	$ 985
Plastic Mixed Plastics Rigid #3-#7	Recyclability Variable by Municipality	402	$ 2	$ 604
				$ 3,859
				$ 268,561

Figure 6: Example Recycling Market Values for 9.15.2025

Organic Material

Organic material includes edible surplus food, inedible food scraps, and yard debris such as leaves, brush, grass clippings and trimmings. In Michigan, yard clippings are prohibited from disposal in municipal solid waste landfills under Part 115 of the Natural Resources and Environmental Protection Act (NREPA) [2]. Despite this prohibition, waste characterization studies routinely indicate that yard materials still appear in disposed MCW streams (typically due to seasonal cleanouts, mixed loads,

[2] https://legislature.mi.gov/Laws/MCL?objectName=mcl-324-11514&utm

or limited access to convenient organics options). Within Wexford County, only residents in **Cadillac** have access to curbside yard waste collection. It's possible that residents in other communities have access to curbside yard waste collection or access to drop-off programs but this is not well documented. In addition, the tonnage collected through Cadillac or other communities curbside programs are not currently available, limiting the County's ability to quantify organics diversion and track progress over time.

SEEDS ORGANICS ANALYSIS

A 2021 report[3] prepared by RRS and commissioned by SEEDS Ecology & Education Centers and funded with a 2021 EGLE Market Development Grant, evaluated current prevention, rescue/recovery and recycling processing opportunities and applied feasibility of each option to each county in the region and modeled centralized composting and operating costs and a preliminary collection and transportation plan. It also projected GHG emission savings and job creation and identified actionable next steps for the region to support the organics circular economy. The study concluded that Wexford County generated an estimated 8,035 tons of organic waste per year with approximately 77 tons diverted to permitted composting sites annually. Based on RRS's current model of landfilled MCW and the average MCW tons for the county, in 2024 RRS estimates that Wexford County generated approximately 8,300 tons of organic waste that was landfilled. **For planning purposes, Wexford County should estimate 8,035 - 8,300 tons of organic waste generated (food scraps, yard waste, brush, leaves, branches and trimmings) annually.**

SEEDS REPORT ESTIMATED ORGANICS GENERATION AND DIVERSION 2021

Figure 7 below summarizes the ten counties analyzed, showing their estimated annual generation of organic waste (food and yard waste) in tons, the amount currently diverted, and the additional tonnage that could potentially be diverted through various methods. If all identified strategies were implemented, Wexford County's overall organics diversion rate would reach 22.6%. The study noted an existing strength in Wexford County with a number of farms actively engaged in onsite composting. The study also identified the close proximity to existing composting operations in Sears, MI (Morgan Composting) could present an opportunity for increased organics collection. At the time, it was estimated that ~ 261 tons of food waste is generated per year from food stores within the county and ~960 tons per year from food processing operations.

[3] https://michiganrecycles.org/wp-content/uploads/2022/08/RRS-FINAL-REVISED-NW-Lower-MI-Regional-Organics-Strategy-Report.pdf

ANNUAL TONS YARD AND FOOD WASTE								
			Estimated Potential Diversion					
COUNTY	Generation	Current Diversion*	Prevention	Rescue/ Recovery	Recycle**	Centralized Composting	Tons Diversion	Percent Diversion
Antrim County	6,149	41	81	39	345	935	1,400	22.8%
Benzie County	5,101	108	62	30	360	686	1,138	22.3%
Charlevoix County	6,687	1,286	91	44	387	1,415	1,937	29.0%
Emmet County	8,006	1,048	236	127	678	2,806	3,847	48.0%
Grand Traverse County	19,074	4,003	319	302	1,551	8,301	10,473	54.9%
Kalkaska County	5,114	14	61	30	229	721	1,041	20.4%
Leelanau County	5,850	751	76	36	447	861	1,420	24.3%
Manistee County	6,366	421	85	41	321	992	1,438	22.6%
Missaukee County	4,608	1	52	25	194	561	832	18.1%
Wexford County	8,035	77	115	56	547	1,789	2,507	31.2%
TOTAL	**74,989**	**7,750**	**1,179**	**729**	**5,060**	**19,066**	**26,034**	**34.7%**

*Current Diversion tonnage is estimated based on 2021 survey data and 2019 EGLE Waste Data System (WDS) of reported volumes to permitted composting sites.
**Recycle includes backyard composting, community composting and animal feed. The estimated diversion by sub-category is included in the appendix.

Figure 7: Potential Organic Tonnage, SEEDS 2021

Demographic Data & Waste Generation

MCW GENERATION PROJECTIONS

Networks Northwest provided RRS with county-level demographic data obtained from the American Community Survey, the Bureau of Labor Statistics, and the Michigan Department of Technology, Management & Budget. These data include projected five-year population estimates through 2050. Table 5 below applies both the state average MCW disposal rate of 4.6 pounds per person per day and the 4.35 pounds per person per day calculated from 2024 reported landfill tonnages to illustrate the potential range of MCW volumes the county may need to manage in the coming decades.

YEAR	PROJECTED COUNTY POPULATION	ANNUAL MCW TONS AT 4.35 LBS/PP/DAY	ANNUAL MCW TONS AT 4.6 LBS/PP/DAY
2024	33,868	26,875	28,679
2025	33,493	26,577	28,362
2030	35,285	27,999	29,879
2035	35,915	28,499	30,413

2040	36,301	28,806	30,740
2045	36,354	28,848	30,785
2050	36,354	28,848	30,785

Table 5: RRS Potential MCW Tonnage Projections

BUSINESS SECTOR DEMOGRAPHICS

Detailed business establishment and employment data for **2018 and 2023**, provided by Networks Northwest and originally sourced from Esri, provide insight into Wexford County's commercial landscape and its implications for materials management planning. These data form the basis for Figure 7, Figure 8 and Figure 9 and highlight both sector growth trends and material recovery opportunities relevant to the County's Materials Management Plan. The full 2018 and 2023 establishment and employment datasets are included in the appendix.

Between 2018 and 2023, **Wexford County experienced growth across many major business sectors**, particularly those associated with higher material generation and recovery potential. Retail Trade increased from 121 to 135 establishments, Health Care and Social Assistance from 76 to 133, and Accommodation and Food Services from 76 to 98 establishments. Construction also expanded from 56 to 75 establishments, while Manufacturing increased from 51 to 61 establishments. Growth was also observed in Administrative Support and Waste Management and Remediation Services (from 37 to 47 establishments) and Transportation and Warehousing (from 31 to 38 establishments). These trends reflect a diversifying and expanding local economy with implications for both municipal and commercial waste generation.

Employment data further clarify where materials management strategies may have the greatest impact. In **2023**, the largest employment sectors in Wexford County were **Manufacturing (3,310 jobs)**, **Retail Trade (1,850 jobs)**, and **Health Care and Social Assistance (1,657 jobs)**. Accommodation and Food Services remained a major employment sector with **1,076 jobs**, despite a decline from 2018 levels. Transportation and Warehousing employment increased from **516 to 596 jobs**, while Construction employment grew from **257 to 293 jobs**. Administrative Support and Waste Management Services remained a significant employer, with **541 jobs** in 2023.

From a materials management perspective, these data reinforce several priority opportunities identified in EGLE's Materials Management Planning guidance. The scale of employment and establishments in **Accommodation and Food Services** aligns with waste characterization findings showing food waste as a major component of the municipal and commercial waste stream. This underscores the importance of **food waste prevention, food rescue, and organics diversion strategies** targeted to restaurants, hotels, institutional food service operations, and grocery-related businesses.

Similarly, the size and growth of **Retail Trade, Manufacturing, Transportation and Warehousing, and Wholesale Trade** point to **corrugated cardboard** as a high-volume, readily recyclable material with strong recovery potential. These sectors collectively represent a substantial share of establishments and employment and are well suited for **targeted commercial recycling initiatives**, improved access to cardboard recycling infrastructure, and outreach to private haulers and businesses.

Overall, the **2023 establishment and employment data** support a planning approach that prioritizes **sector-specific strategies**, consistent with EGLE's emphasis on focusing resources where they can achieve the greatest diversion impact. By

aligning program development with Wexford County's evolving business profile, the County can more effectively reduce disposal, increase recovery of high-value materials, and advance progress toward its Materials Management Plan goals.

Figure 8: Industry and Employment Statistics, Courtesy Networks Northwest

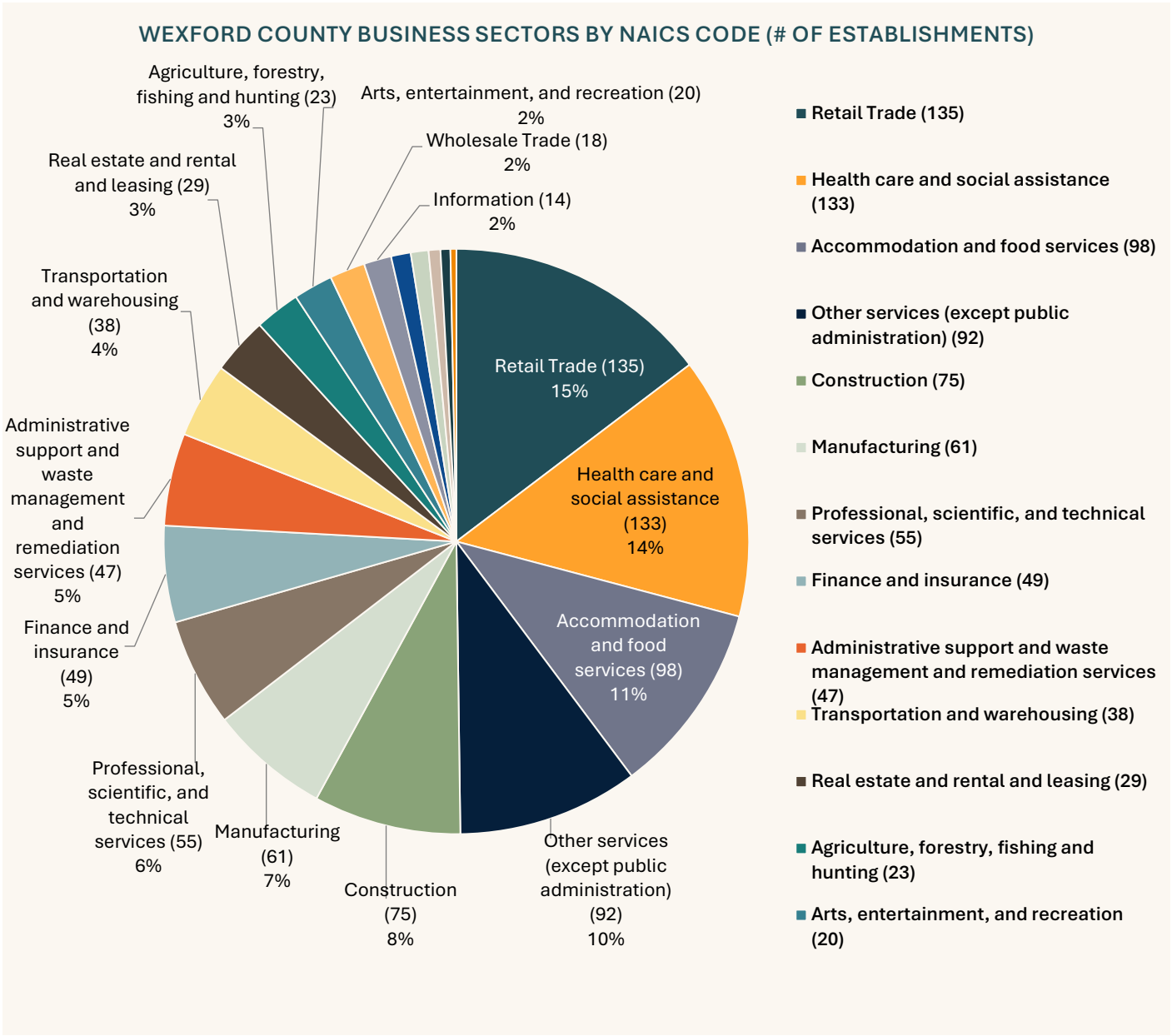


Figure 9: Wexford County Business Sectors by NAICS Code, # of Establishments. Data provided by Networks Northwest

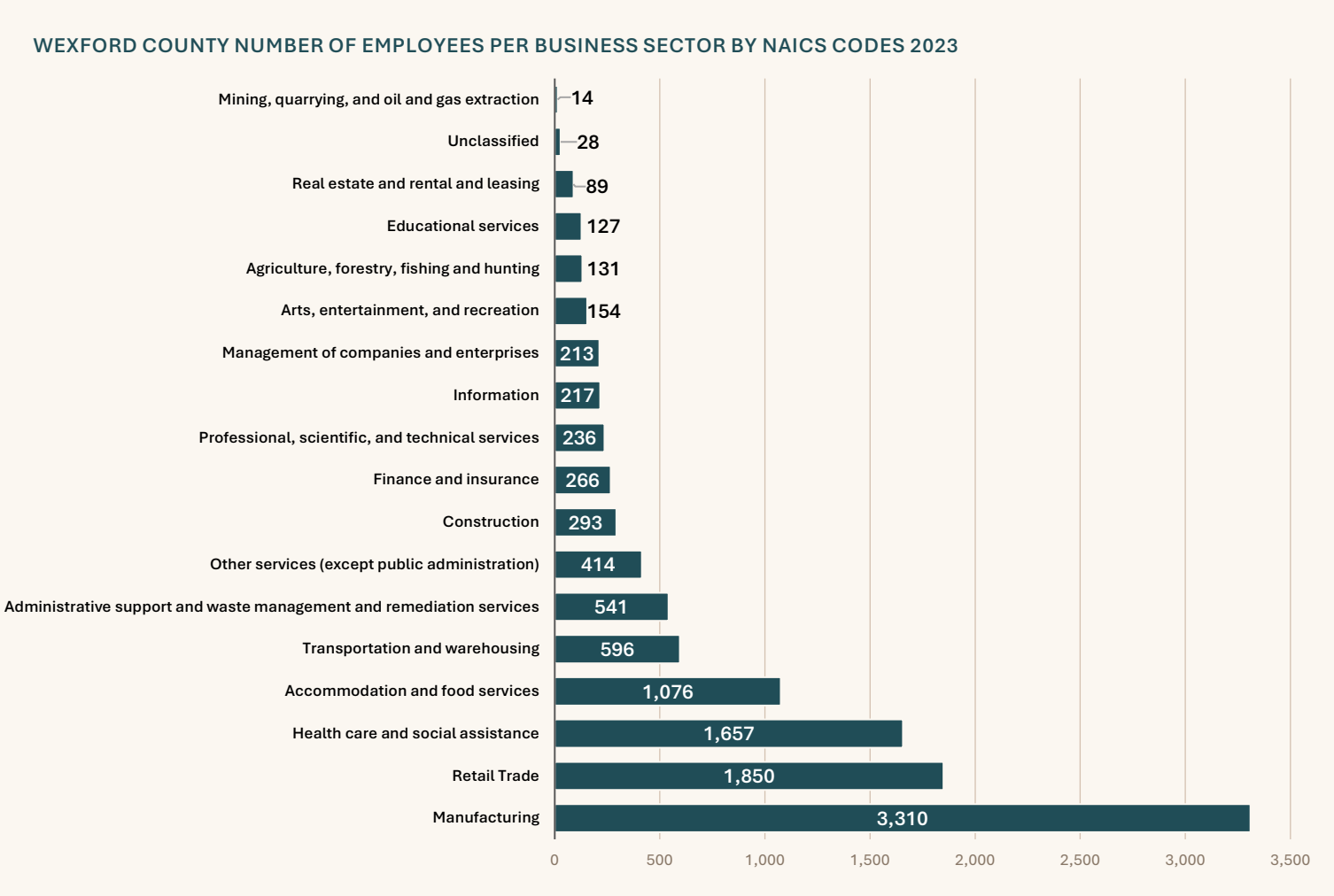


Figure 10: Wexford County # of Employees by NAICS Code, 2023. Data provided by Networks Northwest

Compliance with Part 115 and Benchmark Recycling Standards

Wexford County is **not currently in full compliance** with Michigan's **Part 115 Benchmark Recycling Standards**, which are intended to ensure that counties provide residents and businesses with reasonable and equitable access to recycling opportunities in support of the State's broader materials management goals. The County does not contain any designated urbanized areas and includes only one municipality, the **City of Cadillac**, with a population exceeding 5,000 residents.

The City of Cadillac directs residents to curbside recycling services provided by **Ms. Green Shredding & Recycling**. Under Part 115, this arrangement may satisfy the **curbside recycling access benchmark** for municipalities with populations over

5,000 residents, provided that curbside service is available to at least **90 percent of single-family households by January 1, 2028**. Definitions of the Benchmark Recycling Standards are included in the appendix. While residents in other municipalities may also obtain curbside recycling through subscription-based arrangements with Ms. Green or other private haulers, these services are **not publicly documented, verified countywide, or uniformly available**, limiting their applicability for compliance determination.

Wexford County's broader recycling system is similarly reliant on **Ms. Green** as the only documented provider of **drop-off recycling for traditional recyclables** (paper and packaging) available to the general public. Under Part 115, counties with populations under 100,000 must provide at least **one recycling drop-off location for every 10,000 residents without access to curbside recycling by January 1, 2032**. With approximately **23,000 residents lacking verified curbside recycling access**, Wexford County would need a minimum of **three qualifying drop-off locations** unless curbside recycling access can be verified or expanded. In the absence of additional confirmed drop-off sites or verified curbside access beyond Cadillac, the County should plan to either establish additional drop-off facilities that meet Part 115 criteria or formalize and expand curbside recycling access for single-family residences.

CURBSIDE SERVICE TYPES

More broadly, curbside waste, recycling, and organics/yard waste collection programs can be categorized as:

1. **Municipal** – municipal staff collect material using municipal equipment.
2. **Contracted or franchised** – a municipality contracts with a single hauler to provide curbside service to all residents (funded through a variety of approaches, such as general funds, special assessments, utility-style fees, or billed service fees).
3. **Subscription (open-market)** – residents contract directly with the hauler of their choice for curbside services.
4. **No curbside program** – there is no verified curbside service being actively provided within the municipality (regardless of cost).

EGLE instructs counties to calculate curbside recycling access according to this formula:

$$\text{Curbside Recycling Access} = \frac{\text{Sum of single family dwellings which have curbside recycling access}}{\text{Total number of single family dwellings}} \times 100$$

Under Part 115, subscription or open-market service qualifies as "access" when residents are able to obtain curbside recycling through their chosen hauler. However, the statute does not establish any affordability criteria, such as rate caps or cost thresholds, meaning a community may be considered to have curbside access even if cost remains a practical barrier for some

households. Specifically, the statute provides that curbside recycling qualifies when: "The curbside recycling is provided by the municipality or the resident has access to curbside recycling by the resident's chosen hauler."[4]

Currently, Cadillac is the only municipality in Wexford County with documented residential curbside recycling access, although it is not clearly defined whether this service operates as a contracted municipal program or a subscription-based service. While subscription-based recycling may occur on a limited basis elsewhere in the county, there are no publicly confirmed haulers documented as providing consistent curbside recycling service in other municipalities.

RECYCLING AND COMPOSTING ACCESS IN WEXFORD COUNTY

The City of Cadillac provides residential curbside recycling service through **Ms. Green Shredding & Recycling**. Ms. Green purchased the former Wexford County Recycling Facility building in 2018 and currently provides **subscription-based curbside recycling and drop-off recycling services** for traditional recyclables. **Padnos Cadillac** offers additional drop-off options for limited materials, primarily metals and white goods, as described in the Hard-to-Recycle Materials section.

Information on residential access to **organics recycling** in Wexford County is limited. While there are documented examples of **food processors and on-site agricultural composting** identified in the SEEDS Organics Analysis, there are no confirmed countywide or municipal programs providing routine curbside or drop-off organics collection for residents at this time.

SUMMARY TABLE OF RECYCLING ACCESS BY COMMUNITY

COMMUNITY NAME	2020 CENSUS NAME	COMMUNITY POPULATION	# OF HOUSE HOLDS	POPULATION IN SINGLE FAMILY HOMES[5]	POPULATION IN MULTI FAMILY HOMES[6]	RECYCLING CURBSIDE SERVICE TYPE
Boon township	Boon CDP	90	35	90	0	No Curbside Program
Hanover township	Buckley village	774	282	752	22	No Curbside Program
South Branch township	Caberfae CDP (1 of 2)	57	15	57	0	No Curbside Program
Slagle township	Caberfae CDP (1 of 2)	15	5	15	0	No Curbside Program
Cadillac city	Cadillac city	10,369	4,439	8855	1514	Subscription[7]
Cedar Creek township	Cedar Creek township	1,855	640	1855	0	No Curbside Program

[4] https://www.legislature.mi.gov/documents/mcl/pdf/mcl-451-1994-ii-3-115.pdf

[5] Single-Family = 1-4 units, mobile homes and other types of housing.

[6] Muli-Family = 5 or more units.

[7] Assumed Subscription.

Clam Lake township	Clam Lake township	2,324	915	2171	153	No Curbside Program
Colfax township	Colfax township	897	342	897	0	No Curbside Program
Greenwood township	Greenwood township	633	230	633	0	No Curbside Program
Haring charter township	Haring CDP	335	126	305	30	No Curbside Program
Boon township	Harrietta village (1 of 2)	126	67	121	5	No Curbside Program
Slagle township	Harrietta village (1 of 2)	26	16	25	1	No Curbside Program
Henderson township	Henderson township	183	84	183	0	No Curbside Program
Liberty township	Liberty township	936	338	936	0	No Curbside Program
Manton city	Manton city	1,258	534	1088	170	No Curbside Program
Springville township	Mesick village (1 of 2)	397	155	379	18	No Curbside Program
Antioch township	Mesick village (1 of 2)	-	-	0	0	No Curbside Program
Antioch township	Antioch township	899	357	899	0	No Curbside Program
Boon township	Boon township	435	181	435	0	No Curbside Program
Cherry Grove township	Cherry Grove township	2,194	883	2185	9	No Curbside Program
Hanover township	Hanover township	923	378	912	11	No Curbside Program
Haring charter township	Haring charter township	3,221	1,245	3152	69	No Curbside Program
Slagle township	Slagle township	469	205	462	7	No Curbside Program
South Branch township	South Branch township	291	162	291	0	No Curbside Program
Springville township	Springville township	1,342	541	1326	16	No Curbside Program
Selma township	Selma township	2,234	895	2234	0	No Curbside Program
Cherry Grove township	Wedgewood CDP	227	92	227	0	No Curbside Program
Wexford township	Wexford township	1,161	445	1161	0	No Curbside Program

Table 6: Summary of Recycling Access by Community

Data Currently Available

At this time, **Wexford County does not have reported tonnage data for recycling or composting activities** occurring within the county. There are no publicly reported data for recyclable materials collected through curbside or drop-off programs, nor are there measured tonnages for materials that may be collected through private subscription-based services.

Similarly, while yard waste collection programs and organics management activities may be occurring at the municipal, commercial, or agricultural level, **no tonnage data are currently tracked or reported** for yard waste, food waste, or other organic materials. This includes organic materials delivered to municipal or private composting or mulching facilities, food processing residuals, spent brewery grains, or agricultural materials composted or managed on-site. As a result, these material flows cannot be quantified for planning or performance measurement purposes.

The only consistently reported waste data available for Wexford County are the disposed tonnages reported through the State's landfill reporting system, which capture municipal and commercial waste landfilled but do not reflect materials diverted through recycling or composting activities. Due to the absence of measured recycling and organics data, Wexford County does not currently have a measured recycling rate or diversion rate.

For planning purposes, the best available estimate of diversion for Wexford County remains the statewide per-capita diversion estimates developed during Michigan's Mega Data Collection Project, applied to the County's population. These estimates provide a reasonable proxy in the absence of local data but should be considered indicative rather than definitive.

Establishing consistent, countywide systems for tracking and reporting recycling and organics tonnages represents a significant opportunity for Wexford County. Improved data collection would enable the County to calculate a documented diversion rate, better understand material flows, and more effectively track progress toward the goals established through the Materials Management Plan process.

Recycling Rate Estimates

RECYCLING RATE VS DIVERSION RATE

As noted previously, RRS estimates a Municipal and Commercial Waste (MCW) **Generation Rate** of approximately 4.35 to 4.64 pounds per person per day for planning purposes. This MCW generation rate represents the average quantity of waste disposed per person per day and is used to estimate total disposal system demand.

To evaluate recycling performance and calculate a measured Recycling Rate it is also necessary to quantify the **weight of material recycled.** It is important to understand that for the MMP process, as defined by EGLE, the term **"Recycling Rate"** incudes both traditional recyclables (packaging and paper) and organic material (food scraps and yard waste) that is recycled.

The term **"Diversion Rate"** accounts for additional material diverted from landfill via reuse, recovery, donation, co-generation, digestion or other processes along with traditional recycling and composting. In order to calculate a complete diversion rate, the county would need tonnage data for material diverted via these additional methods.

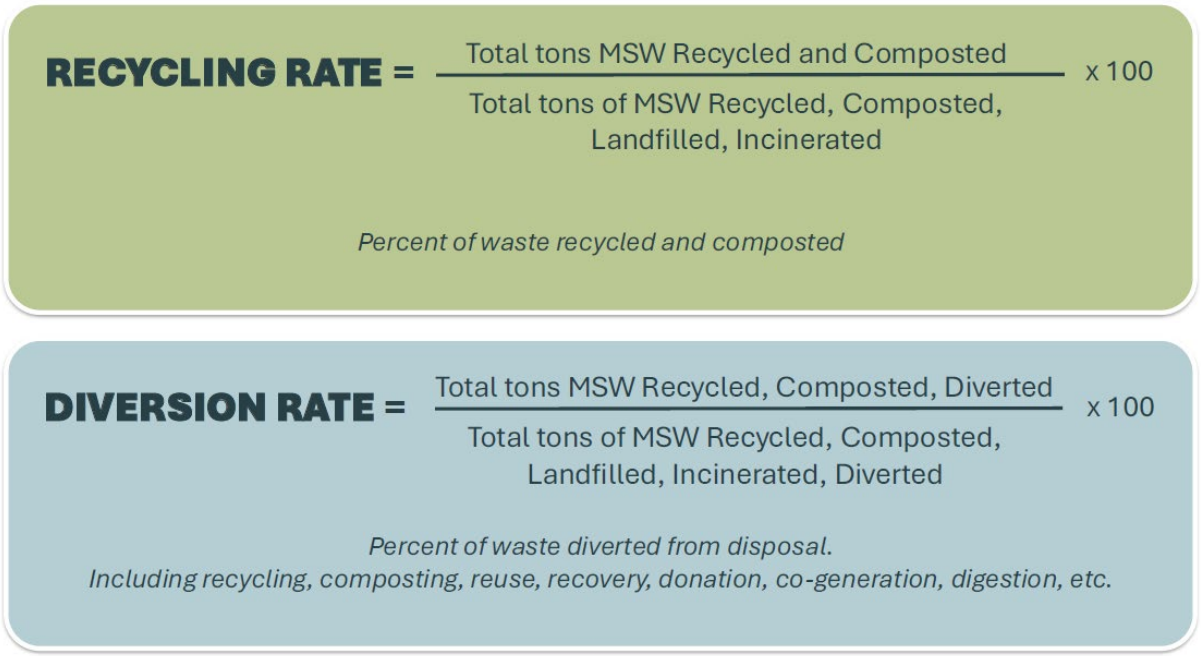


Figure 11: Recycling and Diversion Rate Definitions, EGLE, "Setting Materials Management Goals"[8]

RECYCLING RATE

In the absence of comprehensive, measured, and reported tonnages for recyclables collected through all drop-off systems, curbside programs and from commercial and institutional sources, proxy data may be used for planning purposes. RRS developed an estimation model during the statewide Mega Data Collection Project[9] to project recovered quantities using variables related to recycling access and recycling program design. The model draws on findings from The Recycling Partnership[10], which identifies characteristics of recycling programs that are associated with varying levels of material recovery per household.

The Recycling Partnership has identified several characteristics associated with high-performing residential recycling programs that capture higher quantities of material per household. These factors include:

- Curbside collection (rather than drop-off access),
- Use of collection carts instead of bins for curbside collection,

[8] https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Programs/MMD/Recycling/MMP-Goals-MRC-Presentation-Slides.pdf

[9] https://www.michigan.gov/egle/about/organization/materials-management/materials-management-in-michigan/mega-data-collection-project

[10] https://recyclingpartnership.org/wp-content/uploads/2018/05/state-of-recycling-report-Jan2017.pdf

- Automatic enrollment and service delivery (residents receive recycling service with no action required) rather than opt-in participation, and
- Programs supported by public policy mechanisms (such as automatic service provisions or ordinances requiring haulers to offer curbside recycling alongside trash collection) compared with programs that lack supporting public action[11].

Based on the 2020 – 2023 Mega Data Project, the projected recycling rates are as follows:

- **Residential Recycling Rate Estimate (Recycling + Compost):** 12.6%
- **Commercial Recycling Rate Estimate:** 10.6%
- **Countywide Recycling Rate Estimate:** 11.5%

Wexford County does not currently have any measured recycling tonnage data available for 2024. State landfill reports indicate that municipal and commercial waste (MCW) disposal tonnage in 2024 was 26,847 tons, which is slightly lower than the 28,254 tons estimated during the State's Mega Data Project. This difference reflects a per-capita disposal rate that is marginally below the Michigan statewide average. While this could suggest that Wexford County is achieving a recycling rate at or above the state average, this conclusion **cannot be verified** given the absence of measured recycling data.

In addition, there are **no measured or reported data for organic material recycling** in Wexford County. Yard waste and food waste, both critical components of the overall recycling and diversion rate, are not consistently tracked across municipal programs, drop-off sites, private composting or mulching facilities, or industrial and agricultural activities.

Because all three required inputs needed to calculate a measured diversion rate (traditional recycling tonnage, organic material recycling tonnage, and a fully reliable MCW disposal tonnage) are either incomplete or inconsistent, there is currently no defensible basis to update or replace the Mega Data diversion estimates. Accordingly, the **Mega Data countywide diversion rate of 11.5%** remains the most appropriate planning estimate for Wexford County at this time.

Recycling Data Gaps

Several significant data gaps limit Wexford County's ability to fully quantify recycling and diversion performance. Most notably, there is **no reliable accounting of commercial and institutional recycling tonnage** that may be collected directly by private haulers. While many businesses and institutions may be recycling materials through contracted services, the absence of standardized reporting requirements means these recovered materials are **not captured in countywide recycling or diversion rate calculations**.

[11] https://recyclingpartnership.org/wp-content/uploads/2018/05/state-of-recycling-report-Jan2017.pdf

In addition, information regarding **curbside recycling services operating on a subscription basis** is limited. Although some residential and commercial customers may receive curbside recycling service from private haulers, these activities are **not publicly documented or reported at the county level**. Even modest levels of curbside collection can contribute meaningful tonnage to overall diversion, yet these materials remain unaccounted for without consistent hauler reporting. Establishing formal reporting expectations for private haulers would allow the County to capture this missing data and better understand the full scale of recycling activity occurring outside of publicly managed programs.

Data gaps are also pronounced for **organic material diversion**, including both food waste and yard waste. While yard waste collection programs and organic materials management are known to occur in certain municipal, commercial, agricultural, and industrial contexts, **tonnage data are not consistently tracked or reported**. As a result, organic material recovery cannot be reliably quantified.

These limitations also constrain the County's ability to measure **food waste reduction**, which is a key priority identified in EGLE's Materials Management Planning guidance. Food waste is typically disposed of in the landfill as part of mixed municipal and commercial waste, and without a robust waste characterization or audit program, there is no reliable way to quantify how much food waste is being disposed over time. More accurate measurement would require **source separation of food waste**, paired with food rescue initiatives and/or composting programs, and consistent tracking of recovered material weights.

Improving landfill reporting consistency, expanding recycling and organics tonnage tracking, and establishing standardized reporting from both municipal and private programs represent **critical next steps** for Wexford County. Addressing these data gaps would enable the County to calculate a measured diversion rate, more accurately track progress, and support informed decision-making as part of the Materials Management Plan implementation process.

Hard-to-Recycle Materials and Collection Events

Wexford County manages hard-to-recycle materials primarily through **event-based collection programs** coordinated by **Wexford County** and the **City of Cadillac**, supplemented by municipal clean-up days and private-sector recycling facilities. These programs provide residents with compliant disposal and recycling options for materials that are not accepted through routine curbside recycling or landfill disposal and are documented through official municipal webpages and published event materials.

HOUSEHOLD HAZARDOUS WASTE (HHW)

Wexford County, in coordination with the City of Cadillac, hosts a Household Hazardous Waste (HHW) collection day that is open to residents from across the county. The 2025 HHW event[12], held in May, provided a disposal option for common

[12] https://mi-cadillac.civicplus.com/Calendar.aspx?EID=5119&month=5&year=2025&day=16&calType=0

household hazardous materials that require special handling and should not be disposed of in landfills or standard recycling programs.

MUNICIPAL CLEAN-UP DAYS AND BULKY ITEMS

Clam Lake Township hosts a clean-up day that accepts **appliances/white goods and bulky household items**, providing a local disposal option for materials not handled through regular trash collection. These clean-up events supplement countywide HHW programming by addressing large items that may otherwise be improperly disposed of or stockpiled, but it is important to note that these items are not necessarily recycled. Other municipalities may offer similar clean-up days, but documentation was not publicly available.

OTHER HARD-TO-RECYCLE MATERIALS

In addition to public programs, residents have access to private-sector recycling services for certain hard-to-recycle materials. The **Padnos Cadillac Recycling Center**, located at 1111 Leeson Avenue, Cadillac, Michigan, accepts a wide range of metals, car batteries, and electronic scrap and provides financial compensation for many materials. This facility provides an important recovery pathway for metals, electronics, vehicles, and other specialty materials that are not accepted through municipal recycling programs.

Scrap tires (whole) are banned from Michigan landfills and, if recycled, can be used in a variety of ways, from rubber mulch used on playgrounds, road paving additives, and as a source of energy in manufacturing. Tires can be a nuisance for public agencies due to their likelihood of being illegally dumped and the health risks from standing water becoming a breeding ground for mosquitoes that carry diseases like West Nile Virus. Ongoing or periodic collection events can provide residents with an easy opportunity to safely discard their tires while keeping them out of the environment. Michigan Department of Environment, Great Lakes, and Energy (EGLE) reports that there are currently no scrap tire collection sites in Wexford County.

Expanded polystyrene (EPS) foam is rarely accepted in curbside or drop-off single stream recycling programs because it is difficult to process effectively in automated materials recovery facilities. When collected separately (source-separated), EPS foam can be recycled and has value; however, it requires pre-processing through densification to improve shipping efficiency and increase its market value. Wexford County discards an estimated 228 tons of EPS foam annually.

Electronics (e-waste) have become pervasive in modern life thanks to technological advancements that make them smaller and more affordable, but these same innovations lead to rapid obsolescence, driving consumers to replace them frequently. Computers, cell phones, printers, toasters, coffee pots, and many more devices can be found in the waste stream, with some containing batteries that pose fire and environmental risks. If recycled, precious metals, scrap metal, and rigid plastics can be recovered and diverted from landfills. Wexford County discards an estimated 182 tons of e-waste each year.

Mattresses have emerged as a significant disposal problem. Easy online ordering means more mattresses are being delivered to homes, but with few recycling options and their bulky, non-compactable design, getting rid of them is a challenge. This results in illegal dumping or blight in neighborhoods. When disposed in landfills, mattresses create

operational challenges for landfill operators when the springs wrap around compaction equipment. To compound this, mattresses do not readily compress due to the inner springs, resulting in excessive airspace being consumed (reportedly as much as 40 cubic feet of landfill air space per mattress).

Although the model shows that Wexford County generates just 16 tons of mattresses annually, these items still create headaches for homeowners, landfill operators, and local leaders managing illegal dumping and blight. Fortunately, having a mattress recycler in the region (BARC) opens the door for a community partnership to reduce waste and improve local quality of life.

Batteries are another waste material that has emerged as a significant disposal problem. While not quantified in the model, batteries and particularly lithium-ion batteries are growing in use at a rapid rate. Batteries can be found in nearly every type of consumer product, from mobility, like bikes, scooters, and surfboards to textiles, like jackets and blankets. If discarded in the trash or recycling, batteries can spark fires in collection vehicles, at disposal or processing facilities, and even in shipment if not safely packaged.

Construction & Demolition (C&D) Debris

While no C&D debris recycling tonnages were provided for this report to show active diversion, landfill reporting shows that C&D waste accounted for nearly 9,000 tons, or **15%** of total landfill tonnage, with 98% going to Wexford County Landfill. C&D debris includes anything used in the construction of roads, bridges and buildings. Typically, these materials include concrete, asphalt, wood (treated or blond), drywall, asphalt shingles, metals, rigid and film plastics, vinyl siding and windows, carpet and other flooring, ceiling tiles, cardboard and other paper, glass, and insulation.

While population and economic growth is a significant factor in the generation of C&D debris, most landfill reporting would attribute an average of between 20% and 40% of inbound tonnage from construction and demolition activities. According to US EPA reports, the amount of construction and demolition waste generated in the United States is more than twice that of MCW. A true representation of the types of C&D debris generated in the county would require either localized reporting on an ongoing basis or periodic waste characterization studies that focus on C&D.[13] Some landfills actively seek out C&D debris and even offer discounted disposal rates. Sometimes landfills divert clean wood and/or concrete for use on-site (after chipping, grinding, or crushing); others are diverting it from landfill entirely by sending it to local markets that can use it for landscaping, fuel, or road building aggregates.

[13] C&D loads are typically excluded from most MSW/MCW waste characterization studies. While a waste characterization study may include a category for "C&D" it reflects de minimis amounts that were co-collected in an MSW/MCW collection truck. A specific C&D characterization is needed to capture material coming in rolloff boxes from construction projects.

C&D debris can be diverted from landfills at multiple points in the disposal chain. The most effective approach - yielding the cleanest material with the highest reuse or recycling value - is source separation at the construction site. With Wexford County experiencing growth in construction-related businesses (according to NAICS codes, between 2018 – 2023 Construction expanded from 56 to 75 establishments) – the number of potential partners to engage is significant. Achieving this requires clear, consistent communication and convenient processes, whether through voluntary programs or mandatory policies. Alternatively, mixed C&D processing offers convenience by eliminating on-site separation, but recovered materials have lower value due to contamination and the cost of processing. Mechanical or conveyor-based sorting also produces fine debris such as drywall dust, dirt, and wood particles (referred to as 'fines') with little to no market value.

Markets exist for some C&D materials when prepared according to specification and generated at a consistent rate:

WOOD

Clean wood, including woody vegetation, untreated dimensional lumber, and pallets, would likely constitute sufficient tonnage on a regular basis to warrant separation and would result in meaningful and measurable impact on landfill-bound tonnage. Markets are likely to include:

- reuse of dimensional lumber 6 feet or longer and plywood/engineered boards at least 16 square feet that has not been painted or nailed
- landscaping for woodchips/mulch, with colorization potentially adding value
- energy sector, particularly where renewable energy inputs are sought as feedstock for energy production

SCRAP METAL

Though much of the scrap metal generated on construction sites is already recovered through informal collection by subcontractors and tradespeople, there could remain some fraction of scrap metal in the construction site debris that goes for disposal. A scrap metal container with clear labelling and discreetly positioned on the construction site would present an opportunity for anyone on the construction site to contribute any amount of metal for diversion. Local scrap metal companies would be interested in purchasing mixed or sorted metals from a construction site.

CARDBOARD (OCC)

A collection container for OCC generated at strategic junctures during the project timeline will enable recovery of clean cardboard from product installation, such as cabinetry, appliances, and furniture. This large format cardboard will require a large container, ideally with a lid to protect it from precipitation. Cardboard can typically be delivered loose to a buyer but will carry higher value if baled.

CONCRETE

A designation of "clean" concrete is typically made by vendors that accept and produce a higher standard "crusher-ready' aggregate material. "Mixed aggregate", containing pieces of brick, ceramic, or other engineered inert materials, such as plastics and compound materials is not considered clean. Rebar sometimes presents additional processing challenges for aggregate producers and therefore markets for concrete with rebar are often limited. Partners for concrete recycling include local excavation companies and aggregate manufacturers.

VINYL

Rigid vinyl can come from several sources in a building or renovation project: siding, piping/conduit, window frames, flooring, and fencing are most common. These materials can be transported to a centralized collection point where they can be recycled into new vinyl products. Vinyl is typically not accepted at MRFs but specialty vinyl recyclers, like Fryman's Recycling in Dowagiac or others participating in Revinylize, the national vinyl recycling collaborative, may offer collection bins and pay the transportation costs in exchange for localized collection of rigid vinyl materials.

Storm Debris

At the request of Networks Northwest, RRS evaluated storm debris measurement and quantification methodologies to support Wexford County's preparedness for debris generated by major storms and severe weather events. Establishing baseline debris estimates is an important first step in emergency debris management planning, which is typically implemented through a countywide Emergency Operations Plan (EOP) and supporting annexes.

The Michigan State Police, Emergency Management & Homeland Security Division provides a **Local Disaster Debris Management Plan Template**[14] for counties, cities, and townships to adapt. The template positions disaster debris planning as a companion to the EOP and as a local counterpart to the State's Disaster Debris Management Plan. Adoption of local debris plans varies, and EGLE has noted that outside of hurricane-prone regions, many communities do not complete disaster debris pre-planning. As a result, the Materials Management Plan (MMP) process represents a timely opportunity to "connect the dots" by documenting the infrastructure, roles, and material pathways that emergency management will depend on during surge conditions.

RRS recommends aligning disaster debris planning with MMP planning because both efforts rely on the same underlying materials management system, facilities, collection/processing capacity, transportation logistics, and end markets, operating under different time horizons. Even without a finalized County or local Disaster Debris Management Plan, the MMP can formalize this linkage by capturing core operational elements that will be needed during an incident, including:

- **Sites:** Existing solid waste and recycling facilities, as well as candidate temporary debris staging and reduction sites, including key constraints (e.g., access, drainage, and traffic control). This enables emergency operations to begin with identified options rather than starting from zero.

[14] https://www.michigan.gov//media/Project/Websites/msp/EMHSD/Publications/Local_Disaster_Debris_Management_Plan_Template_2008_Final_Edition.pdf?rev=f548c2a196c248c69772fa733bc01714&utm

- **Capacity:** Normal throughput versus surge conditions, including overflow routing options. The County can also pre-define "activation triggers" tied to capacity constraints (e.g., transfer station queues exceeding a defined threshold for multiple days, or primary MRF downtime exceeding 48 hours).
- **Roles and responsibilities:** Identification of who supports the Emergency Operations Center (EOC) with materials management decisions, regulatory coordination, and communications.
- **Contractors and end markets:** Pre-identified pathways for hauling, grinding, C&D handling, white goods, and HHW management; recognizing that surge volumes may require intermediate staging and alternative destinations.
- **Public guidance hooks:** Pre-developed reuse- and recycling-first messaging where feasible, consistent with EGLE storm debris guidance, including separating materials and emphasizing recovery options when conditions allow.

RRS has developed preliminary storm debris estimates (in cubic yards) for multiple weather scenarios; these estimates are presented in the following subsections.

SCENARIO 1: ICE STORMS

The first scenario evaluates an ice storm producing between **0.25 inches and 1 inch of ice accumulation** with sustained winds between **10 and 30 mph**. The debris estimate uses roadway mileage as a key input, based on MDOT's published **System Length / Route Miles** metric[15], which for Wexford County is **1,303 miles.** In MDOT's reporting, System Length / Route Miles generally represent roadway centerline mileage (counting only one side of divided roads and excluding ramps) for public roads open to travel and certified by public road agencies; MDOT notes this dataset is GIS-based, tied to federal mileage certification processes, and available historically back to 1990.

Using the county's applicable route-mile input and the scenario assumptions above, RRS estimates that ice storms of these magnitudes could generate the approximate debris quantities below. These calculations are based on methodology laid out in a published 2011 study *Rapid Assessment of Tree Debris Following Urban Forest Ice Storms*[16], including a negative correlation between wind speed and debris volume (as wind speed increases less debris observed). FEMA guidance[17] indicates that ice and snowstorm debris streams are typically dominated by **vegetative debris** (downed limbs and trees), along with **overhead utility system components** associated with damaged lines and service infrastructure (see Figure 8).

[15] https://www.michigan.gov/mdot/-/media/Project/Websites/MDOT/Programs/Planning/Asset-Management/HPMS/Statewide-Statistics-LS-County.pdf

[16] Hauer, Richard J.; Hauer, Angela J.; Hartel, Dudley R.; Johnson, Jill R. 2011. Rapid Assessment of Tree Debris Following Urban Forest Ice Storms. Arboriculture & Urban Forestry 37(5):236–246. https://www.srs.fs.usda.gov/pubs/ja/2011/ja_2011_hauer_001.pdf

[17] https://www.fema.gov/sites/default/files/2020-07/fema_325_public-assistance-debris-mgmt-plan_Guide_6-1-2007.pdf, Chapter 6

COUNTY NAME	SYSTEM MILES	WIND SPEED MPH	ICE THICKNESS (INCHES)	SCENARIO 1 DEBRIS ESTIMATE CUBIC YARDS
Wexford	1,303	10	0.25	127,053
		20	0.25	79,477
		30	0.25	31,902
		10	0.50	243,917
		20	0.50	152,581
		30	0.50	63,803
		10	0.75	365,875
		20	0.75	228,871
		30	0.75	95,705
		10	1.00	487,834
		20	1.00	317,909
		30	1.00	127,607

Table 7: RRS Estimated Ice Storm Debris Volumes CY

SCENARIO 2: SEVERE WEATHER EVENTS

Scenario 2 evaluates debris generation associated with **severe weather events**, with or without precipitation, characterized by **wind speeds ranging from 74 mph to 157+ mph**. At the upper end of this range, the scenario includes **tornado events**, which can produce highly variable and localized debris conditions. The debris estimates generated under this scenario incorporate multiple variables beyond wind speed, including **household density**, **vegetation cover**, and the **prevalence of commercial properties**, all of which influence both the quantity and composition of storm debris.

For Wexford County, the model inputs include **13,610 households**, a **Heavy vegetation** classification, and a **Light commercial property** designation. Heavy vegetation is typically associated with mature neighborhoods and wooded areas where dense tree canopy cover limits visibility of the ground or structures, increasing the likelihood of vegetative debris during severe wind events. The Light commercial property classification reflects a lower concentration of large commercial structures relative to residential land uses, which influences the proportion of construction and demolition (C&D) debris expected in the debris stream.

In addition to debris volume estimates, it is important to consider anticipated debris composition. FEMA guidance[18] describes typical tornado debris as including vegetative debris, construction and demolition (C&D) debris, personal

[18] https://www.fema.gov/sites/default/files/2020-07/fema_325_public-assistance-debris-mgmt-plan_Guide_6-1-2007.pdf, Chapter 6

property/household items, hazardous waste, household hazardous waste (HHW), white goods, and vehicles and vessels (see Figure 8).

The resulting debris estimates, segmented by precipitation condition and wind speed category, are presented in the table below. These estimates are intended to support emergency planning by illustrating the potential range of debris volumes that could be generated under severe weather scenarios affecting --------Wexford ------- County.

COUNTY	HOUSEHOLDS	COMMERCIAL PROPERTY	VEGETATION	WIND SPEED	PRECIPITATION	SCENARIO 2 DEBRIS ESTIMATE CUBIC YARDS
Wexford	13,610	Light	Heavy	74-95 MPH	None to Light	40,830
				74-95 MPH	Medium - Heavy	48,996
				96-110 MPH	None to Light	163,320
				96-110 MPH	Medium - Heavy	195,984
				111-129 MPH	None to Light	530,790
				111-129 MPH	Medium - Heavy	636,948
				130-156 MPH	None to Light	1,020,750
				130-156 MPH	Medium - Heavy	1,224,900
				157+ MPH	None to Light	1,633,200
				157+ MPH	Medium - Heavy	1,959,840

Table 8: RRS Estimated Severe Weather Debris Volumes CY

		Typical Debris Streams								
		Vegetative	Construction & Demolition (C&D)	Personal Property/ Household Items	Hazardous Waste	Household Hazardous Waste (HHW)	White Goods	Soil, Mud and Sand	Vehicles and Vessels	Putrescent
Types of Disasters	Hurricanes / Typhoons	X	X	X	X	X	X	X	X	X
	Tsunamis	X	X	X	X	X	X	X	X	X
	Tornadoes	X	X	X	X	X	X		X	X
	Floods	X	X	X	X	X	X	X	X	X
	Earthquakes		X	X		X	X	X		
	Wildfires	X		X		X	X	X		
	Ice Storms	X				X				

Figure 12: FEMA-325 "Figure 6.2 – Typical Debris Streams for Different Types of Disasters"[19]

Facility Inventory

Name	Address	Address	Description
Wexford County Landfill	990 US 131 NORTH	Manton	Type II Landfill
Ms. Green LLC	5018 M-115 Hwy	Cadillac	Materials Recovery Facility
Padnos - Cadillac Recycling	1111 Leeson Avenue	Cadillac	Materials Recovery Facility
Ms. Green LLC	5018 M-115 Hwy	Cadillac	Other Source Separated Facility
Padnos - Cadillac Recycling	1111 Leeson Avenue	Cadillac	Other Source Separated Facility
Clam Lake Township Annual Clean Up Day	S 43 Mile Rd	Cadillac	Other Source Separated Facility
Colfax Township Annual Clean-up Day	4964 N 31 Rd	Manton	Other Source Separated Facility
Wexford Township Clean-up Day	8970 N 7 Rd	Mesick	Other Source Separated Facility

Table 9: Materials Management Infrastructure

[19] https://www.fema.gov/sites/default/files/2020-07/fema_325_public-assistance-debris-mgmt-plan_Guide_6-1-2007.pdf

Appendix

RRS MCW Composition Model

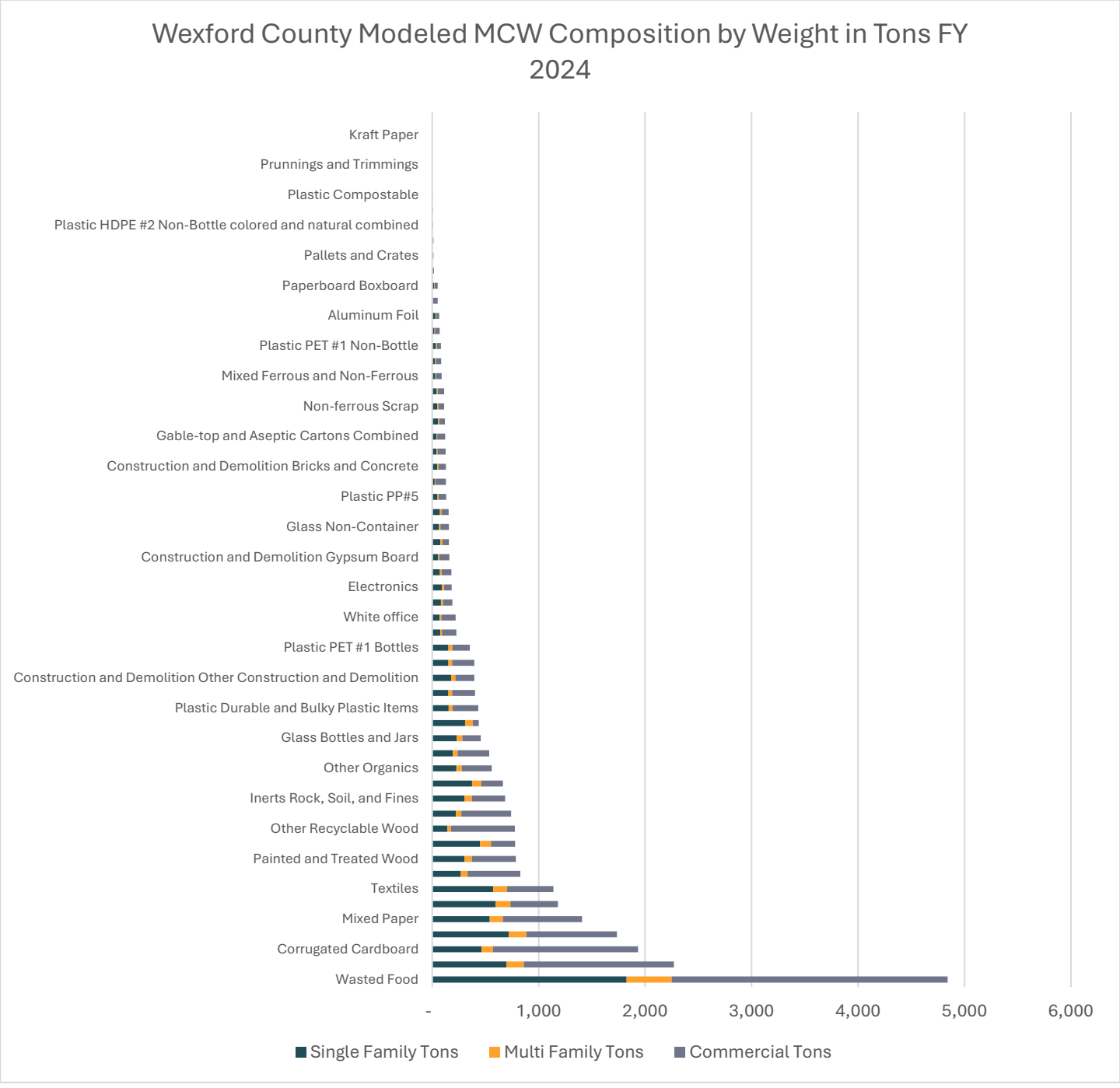


Figure 13: Wexford County RRS-Modeled MCW Composition 2024

Definitions of the Benchmark Recycling Standards

Michigan Legislature. (1994). Natural resources and environmental protection act, Act 451 of 1994, Part 115, § 11502. Retrieved from Michigan Legislature website: https://www.legislature.mi.gov/documents/mcl/pdf/mcl-451-1994-ii-3-115.pdf

(6) "Benchmark recycling standards" means all of the following requirements:

(a) By January 1, 2026, at least 90% of single-family dwellings in urban areas as identified by the most recent federal decennial census and, by January 1, 2028, at least 90% of single-family dwellings in municipalities with more than 5,000 residents have access to curbside recycling that meets all of the following criteria:

(*i*) One or more recyclable materials, as determined by the county's material management plan, that are typically collected through curbside recycling programs, are collected at least twice per month.

(*ii*) If recyclable materials are not collected separately, the mixed load is delivered to a solid waste processing and transfer facility and the recyclable materials are separated from material to be sent to a solid waste disposal area.

(*iii*) Recyclable materials collected are delivered to a materials recovery facility that complies with part 115 or are managed appropriately at an out-of-state recycling facility.

(*iv*) The curbside recycling is provided by the municipality or the resident has access to curbside recycling by the resident's chosen hauler.

(b) By January 1, 2032, the following additional criteria:

(*i*) In counties with a population of less than 100,000, there is at least 1 drop-off location for each 10,000 residents without access to curbside recycling at their dwelling, and the drop-off location is available at least 24 hours per month.

(*ii*) In counties with a population of 100,000 or more, there is at least 1 drop-off location for each 50,000 residents without access to curbside recycling at their dwelling, and the drop-off location is available at least 24 hours per month.

Material Disposed at Wexford County Landfill 2024

Material Disposed at GFL's Wexford County Landfill, Identified by Type and County of Origin. 2024 State Landfill Reports.

County of Origin	ADC	C&D	IW	MCW	OTHER	Grand Total	% of Total
Grand Traverse	37	239	19	123,443	2,160	125,897	38.85%
Antrim	-	305	-	56,132	54	56,491	17.43%
Wexford	9,126	8,728	12,812	21,264	20	51,950	16.03%
Roscommon	-	17	-	29,577	30	29,624	9.14%
Kalkaska	5,839	1,026	9,151	848	422	17,287	5.33%
Osceola	-	4,074	2,766	6,230	865	13,934	4.30%
Otsego	9,463	45	-	10	-	9,517	2.94%
Missaukee	22	1,536	114	7,468	75	9,216	2.84%
Benzie	-	3,145	154	852	7	4,158	1.28%
Crawford	1,663	39	345	-	-	2,048	0.63%
Manistee	34	1,119	95	118	78	1,445	0.45%
Mason	-	693	75	284	20	1,073	0.33%
Ohio	-	-	1,051	-	-	1,051	0.32%
Lake	-	63	-	16	5	84	0.03%
Charlevoix	-	15	-	-	67	82	0.03%
Emmet	-	-	-	-	45	45	0.01%
California	-	-	41	-	-	41	0.01%
Newaygo	-	-	35	-	-	35	0.01%
Mecosta	-	-	34	-	-	34	0.01%
Wisconsin	-	-	-	-	29	29	0.01%
Montana	-	-	-	-	6	6	0.00%
Pennsylvania	-	-	-	-	6	6	0.00%
Illinois	-	-	-	-	5	5	0.00%
Iowa	-	-	-	-	4	4	0.00%
Minnesota	-	-	-	-	3	3	0.00%
West Virginia	-	-	-	-	3	3	0.00%
Grand Total	**26,184**	**21,045**	**26,692**	**246,242**	**3,904**	**324,068**	100%

BUSINESS SECTOR DEMOGRAPHICS, NUMBER OF ESTABLISHMENTS AND NUMBER OF JOBS

Datasets generated by Esri, provided by Networks Northwest

ESTABLISHMENTS

Industry	2018	2023
Retail Trade (135)	121	135
Health care and social assistance (133)	76	133
Accommodation and food services (98)	76	98
Other services (except public administration) (92)	73	92
Construction (75)	56	75
Manufacturing (61)	51	61
Professional, scientific, and technical services (55)	49	55
Finance and insurance (49)	44	49
Administrative support and waste management and remediation services (47)	37	47
Transportation and warehousing (38)	31	38
Real estate and rental and leasing (29)	23	29
Agriculture, forestry, fishing and hunting (23)	19	23
Arts, entertainment, and recreation (20)	16	20
Wholesale Trade (18)	21	18

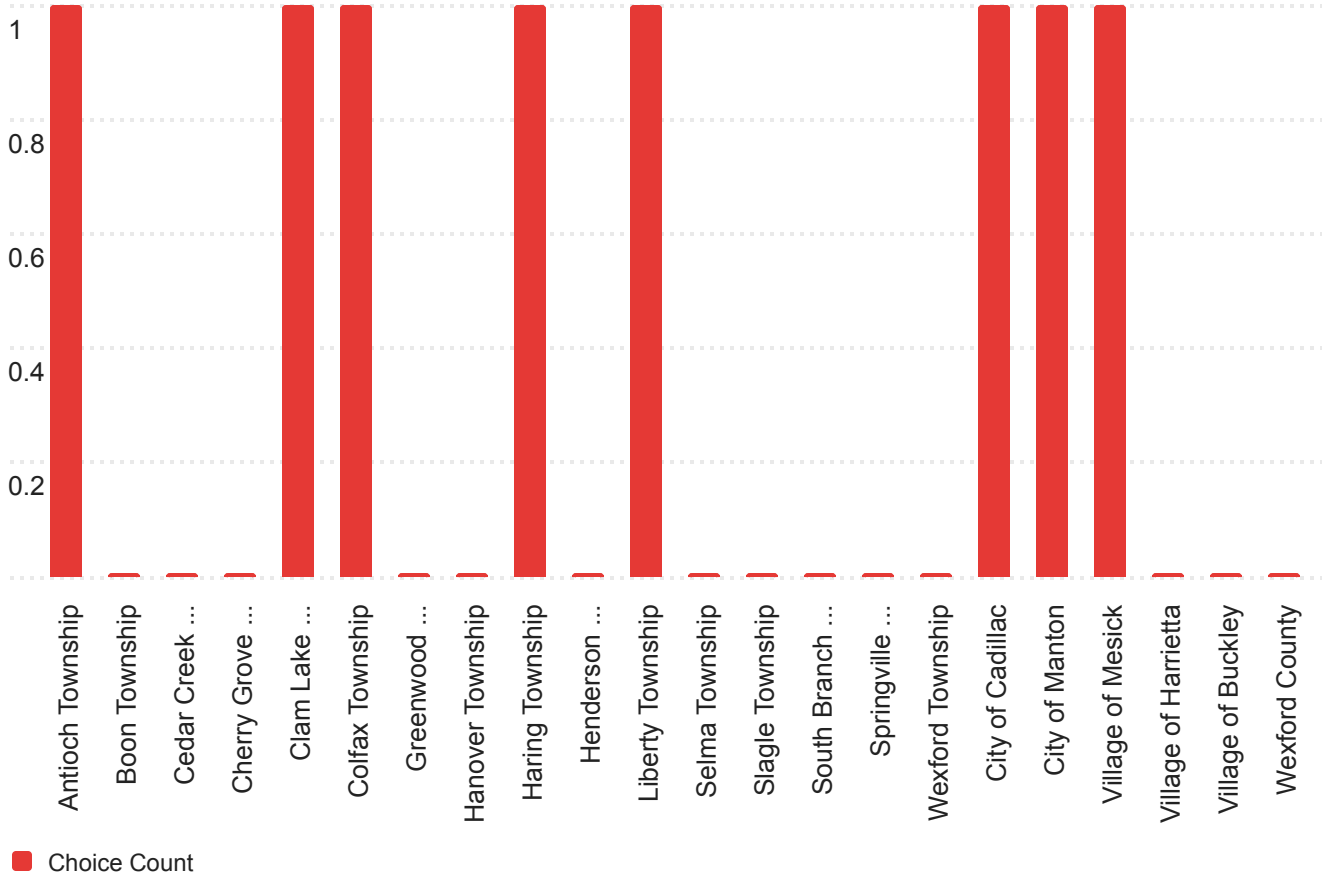
JOBS

Industry	2018	2023
Utilities	N/A	N/A
Wholesale Trade	N/A	N/A
Manufacturing	3,171	3,310
Retail Trade	1,715	1,850
Health care and social assistance	1,502	1,657
Accommodation and food services	1,394	1,076
Transportation and warehousing	516	596
Administrative support and waste management and remediation services	627	541
Other services (except public administration)	413	414
Construction	257	293
Finance and insurance	267	266
Professional, scientific, and technical services	N/A	236
Information	259	217
Management of companies and enterprises	N/A	213

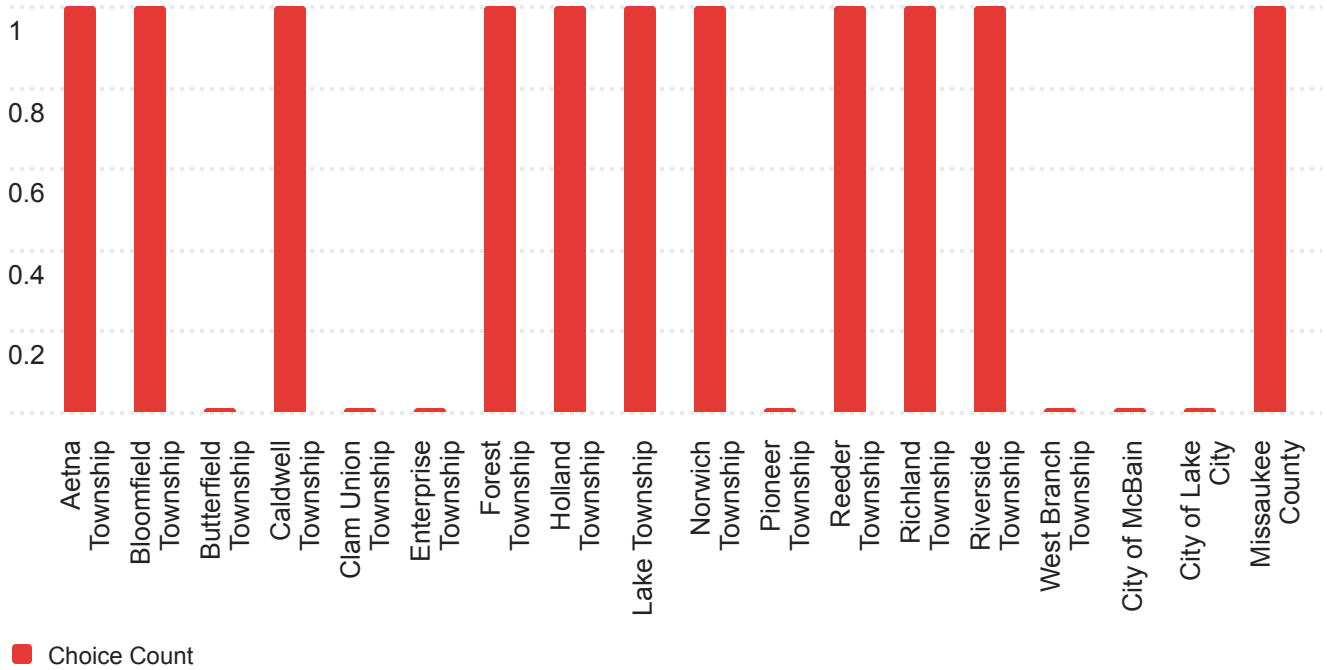
Information (14)	12	14
Unclassified (10)	5	10
Educational services (9)	7	9
Mining, quarrying, and oil and gas extraction (6)	7	6
Management of companies and enterprises (5)	3	5
Utilities (3)	3	3

Arts, entertainment, and recreation	189	154
Agriculture, forestry, fishing and hunting	150	131
Educational services	178	127
Real estate and rental and leasing	70	89
Unclassified	11	28
Mining, quarrying, and oil and gas extraction	23	14

Q1E - Which Wexford municipality do you represent?

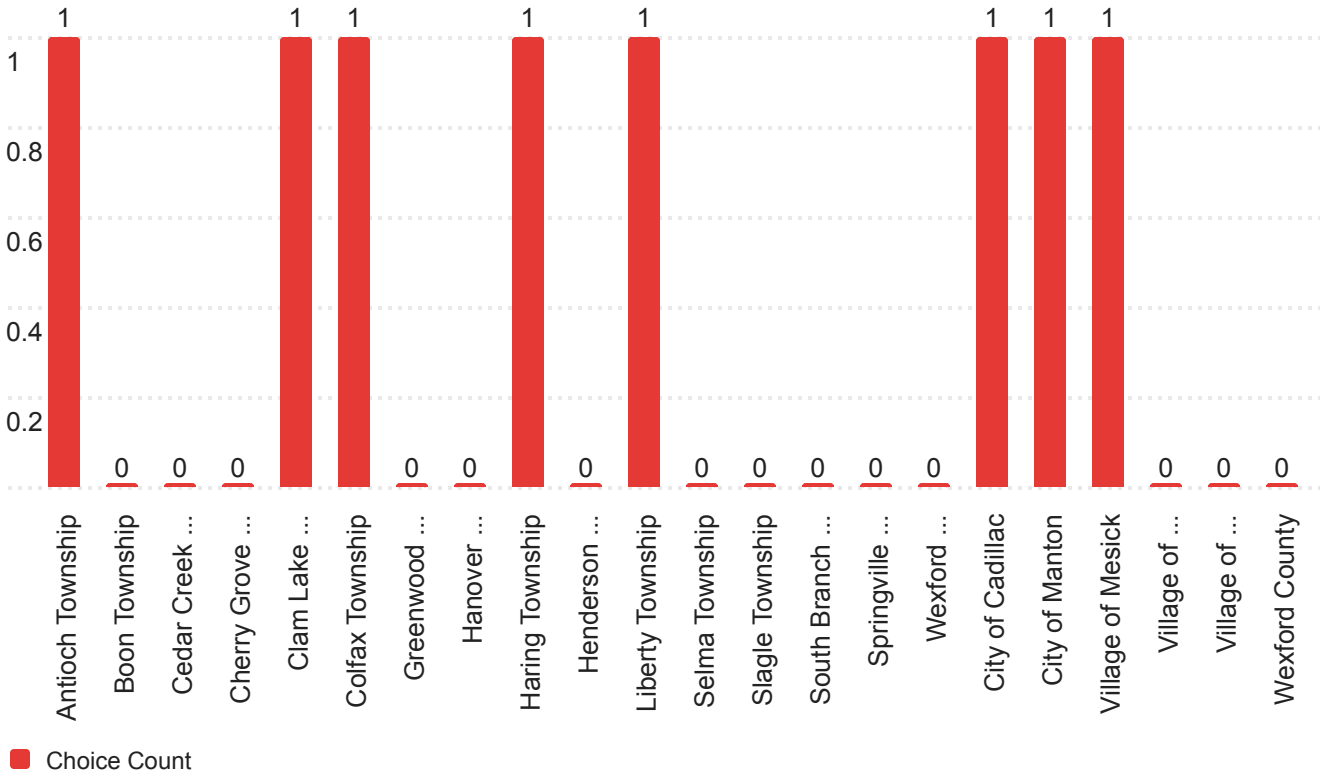


Q1D - Which Missaukee municipality do you represent?



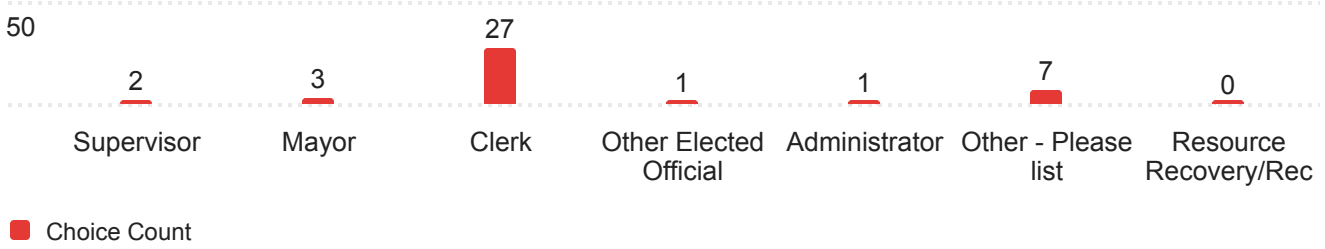
Q1E - Which Wexford municipality do you represent?

8 Responses



Q2 - What best describes your role with your community? - Selected Choice

43 Responses



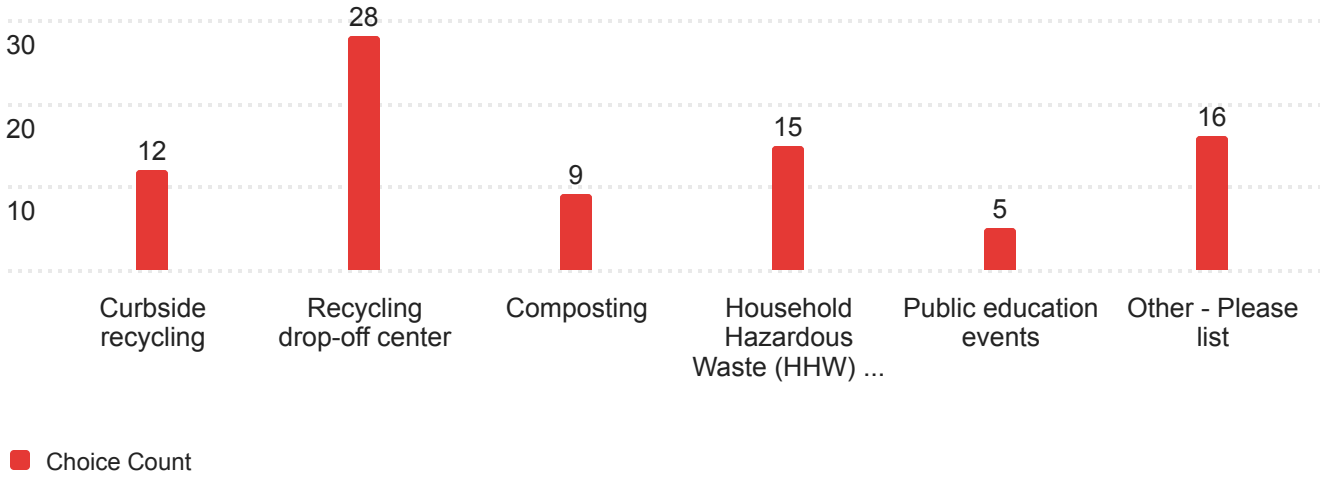
Q2_7_TEXT - Other - Please list - Text

Other - Please list - Text
Planning Commission
Deputy Clerk for elections

Commissioner
Treasurer
president
President
Deputy Supervisor

Q3 - What types of materials management programs or services are currently implemented or supported by your community? Select all that apply. - Selected Choice

40 Responses

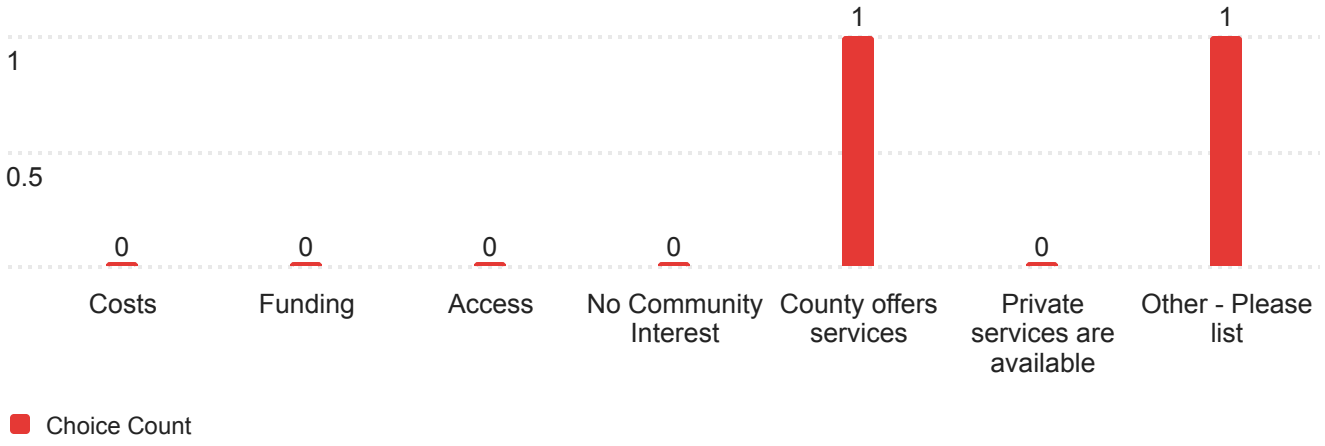


Q3A_7_TEXT - Other - Please list - Text

Other - Please list - Text
The county offers recycling and the household hazardous waste. We have an agreement with the city for a compost site.

Q3A - If you do not offer recycling, household hazardous waste, or composting, why? Select all that apply. - Selected Choice

1 Responses

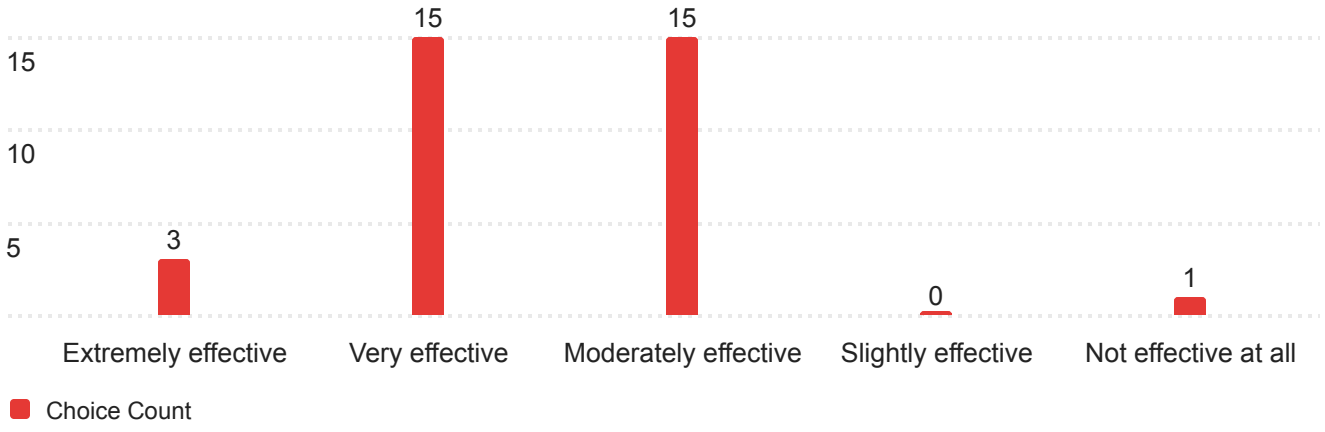


Q3A_7_TEXT - Other - Please list - Text

Other - Please list - Text
The county offers recycling and the household hazardous waste. We have an agreement with the city for a compost site.

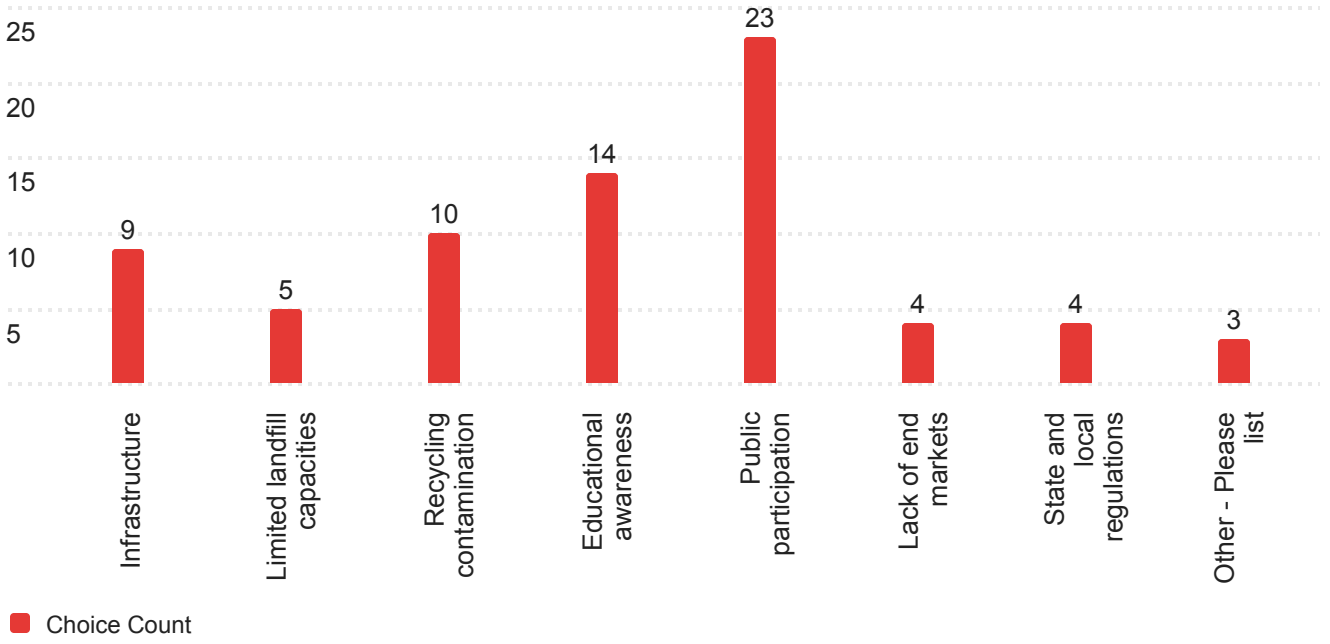
Q4 - How would you rate the effectiveness of the current materials management infrastructure and services within your community?

34 Responses



Q5 - What do you believe are the biggest materials management challenges facing your community? Select all that apply. - Selected Choice

30 Responses



Q5_8_TEXT - Other - Please list - Text

Other - Please list - Text
We are a small rural township, many here either utilize our own composting methods, or it goes straight into the garbage.
As a board member I don't feel well offer enough to our community members but also feel like wouldn't like us to add garbage collection in there taxes.
Need a grocery store

Q6 - How well are different types of materials currently managed within your cou...

Field	Min	Max	Mean	Standard Deviation	Variance	Responses	Sum
Paper	1.00	5.00	2.31	1.07	1.15	32	74.00

Plastics	1.00	5.00	2.52	1.16	1.35	31	78.00
Glass	1.00	6.00	2.63	1.24	1.55	32	84.00
Metals	1.00	6.00	2.77	1.26	1.59	31	86.00
Construction Debris	1.00	6.00	3.78	1.19	1.42	32	121.00
Electronic Waste	1.00	6.00	3.74	1.27	1.61	31	116.00
Matresses	1.00	6.00	3.91	1.31	1.71	32	125.00
Tires	1.00	6.00	3.50	1.32	1.75	32	112.00
Household Hazardous Waste	1.00	6.00	3.31	1.36	1.84	32	106.00
White Goods (appliances)	1.00	6.00	3.81	1.49	2.21	32	122.00
Bulky Waste (furniture, mattresses)	1.00	6.00	3.84	1.37	1.88	32	123.00
Yard Waste	1.00	6.00	3.31	1.42	2.03	32	106.00
Prescription Drugs	1.00	6.00	3.22	1.27	1.61	32	103.00

Q7 - What should be the primary focus of the updated County Materials Management Plan from your community's perspective? An example could be increased recycling participation and access within the community or launching a compost option in the community.

18 Responses

What should be the primary focus of the updated County Materials Management Plan from your community's perspective? An example could be increased recycling participation and access within the community or launching a compost option in the community.

increase recycling information and education

For the most part, the primary focus for our community is access. Currently, residents don't have access to recycling.

increased recycling participation

yes

Funding to help us pay for our garbage collection

increased education to increase participation, access, and compost/natural waste options

Everything is on the county level. We are too small to operate any recycling.

Recycling collection twice a week rather than one.

Public education.

Increased education for the community to reduce contamination in our recycling bins. Better sources for metal recycling.

Increased recycling - most recycle trailers/bins are always "full" making it unattractive to transport recycleable materials to the center only to have to bring them back home.

Increased education and community participation

I feel that getting the word out about the services would offer a lot more participation. People know that we have the services, they just never know when they are available. Plus time- people making the time to do it.

Local education on recycling, composting capabilities

Carboard collection

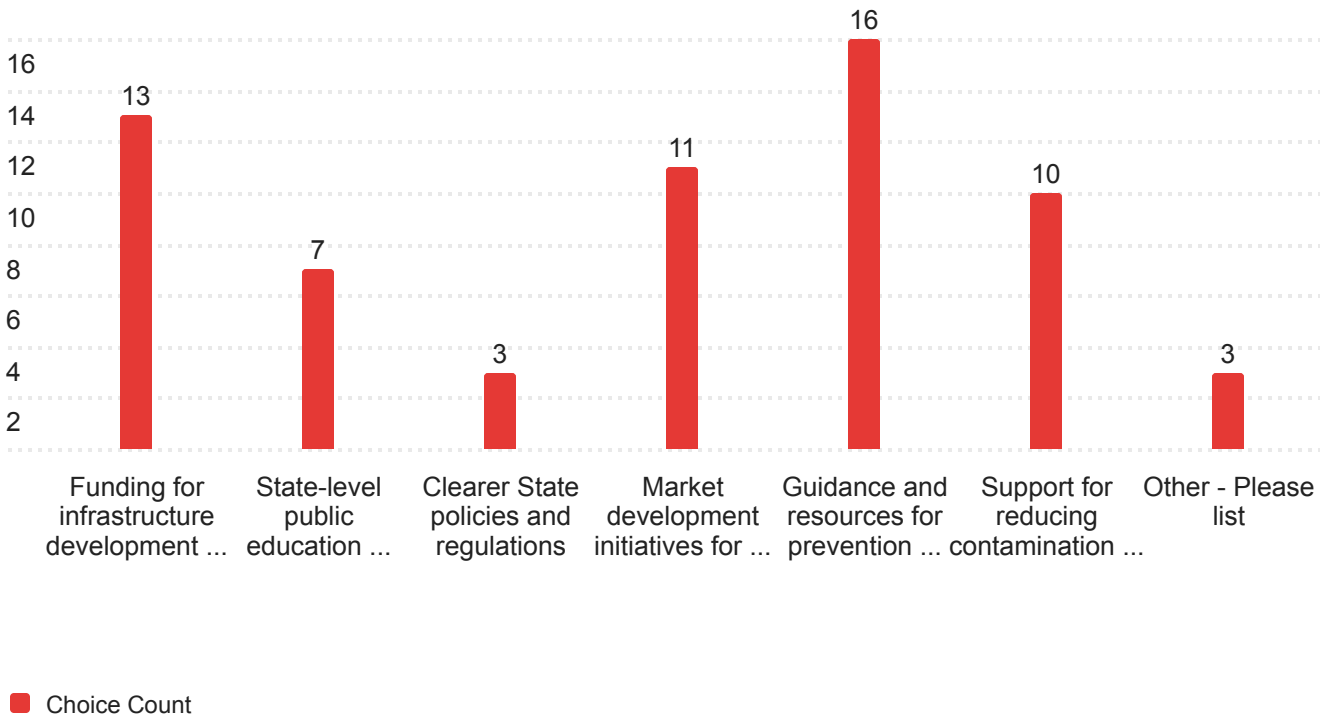
Would like to see more area for getting rid of mattresses, furniture etc at no charge to taxpayers

Switch from land fill to incinerator for disposing of garbage.

Increased community awareness regarding what items go where to eliminate contamination and decrease township costs (for 'scrap metal' bin)

Q8 - Which of the following areas should receive the most attention in the updated County plan to best support your community's materials management efforts? Select your top three. - Selected Choice

27 Responses



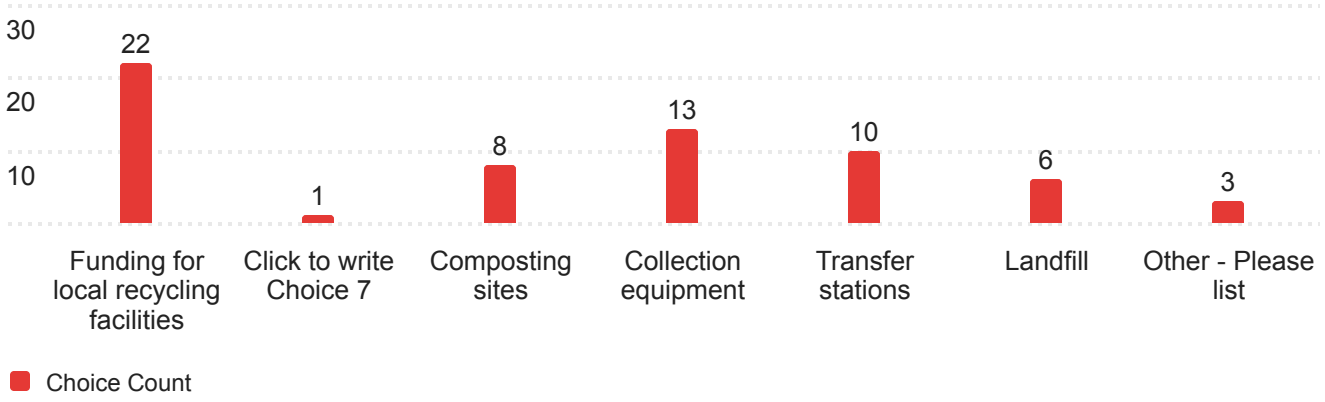
Q8_7_TEXT - Other - Please list - Text

Other - Please list - Text

No clear connection in Wexford between its T,C, and V and the county level. Zero outreach in less populated areas. Wexford County does not support other local municipalities.

Q9 - What types of infrastructure investments are most needed in your county to improve materials management? Select all that apply. - Selected Choice

29 Responses

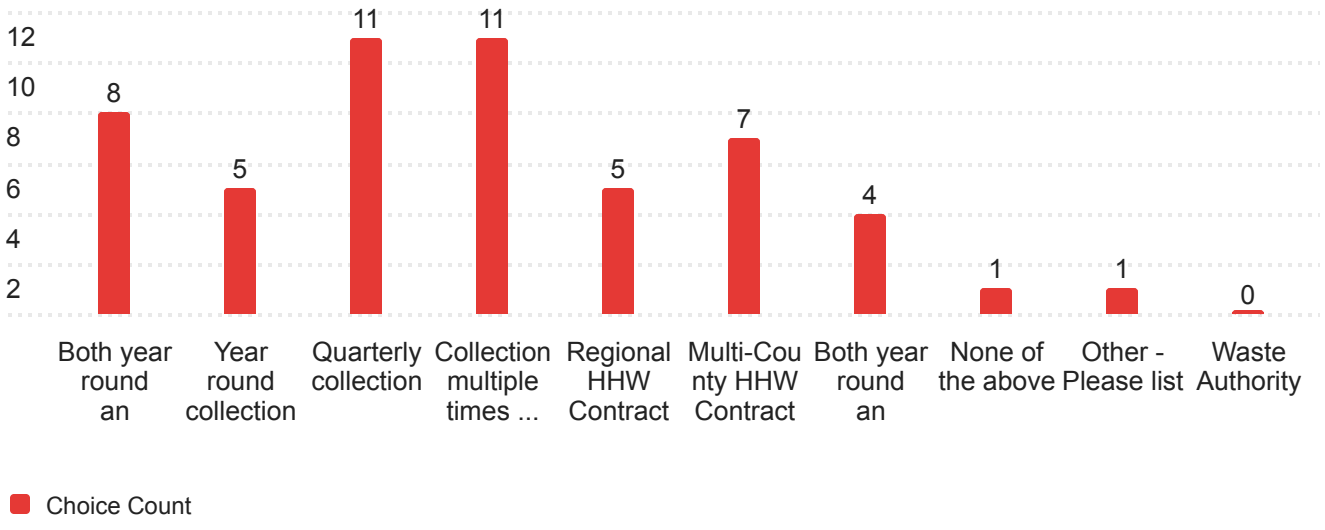


Q9_7_TEXT - Other - Please list - Text

No data found - your filters may be too exclusive!

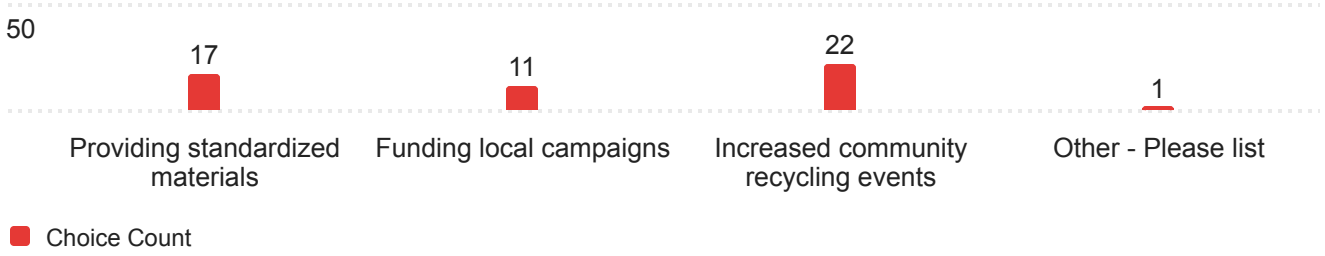
Q10 - Do you see value in pursuing the opportunity for region-wide collection of household hazardous waste year round, waste authority, or a single regional contract for collection events? Select all that apply. - Selected Choice

30 Responses



Q11 - What are the most effective ways to educate the public within your county about proper recycling and waste reduction practices? Select all that apply. - Selected Choice

30 Responses



Q11_4_TEXT - Other - Please list - Text

No data found - your filters may be too exclusive!

Q12 - What are the biggest barriers to increasing recycling rates for materials in your community? - Selected Choice

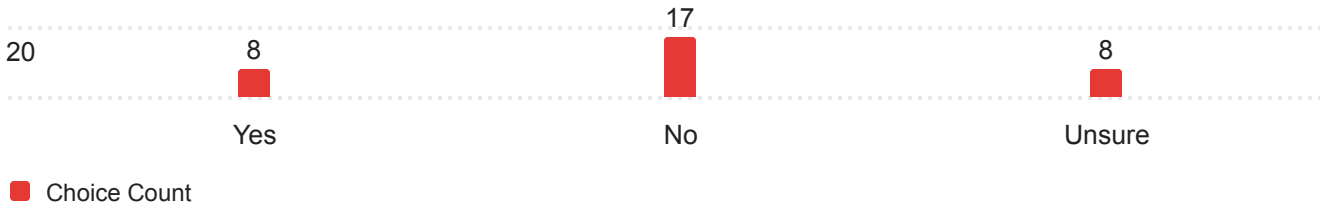
26 Responses

Q12_4_TEXT - Other - Please list - Text

No data found - your filters may be too exclusive!

Q13 - After your communities recycling is collected, do you know where it goes to?

33 Responses



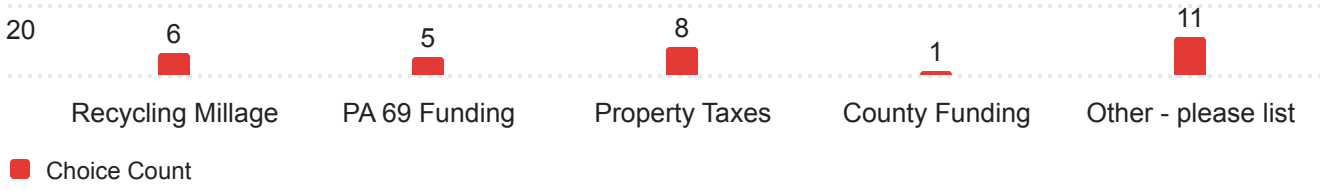
Q13A - If yes, could you please list where they end up? (such as a recycling end-market organization or Emmet County Materials Recovery Facility (MRF))

If yes, could you please list where they end up? (such as a recycling end-market organization or Emmet County Materials Recovery Facility (MRF))
Landfill
Grand Traverse Recycling Center
IT GOES TO A STATWIDE BROKER WHO DISTRIBUTES MATERIALS TO RECYCLERS
Sorting facility and then sold by hauler.

Most plastics end up being shipped to foreign countries where they are burned or dumped in the ocean. Metal is the only recyclable material
BARC

Q14 - How does your community currently pay for recycling? Select all that apply. - Selected Choice

30 Responses

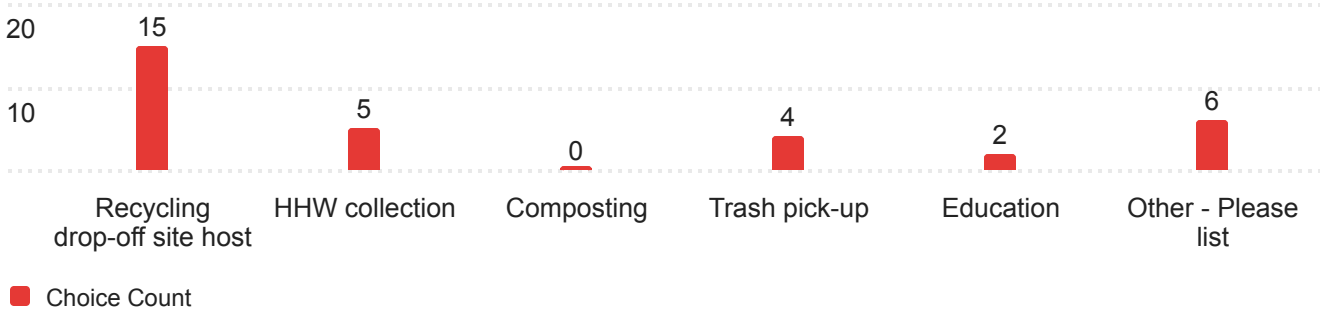


Q14_5_TEXT - Other - please list - Text

Other - please list - Text
Private recycling only
don't know
Our residents currently pay for it themselves through whatever waste management service they personally choose (i.e., GFL).
Monthly resident billing
FEE FOR SERVICE IN UTILITY BILL
Fee, billed monthly to all residential refuse accounts
We don't have recycling
there is no recycling
paid by Bear Lake township at dumpsters within the village limits
I believe the township is billed for recycling
don't know

Q15 - What costs are associated with your communities recycling programs and services funding? Select all that apply. - Selected Choice

27 Responses



Q16 - Could you provide an estimate of how much your community expends on material management services and programs? Please use a $XXX,XXX format.

Could you provide an estimate of how much your community expends on material management services and programs? Please use a $XXX,XXX format.

25,000 for transfer station pick up twice a month and our share of HHW annual pick up

$0

no

Q17 - Is there anything else you would like us to know about materials management and your community?

Is there anything else you would like us to know about materials management and your community?

If the state government cannot realize the value Michigan has as the large fresh water source and continue to supplement Canada trash, this is a complete waste of time.

Simply put, we are a small rural township and there isn't much funding or infrastructure for this type of service. In order to create such infrastructure would more than likely require increased taxes, which residents are not happy about. If anything, our community comes together to do the best they can to take care of the environment.

no

I take my items to the recycling, but many don't because of the distance.

Who provides the signage for our recycling bins? They need to be updated to include polystyrene

Our township does not currently have any programs in place for materials management. Once a year we offer a free clean up day and supply dumpsters from a local company, for large items to be disposed of. Nothing hazardous and no building materials, etc.

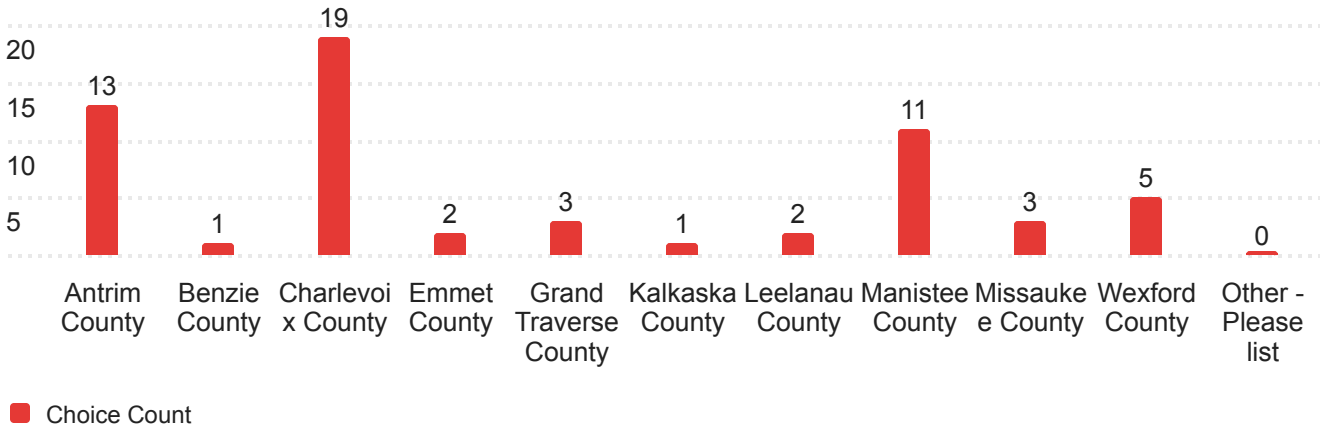
this county is failing

We could use a carboard recycle specific location in addition to our normal recycle location.

we need to stop lying to people about recycling. It is very costly and ends causing more pollution with all the transportation costs and in the end it's dumped in the ocean or burned in foreign countries. Compost collections in down state counties might work, in northern counties many people already compost. This materials management plan is going to end up costing taxpayers more money to have their garbage picked up, which will cause many to just dump their garbage out in the woods on state or federal land or along the road.

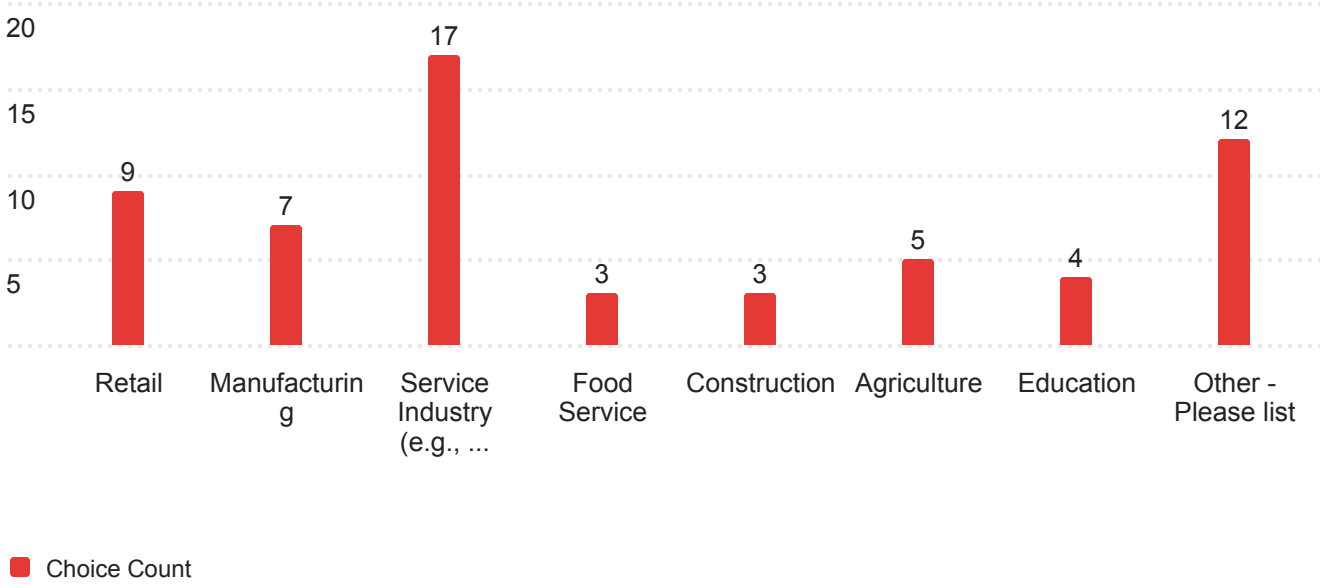
Q1 - What County does your business primarily operate in? - Selected Choice

60 Responses



Q2 - What sector best describes your primary business activity? - Selected Choice

60 Responses



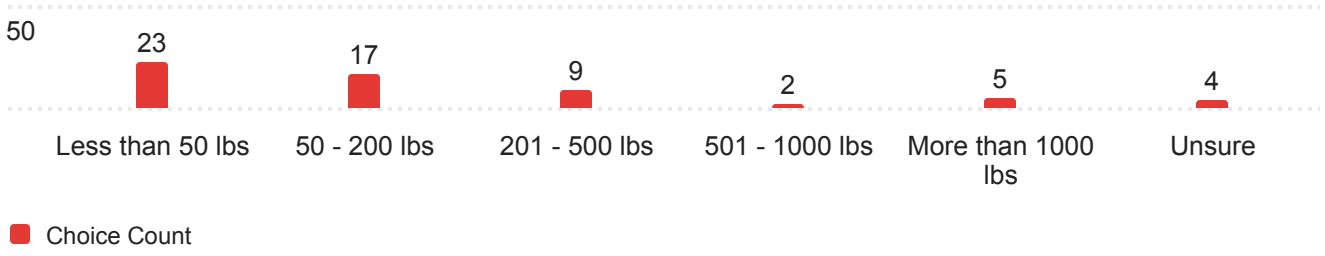
Q2_8_TEXT - Other - Please list - Text

Other - Please list - Text
Conservation

Governmental
Municipality
Non-profit - environmental
County Gov. Law Enforcement
municipality
Government
Distillery and tasting rooms
Government
Workforce Development
gov

Q3 - Approximately how much total non-hazardous waste (trash, recycling, etc.) does your business generate on average per week?

60 Responses

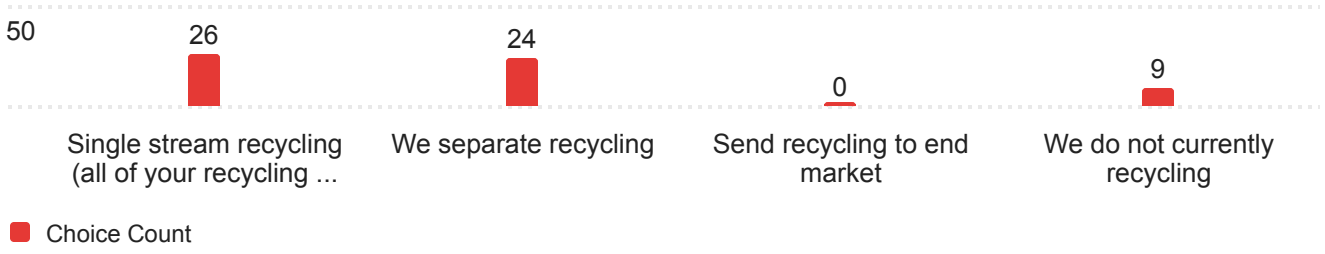


Q4_1 - Estimated Recycling to Waste Rate

Field	Min	Max	Mean	Standard Deviation	Variance	Responses	Sum
Estimated Recycling to Waste Rate	0.00	92.00	48.36	24.59	604.60	55	2660.00

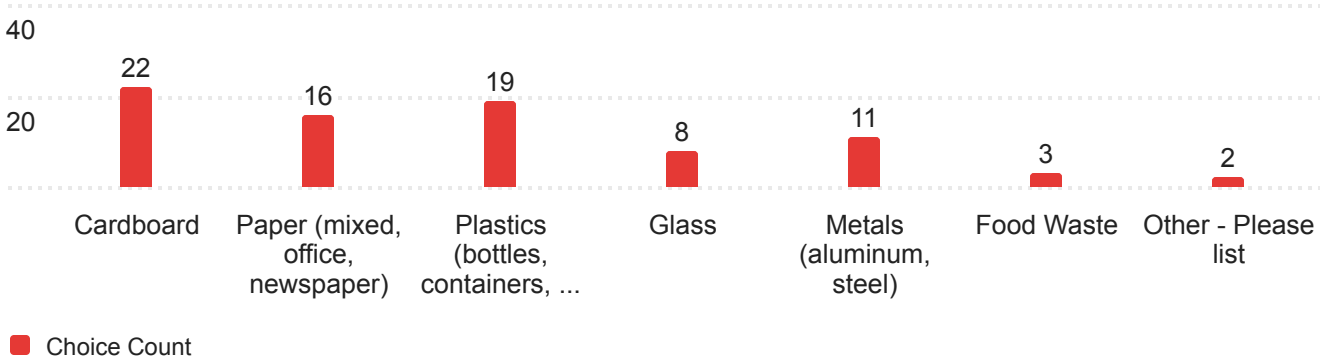
Q5 - How does your business recycle?

59 Responses



Q5A - Which of the following materials does your business currently separate for recycling? Select all that apply. - Selected Choice

23 Responses



Q5B - What materials are you sending to an end market? Please feel free to share what end market you work with.

No data found - your filters may be too exclusive!

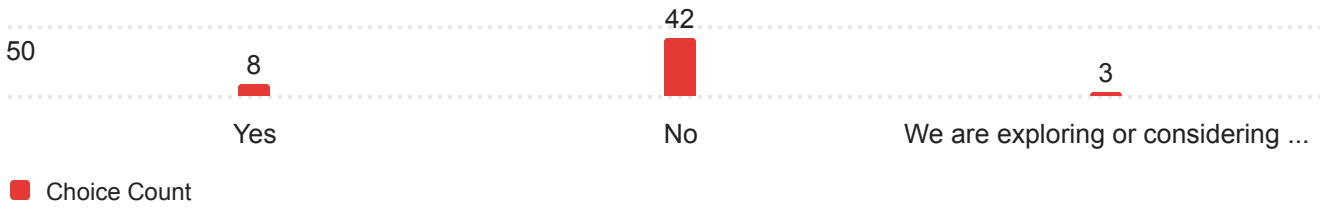
Q5C - If you do not recycle, why?

If you do not recycle, why?
Too much work, only have a waste dumpster, nothing to put recycling in, and we aren't going to haul it to town.
I do not believe in it.
Difficulty in imposing on subcontractors at the construction site. Need for separate dumpsters and recycling service pick-up. We have one client committed to recycling his home renovation, and he is sorting and hauling the material on his own.

Where? This county and frankly state are way behind the capabilities of most states in the US. You need systems to support and encourage by making it easy. If it were accessible, we'd be recycling.

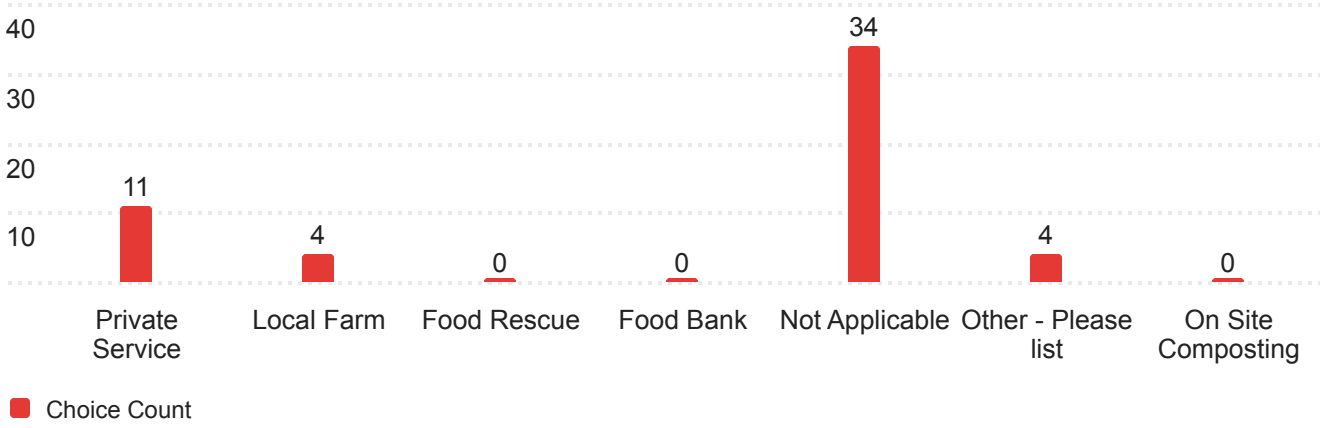
Q6 - Does your business currently participate in any composting or organic waste diversion programs?

53 Responses



Q7 - How do you currently handle your food waste collection? Select all that apply. - Selected Choice

52 Responses



Q7_6_TEXT - Other - Please list - Text

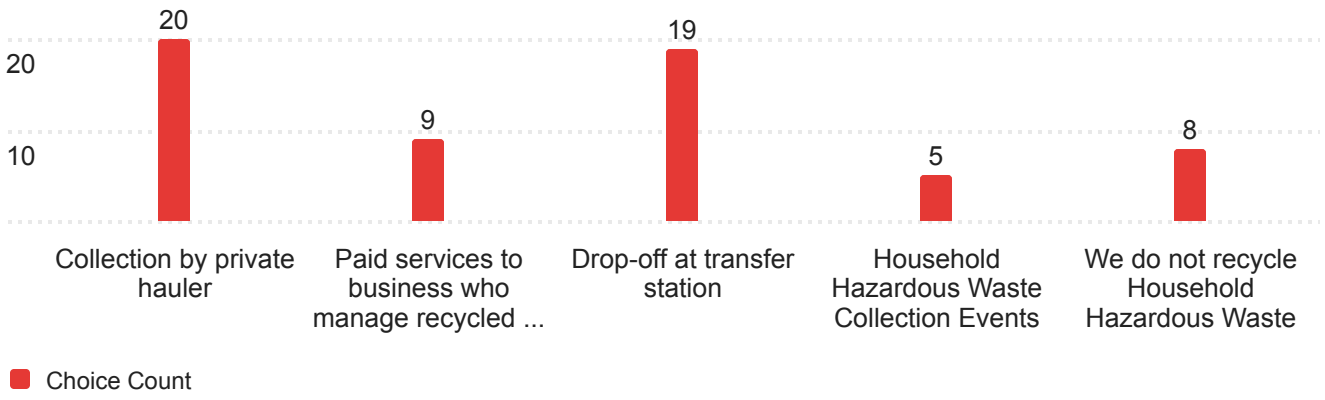
Other - Please list - Text
We vermicompost in our office
We take care of it ourselves and put it into our own fields
Garbage

on Site composting.

For ques above Q6 note - Farm waste consists of manure which is composted, supplemental, and put on the fields increasing carbon sequestration.

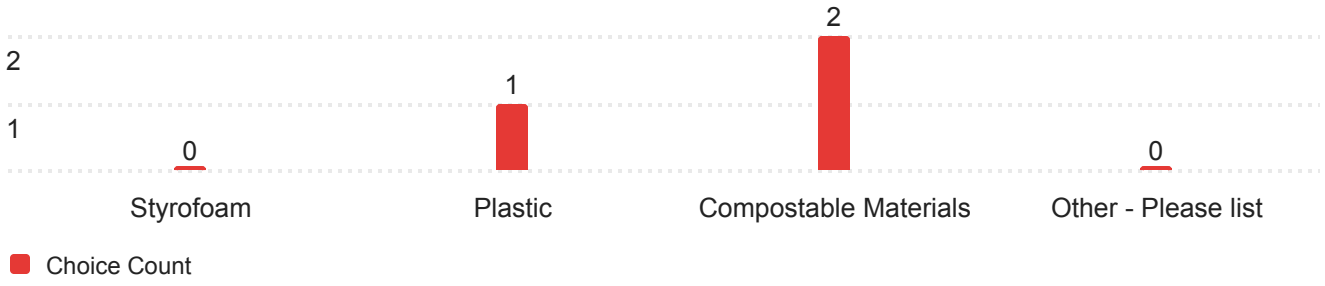
Q8 - How is your business non-hazardous waste recycling picked up? Select all that apply.

53 Responses



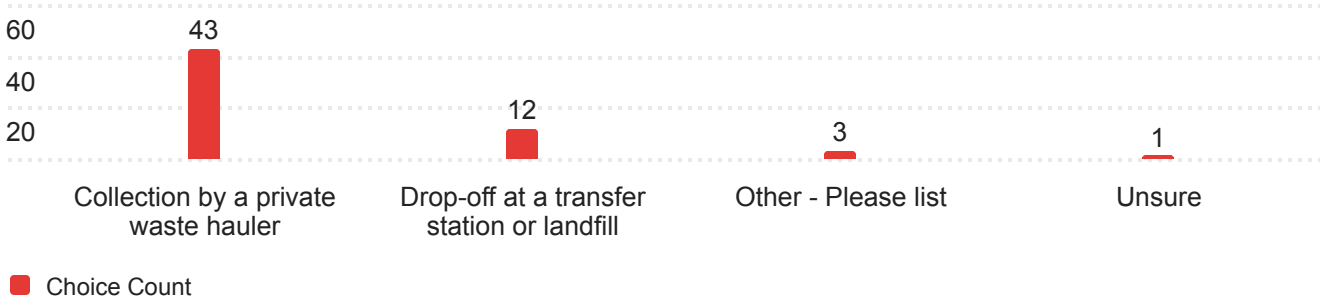
Q9 - If you're business offers take-away, what materials do you utilize for to-go orders? Select all that apply - Selected Choice

2 Responses



Q10 - What are the primary methods your business currently uses for the disposal of non-recyclable/non-compostable waste? Select all that apply. - Selected Choice

53 Responses

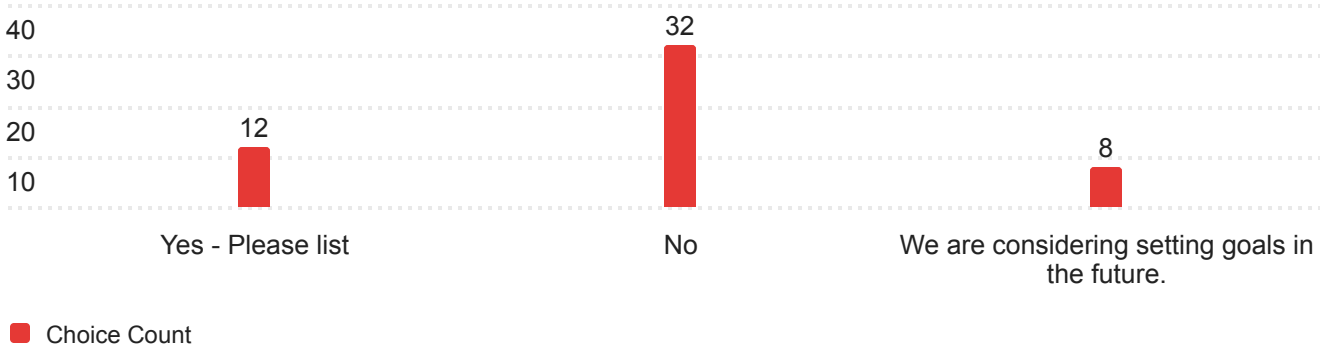


Q10_3_TEXT - Other - Please list - Text

Other - Please list - Text
Donate our spent grain to feed cows
County Recycling
None

Q11 - Does your business currently have any specific goals or initiatives related to reducing waste generation or increasing recycling/composting rates? - Selected Choice

52 Responses



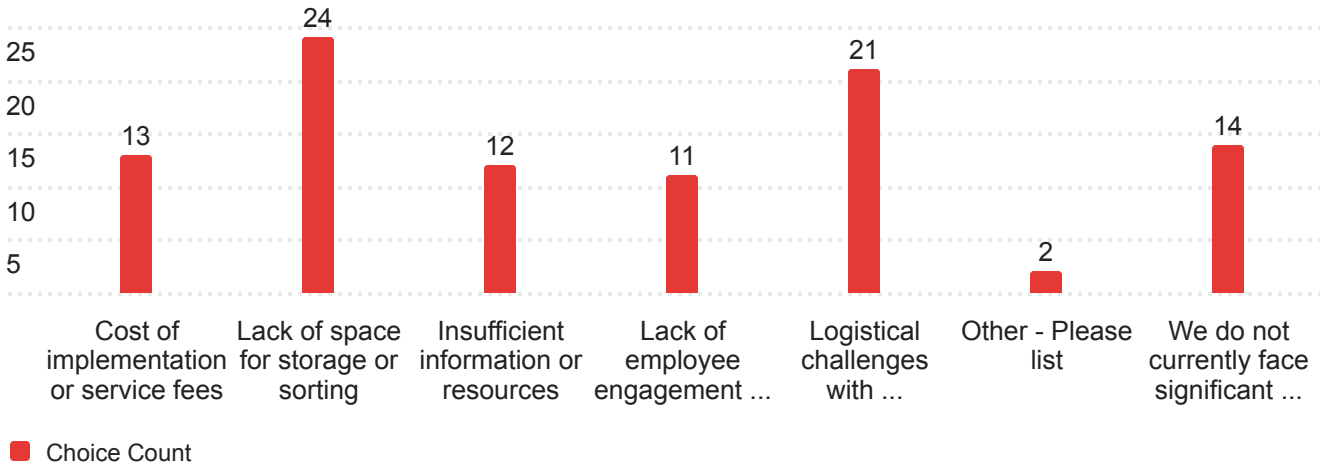
Q11_1_TEXT - Yes - Please list - Text

Yes - Please list - Text
We typically host a composting workshop at least once annually to help educate the community, we also practice vermicomposting at the office, and have separate recycling and trash bins to encourage recycling as much as possible.
We would like to recycle more and wish we had options of commercial composting
We always strive to enhance our recycling needs,
The farm re-uses and repurposes as many items/materials as possible
Our strategic plan highlights how we can recycle more plastic within our manufacturing operations.
Finding a cost effective way to recycle glass bottles
Year-over-year reduction of non-recyclable waste materials.
Our business is based on taking in used/old sails boat sails. We send the sail cloth off to Portland, Maine where it is repurposed into totes and bags of different sizes. Sea Bags.com
We would love to have our community have recycling pick up. Maybe a seperate bin like our garbage bins but a different color.
Efficiency and responsibility
Zero waste

As a plastics manufacturer, we are continuously exploring ways to reuse not only our own recycled plastics but also to transform our plastic waste into new products.

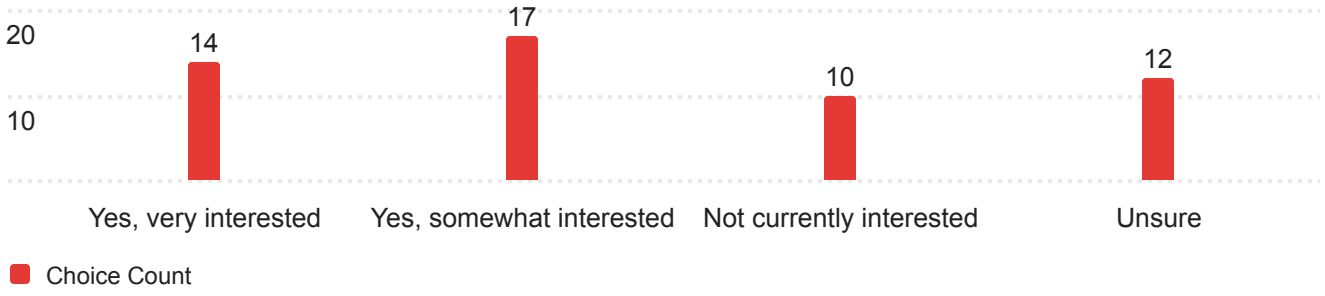
Q12 - What are the biggest challenges your business faces in implementing or expanding sustainable materials management practices (e.g., recycling, composting)? Select all that apply. - Selected Choice

52 Responses



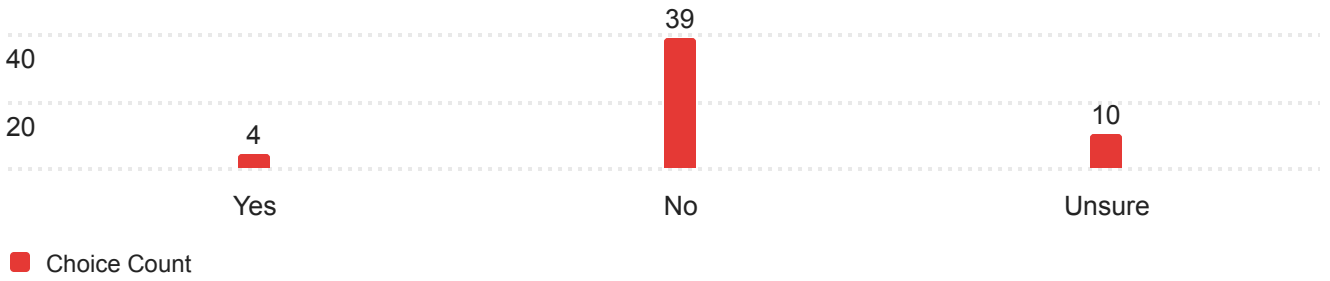
Q13 - Is your business interested in learning more about or participating in local programs or initiatives that support business recycling, composting, or waste reduction?

53 Responses



Q14 - Does your business anticipate any significant changes in the types or volumes of materials it generates in the next 3-5 years?

53 Responses



Q14A - If yes, what types of waste do you expect to increase in the next 3-5 years?

If yes, what types of waste do you expect to increase in the next 3-5 years?
More volume of glass bottles, plastic, cardboard, food waste as business grows
Decrease/retiring
Hopefully, a decrease in plastic will occur as we transition to biobased plastics.
Filter aid

Q15 - Does your business produce a material (by-product or otherwise) that could be recycled, but you do not have an end-user or alternative use for?

53 Responses

Q15A - If yes, what materials could be recycled but need an end user or alternative use for?

If yes, what materials could be recycled but need an end user or alternative use for?

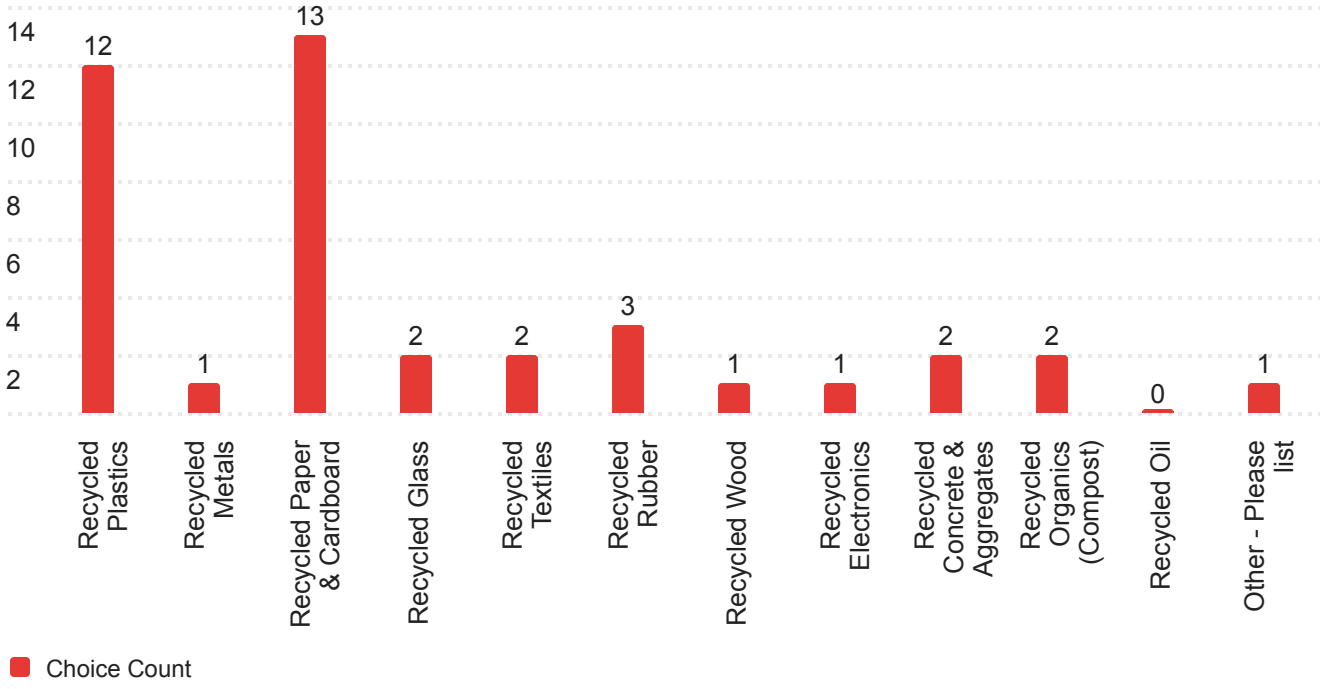
Compostable cups, styrofoam
Totes & Bags
Food waste
Styrofoam, wood scraps
cardboard and other compostable paper materials

Q16 - Does your business purchase recycled materials for use?

52 Responses

Q16A - If yes, what typed of recycled materials do you purchase? Select all that apply. - Selected Choice

21 Responses



Q16B - What recycled materials could your business purchase to utilize if they were available?

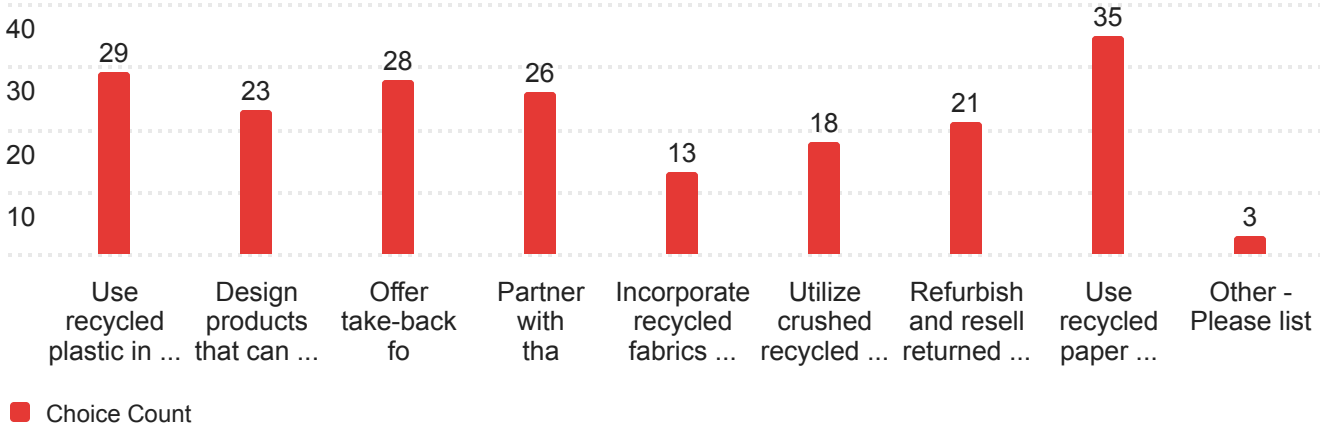
What recycled materials could your business purchase to utilize if they were available?

SHRINK WRAP, LUMBER

anything we could

Q17 - How could businesses better engage with the circular economy through re-use of recycled materials? Select all that apply. - Selected Choice

47 Responses



Q17_9_TEXT - Other - Please list - Text

Other - Please list - Text

recycle for new roads to make materials cheaper

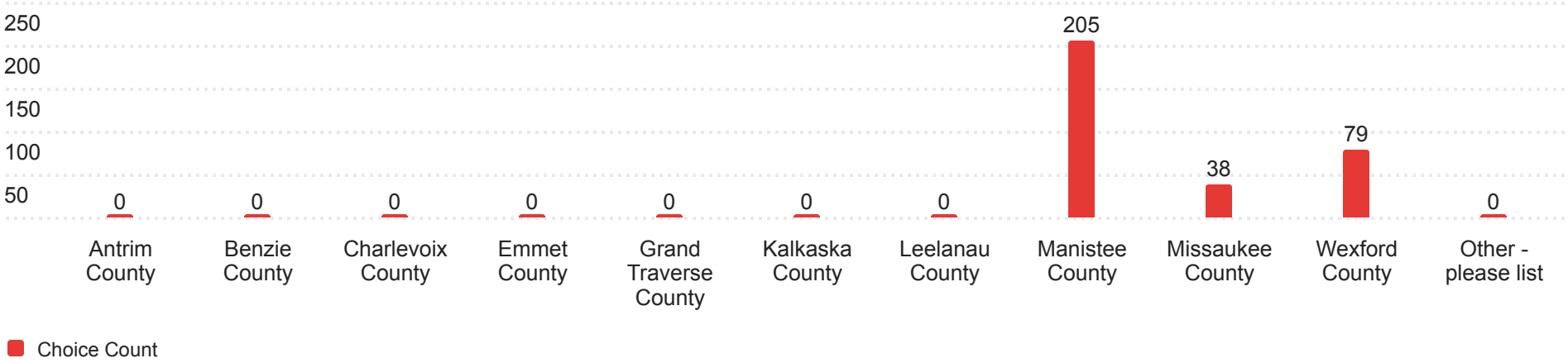
It’s not applicable to my business.

Q1 - Are you a permanent resident, seasonal resident, or visitor in the Northwest Lower Michigan region? This includes Antrim County, Benzie County, Charlevoix County, Emmet County, Grand Traverse County, Kalkaska County, Leelanau County, Manistee County, Missaukee County, and Wexford County

322 Responses

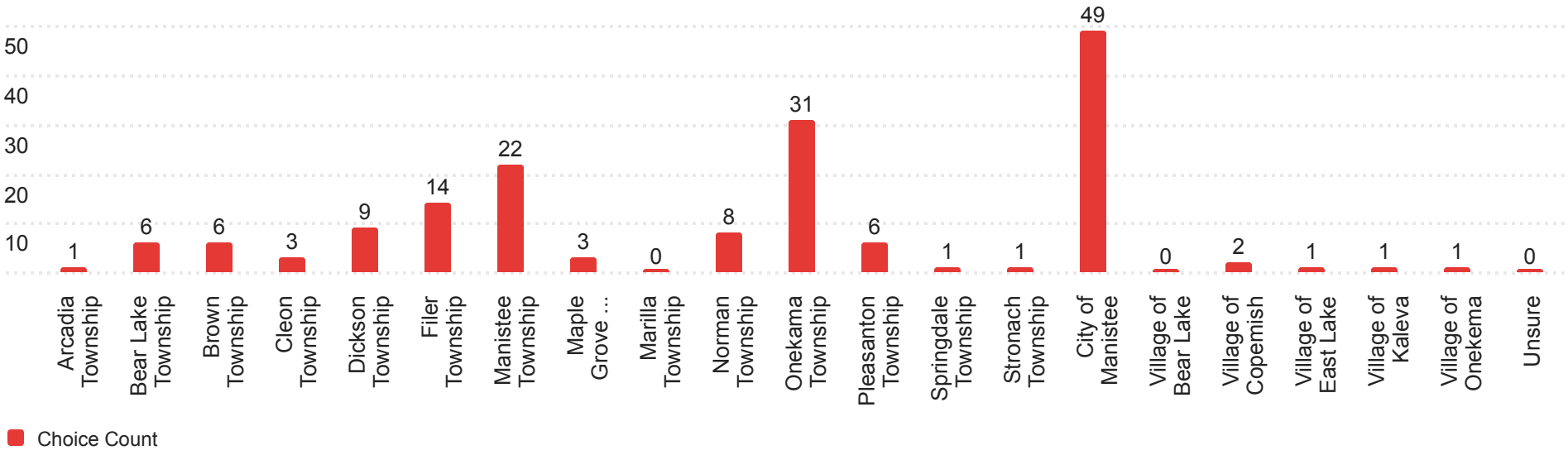
Q2 - What is your County of residence, permanent or seasonal? - Selected Choice

322 Responses



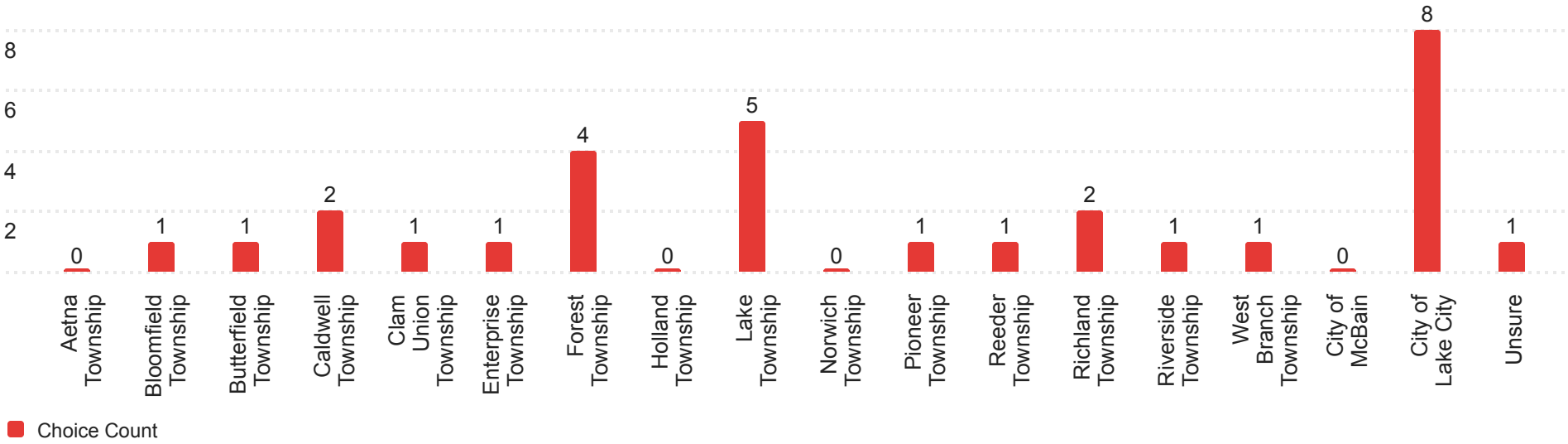
Q2C - What Manistee County municipality (Township, City, or Village) do you reside in?

165 Responses



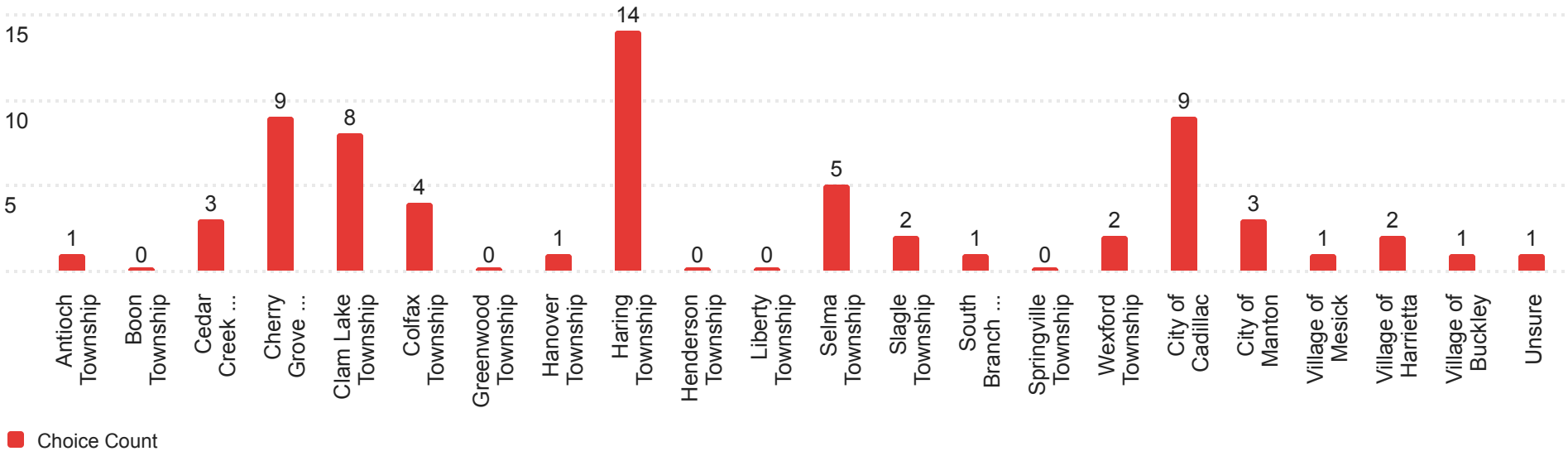
Q2D - What Missaukee County municipality (Township, City, or Village) do you reside in?

30 Responses



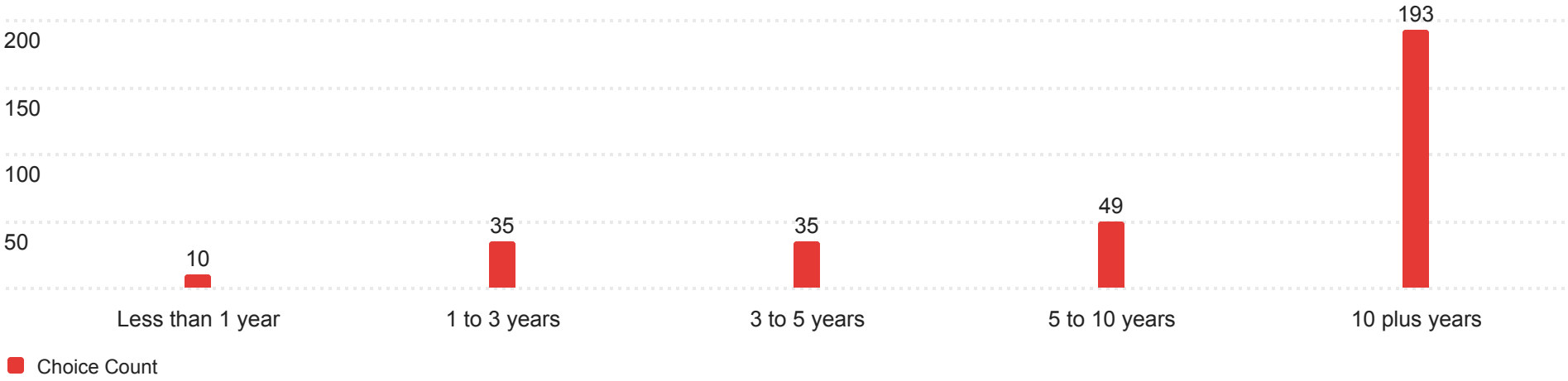
Q2E - What Wexford County municipality (Township, City, or Village) do you reside in?

67 Responses



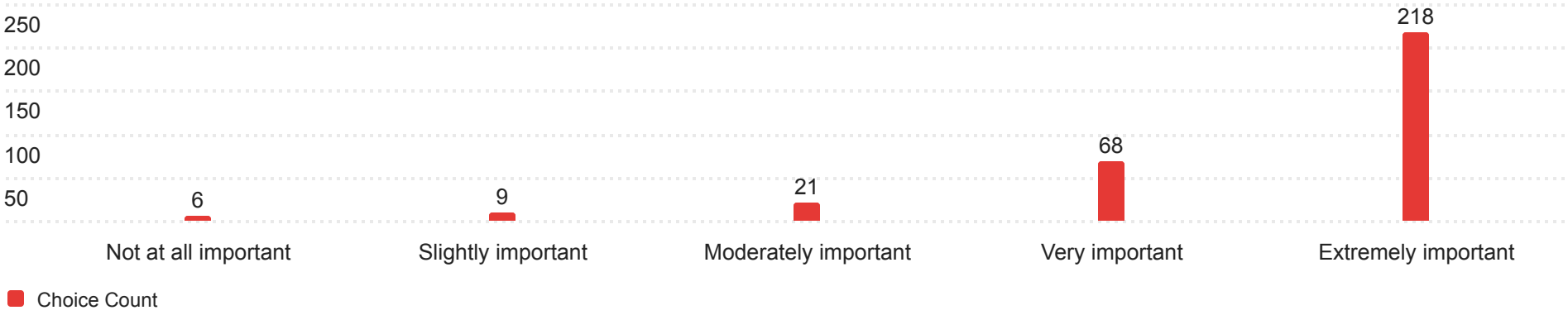
Q4 - How long have you lived at your primary residence?

322 Responses



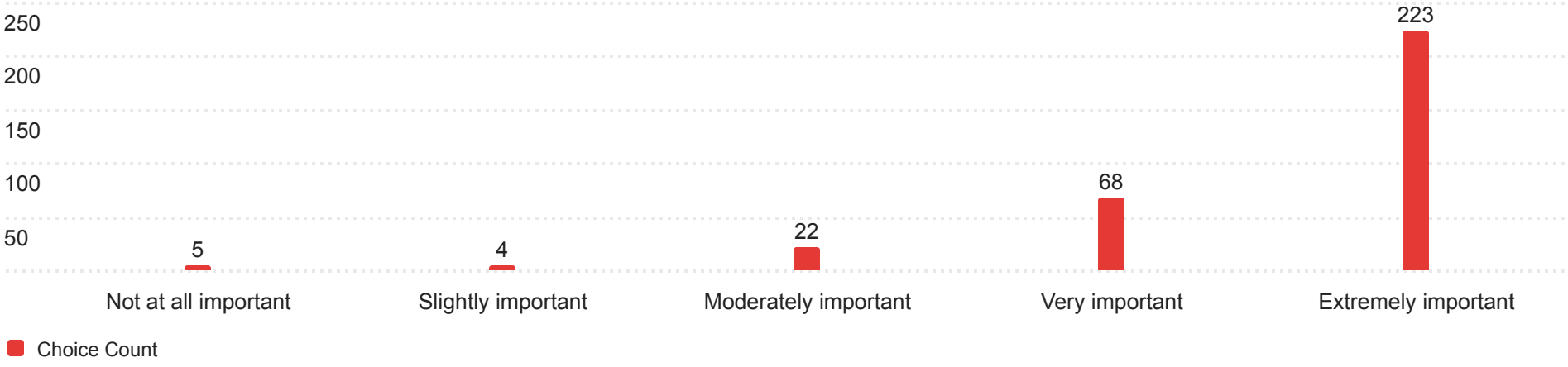
Q5 - How important do you believe recycling is for our communities, environment, and natural resources?

322 Responses



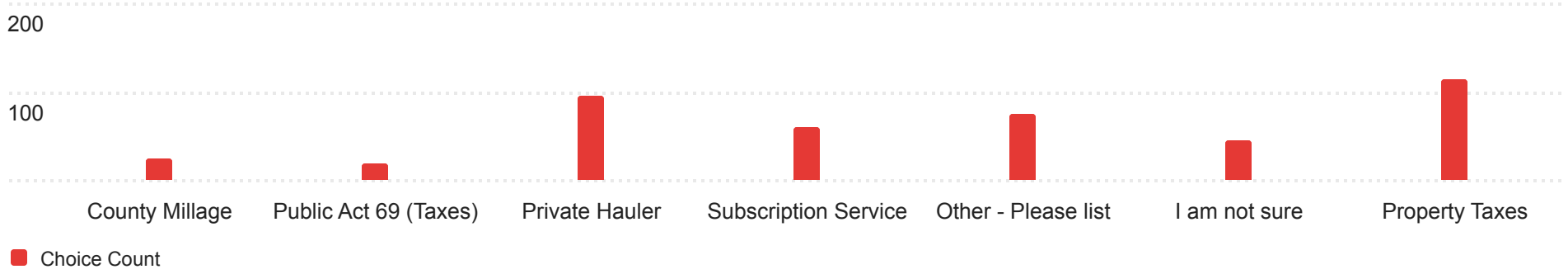
Q6 - How important is it for our community to reduce the amount of waste going into landfills?

322 Responses



Q7 - How do you pay for material management (Trash, Recycling, Organics, etc.) services? Select all that apply. - Selected Choice

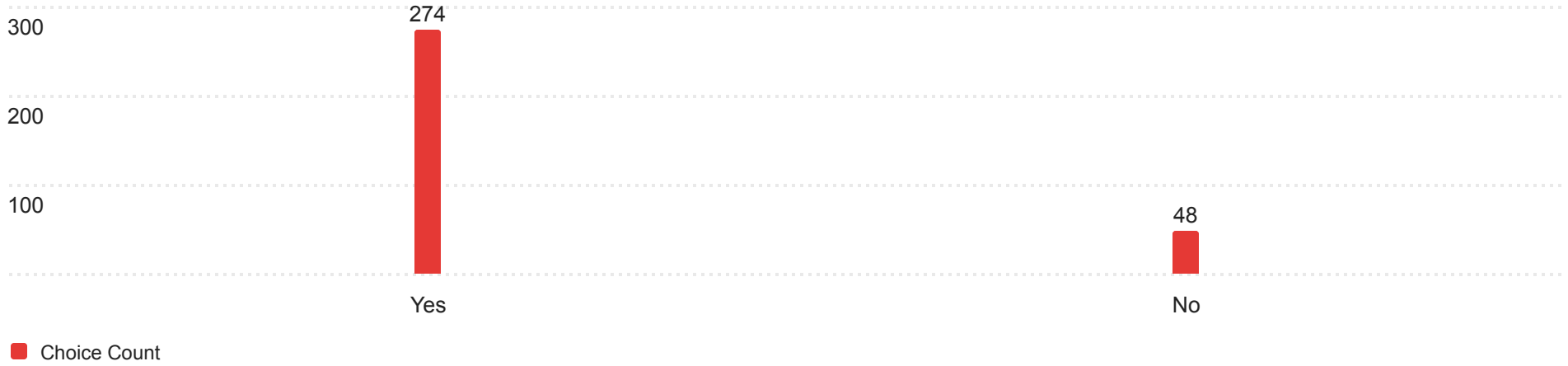
321 Responses



Other ways that material management services were paid for included water/sewer utility bills, local programs, taxes, prepaid trash bags, or through rent or association dues.

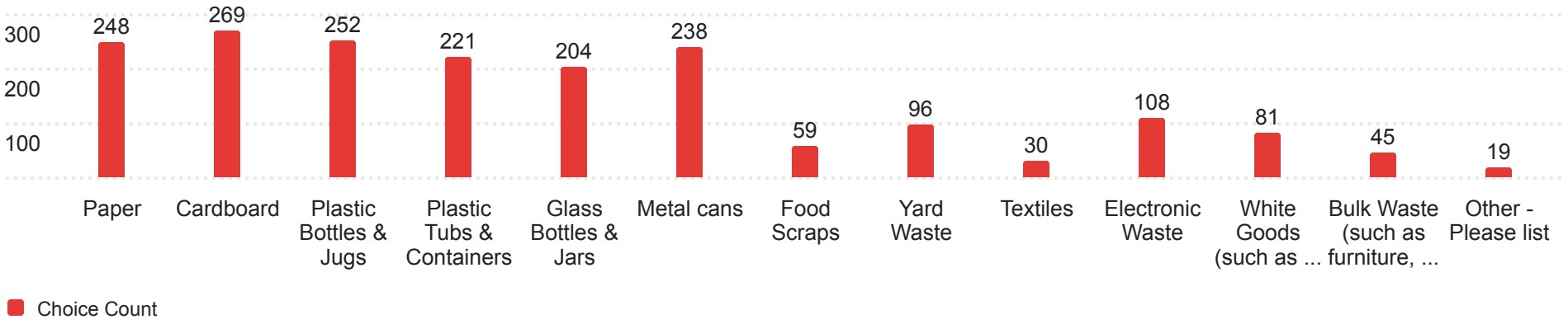
Q8 - Does your household currently participate in recycling?

322 Responses



Q8A - If yes, what types of materials do you typically recycle at home? Select all that apply. - Selected Choice

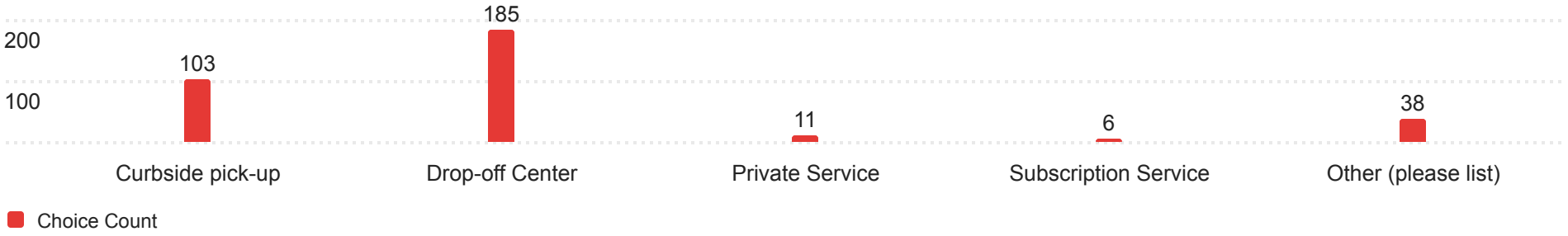
274 Responses



Other materials recycled included hazardous household waste, electronic waste, yard and good waste at home, and donating appliances and textiles.

Q8B - How is your recycling collected? Select all that apply. - Selected Choice

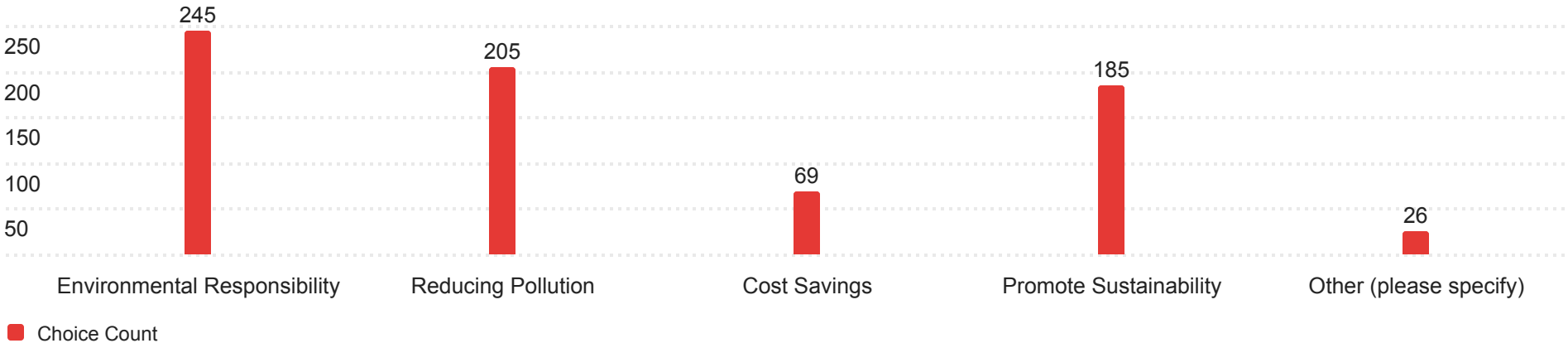
273 Responses



Other ways recycling is collected include at home composting, private drop-offs, newly implemented curbside pickup, and programs and businesses for large items.

Q8C - What are your main reasons for recycling? Select all that apply. - Selected Choice

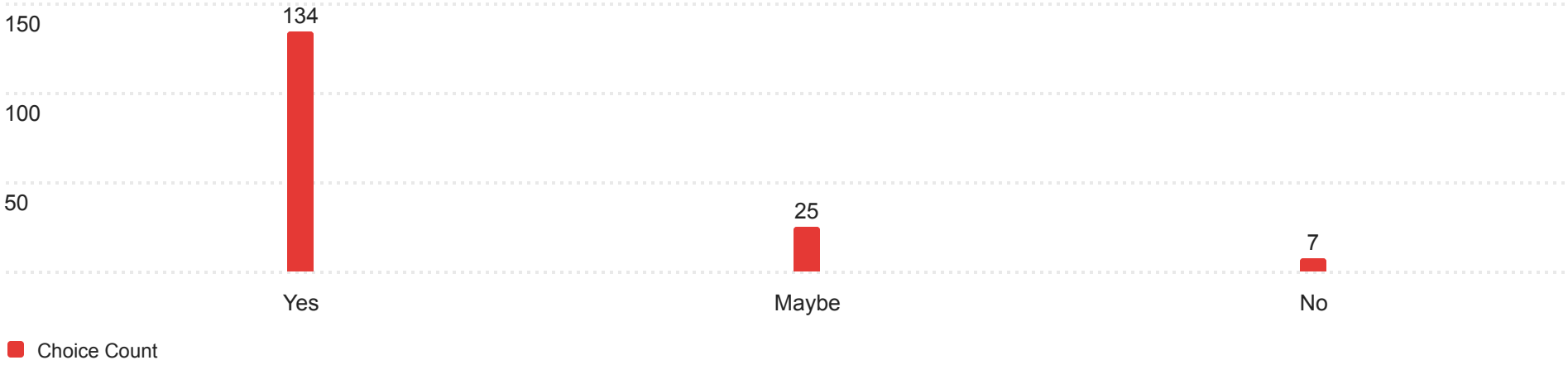
274 Responses



Additional reasons for recycling included environmental protection, reduction of trash volumes, and feelings of mandatory recycling from taxes/fees.

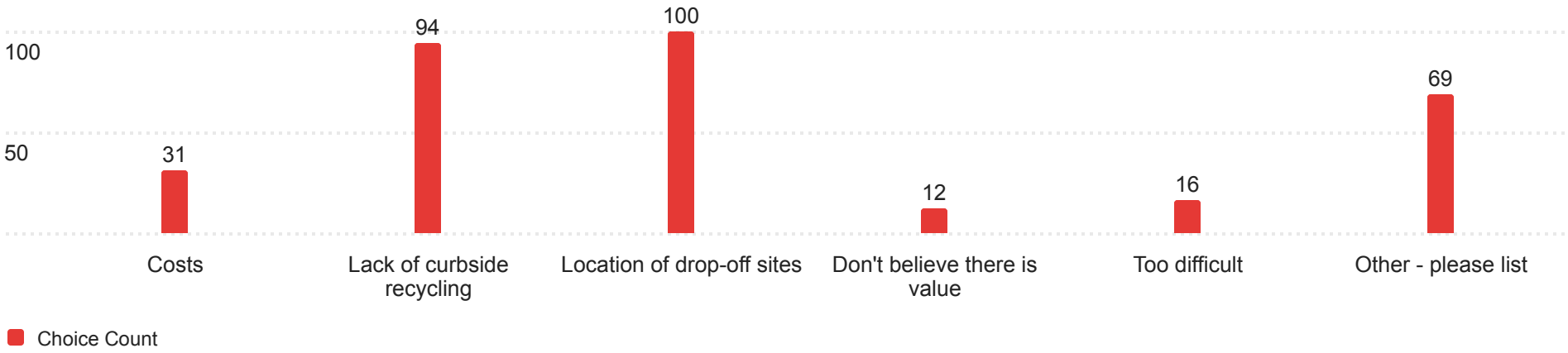
Q9 - If you don't recycle, would you be interested in increased recyling availability?

166 Responses



Q10 - Are there barriers that prevent you from recycling? Select all that apply. - Selected Choice

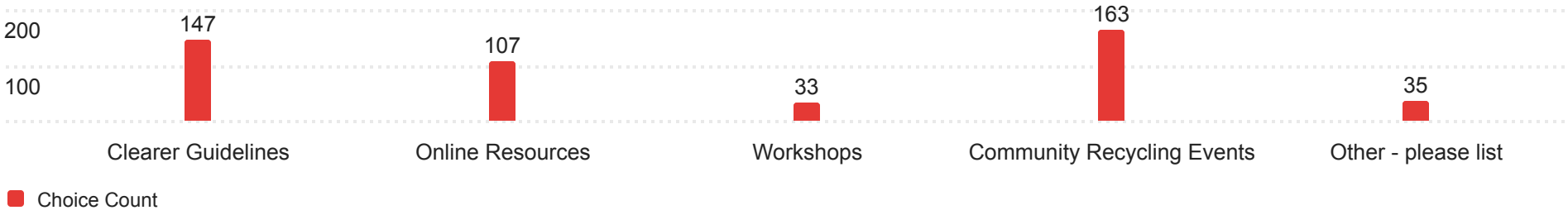
191 Responses



Other barriers to recycling included accessibility (locations too far, bins too full), confusion on what is allowed or not allowed, and transparency of recycled materials end life.

Q11 - What information or resources about recycling and waste reduction would you find helpful? Select all that apply. - Selected Choice

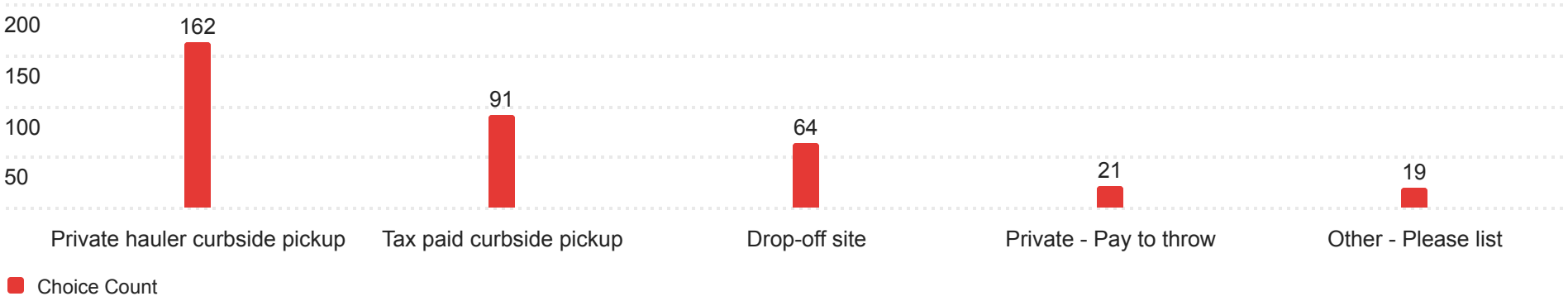
256 Responses



Other resources and information helpful for recycling and waste reduction include clear guidelines on what is and is not accepted, more frequent pick-ups, and transparency of recycled materials.

Q12 - How does your household typically dispose of trash (i.e. non-recyclable waste)? Select all that apply. - Selected Choice

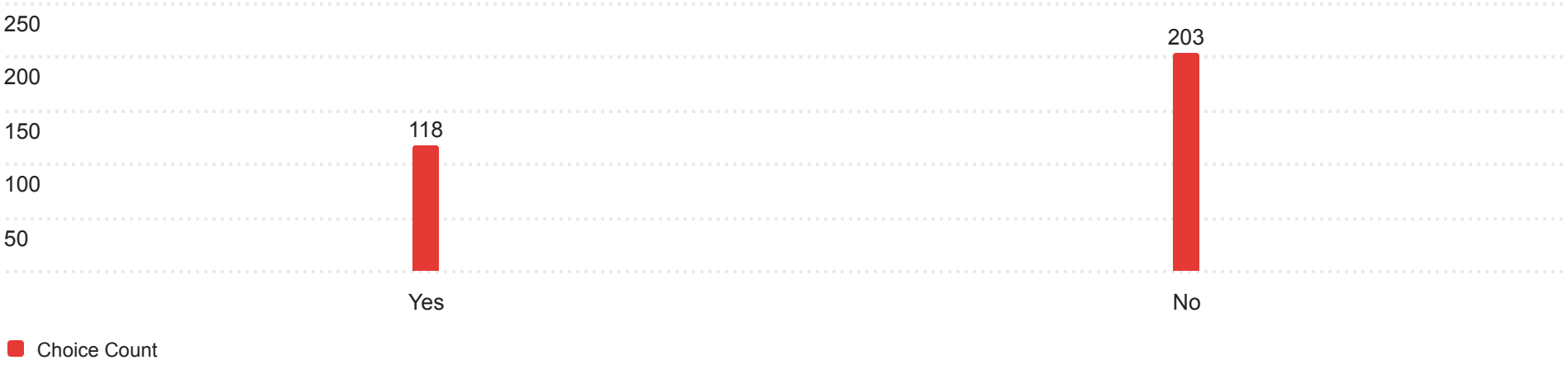
321 Responses



Other ways trash is disposed of include burning, taking back to primary residence, taking items to landfill, community dumpster, and utilizing special events for disposal.

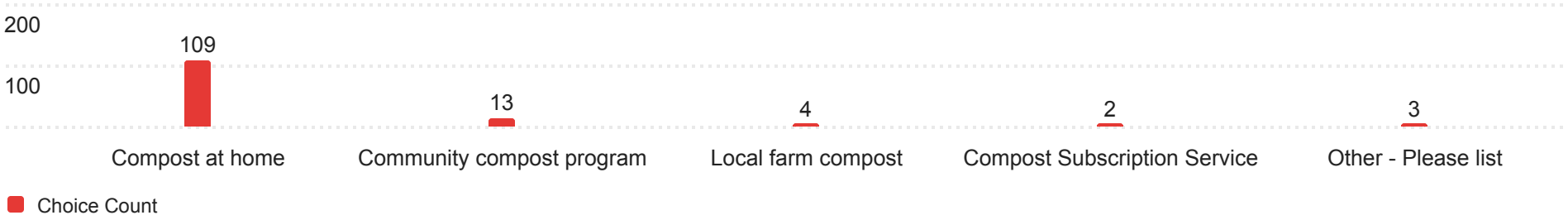
Q13 - Do you participate in composting?

321 Responses



Q13A - How do you compost? Select all that apply. - Selected Choice

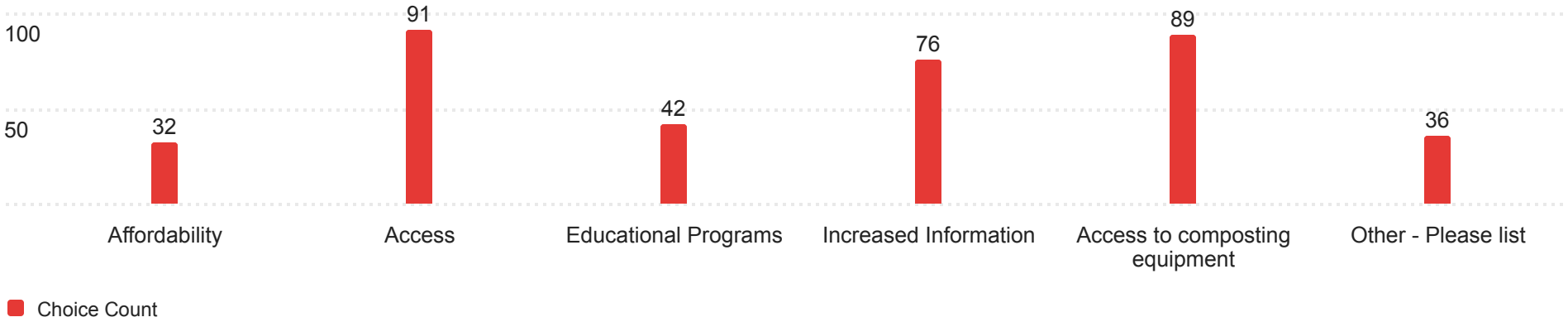
118 Responses



Other composting methods include community garden, local municipality or hauler yard waste pick up, and backyard composting.

Q13B - If you do not utilize compost programs, what would encourage you to participate in composting? Select all that apply. - Selected Choice

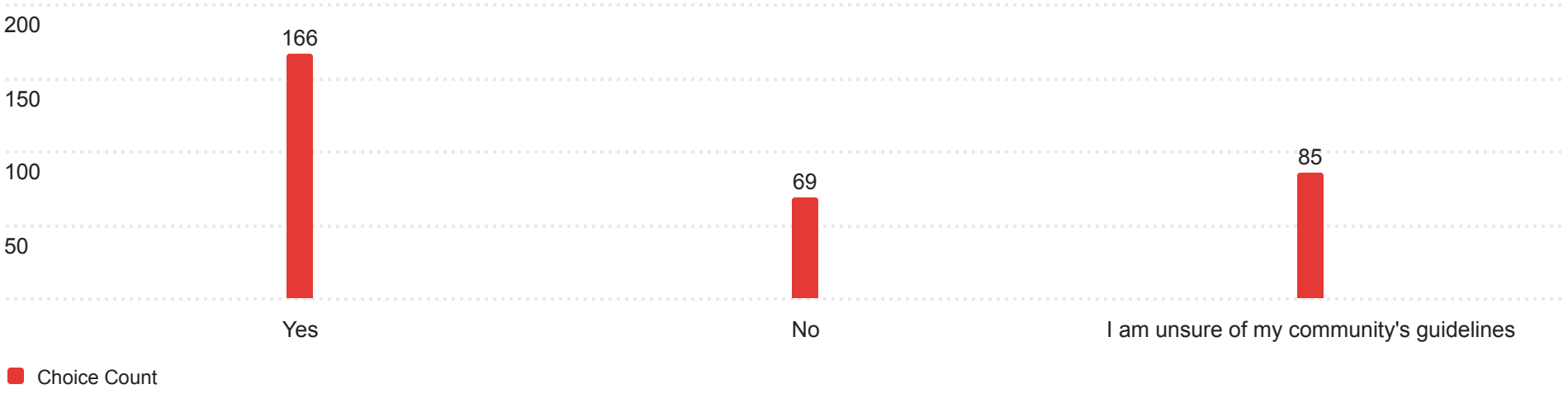
189 Responses



Additional ways composting can be encouraged is through addressing animal attraction, lack of space to compost, inconvenience, cost, and physical ability to participate.

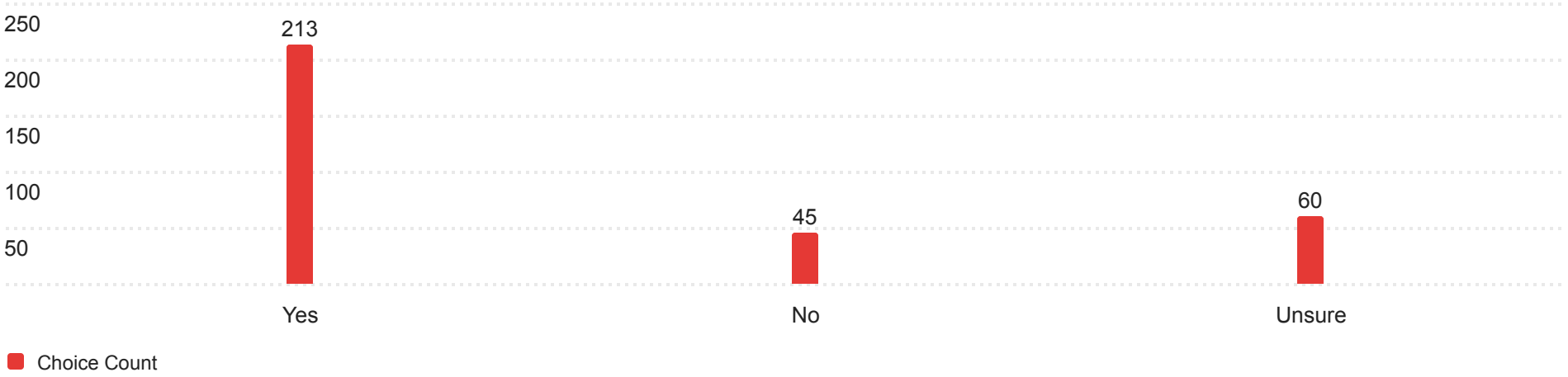
Q14 - Are the rules and guidelines clear for recycling in your community clear?

320 Responses



Q15 - Do you know what recycling items are not accepted by your local program?

318 Responses

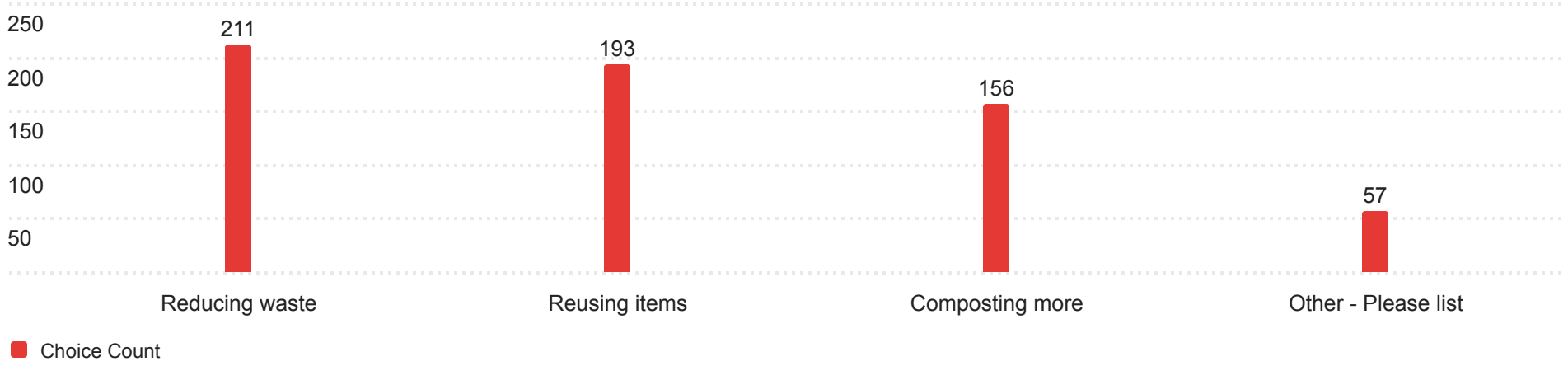


Q16- Are there any specific types of waste or materials that you find particularly difficult to recycle or dispose of properly? Please list all.

Materials that residents find difficult to dispose of or recycle properly include Styrofoam, plastic bags/film, plastics not accepted, electronic waste, paint and chemicals, tires, glass, appliances, furniture, and construction materials. Other concerns pertained to confusions on what is accepted and correct cleaning of materials for recycling.

Q17 - What ways could our communities be doing a better job of managing waste and resources? Select all that apply. - Selected Choice

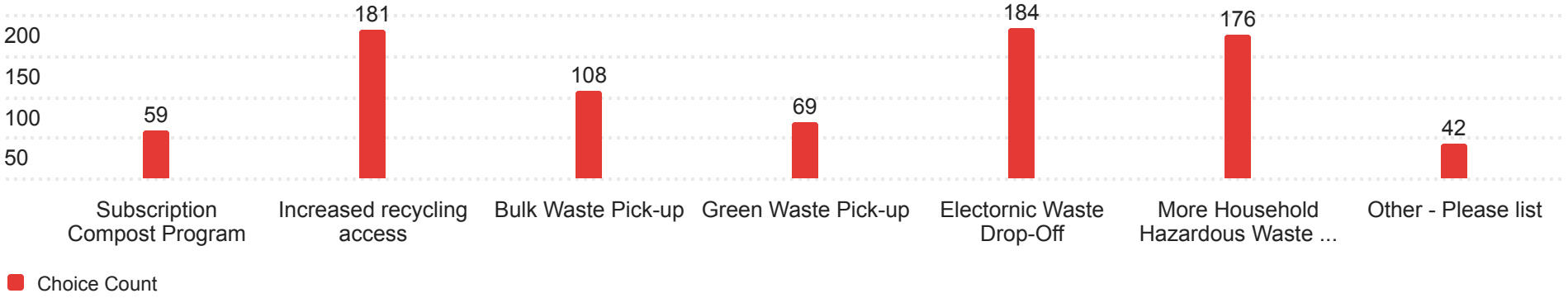
279 Responses



Other ways that communities can do a better job include expanding collection sites to accept more materials, more frequent household hazardous waste and electronic collections, clear education, and assurance of materials being recycled.

Q18 - What services would you like to see offered in your community? Select all that apply. - Selected Choice

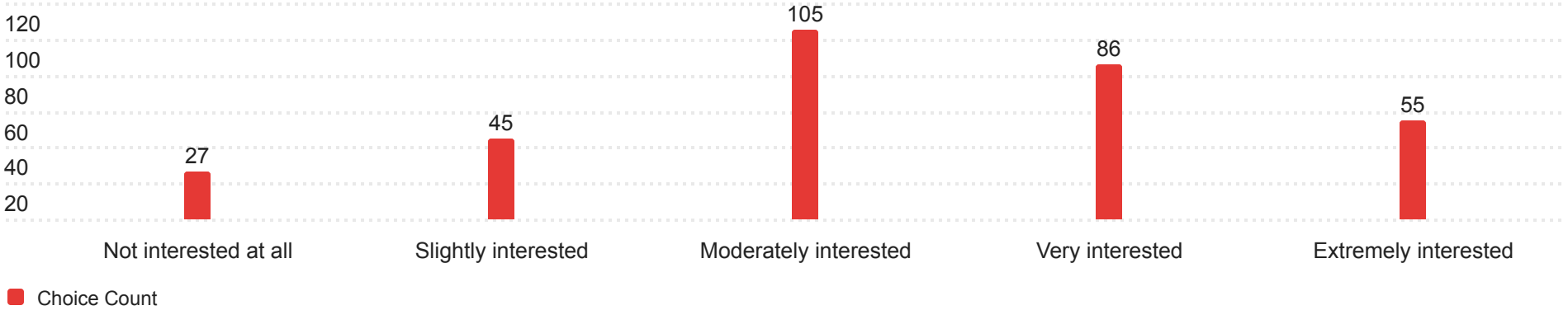
309 Responses



Additional services that residents would like to see include more frequent collection events, yard and green waste clean up, single-stream and curbside recycling. There are concerns of increased costs for services.

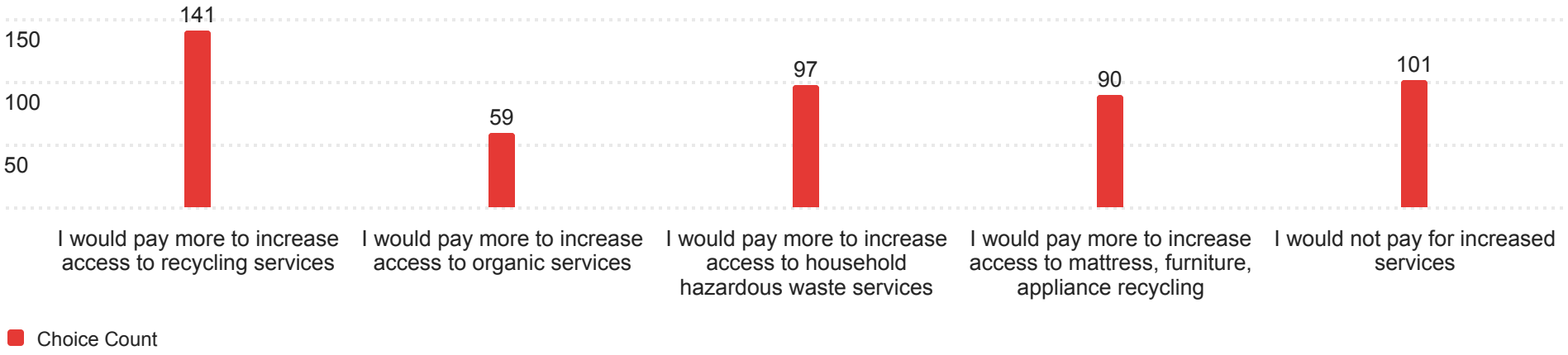
Q19 - How interested are you in learning more about waste reduction and management, recycling, and organics in your community?

318 Responses



Q20 - Are you willing to pay for increased service and access? Select all that apply.

302 Responses

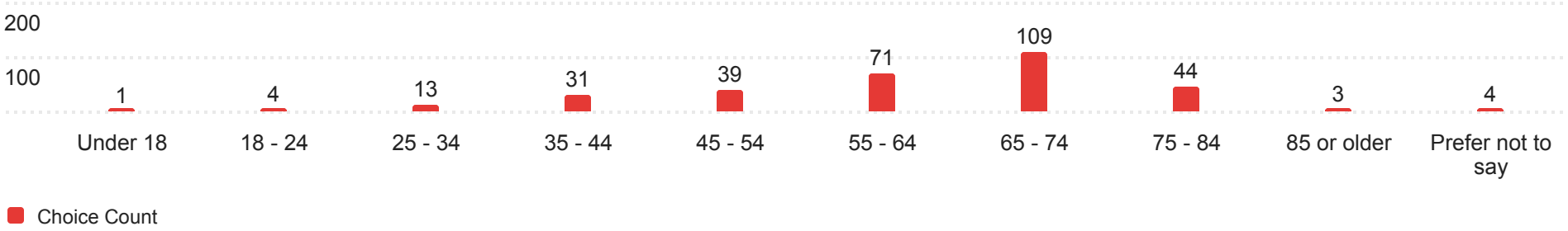


Q21 - Are there any other considerations in regards to materials management (trash, recycling, organics, etc.) planning that should be considered or examined by the respective Materials Management Planning Committees?

Considerations for the MMPC to consider include improved accessibility for all (locations, bin sizes), increased collection events, increased collection of drop-sites, support for at home composting, transparency that collected materials are recycled, maintenance of drop-sites, clear recycling guidelines, and being aware of costs.

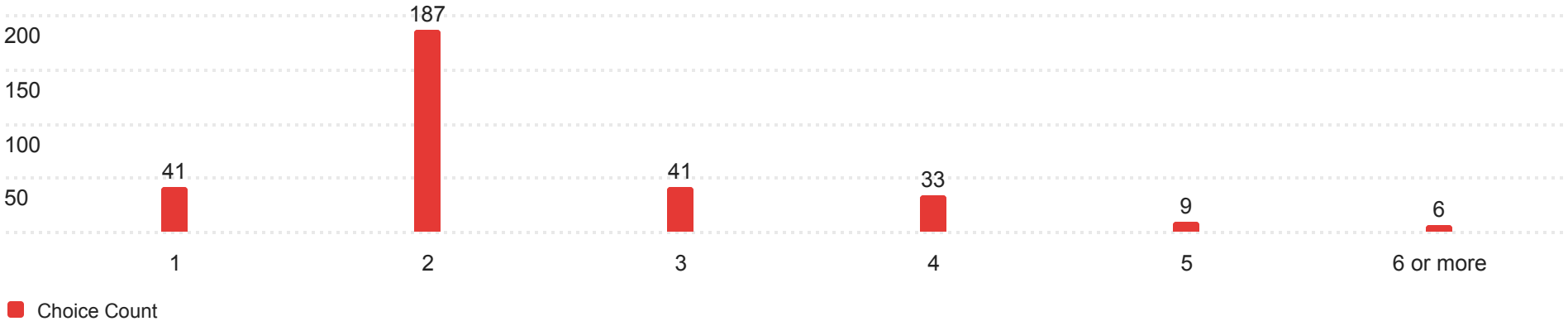
Q22 - What age range do you fall into?

319 Responses



Q23 - Which of the following describes the number of people, including yourself, living in your household?

317 Responses



Q24 - Which of the following best describes your total annual household income?

317 Responses