

**State of Wisconsin**  
**DEPARTMENT OF NATURAL RESOURCES**  
101 S. Webster Street  
Box 7921  
Madison WI 53707-7921

**Tony Evers, Governor**  
**Preston D. Cole, Secretary**  
Telephone 608-266-2621  
Toll Free 1-888-936-7463  
TTY Access via relay - 711



November 30, 2022

Gov. Tony Evers  
115 East Capitol

Mr. Michael J. Queensland, Chief Clerk, Wisconsin Senate  
P.O. Box 7882  
Madison, WI 53707

Mr. Edward A. Blazel, Chief Clerk, Wisconsin Assembly  
I 7 West Main St., Room 401  
Madison, WI 53703

Sen. Robert Cowles, Chair, Senate Committee on Natural Resources and Energy  
118 South Capitol

Rep. Joel Kitchens, Chair, Assembly Committee on Environment  
312 North Capitol

Dear Governor Evers and members of the Legislature:

The enclosed annual report on Wisconsin's electronics recycling law, required by s. 287.17(10), Wis. Stats., includes a summary of program results to date and an update on implementation of the bans on landfilling or incinerating electronics. Also enclosed is a short summary of highlights from the report.

If you have any questions, please do not hesitate to contact Brad Wolbert, director of our Waste and Materials Management Program, at 608-264-6286. Additional program information and results can be found at <https://dnr.wi.gov/topic/Ecycle/>.

Sincerely,

DocuSigned by:

*Sarah Barry*

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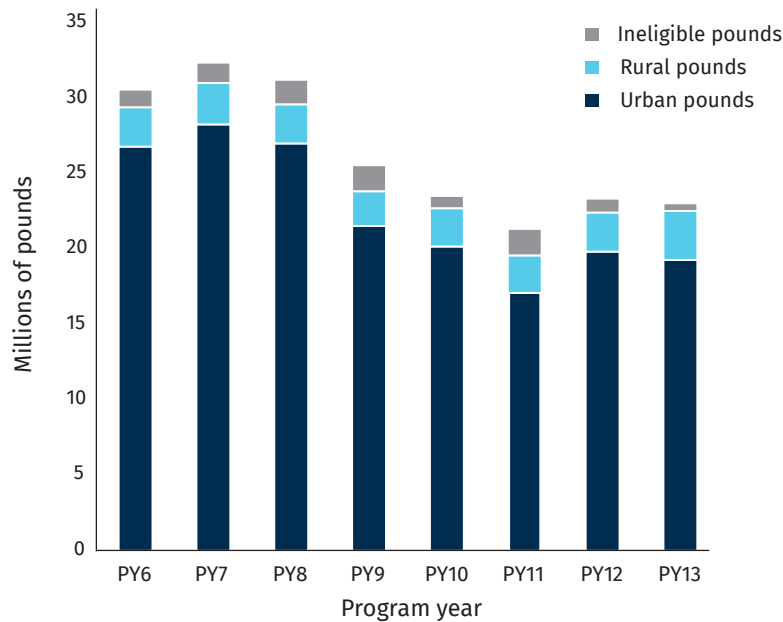
Sarah Barry, Deputy Secretary

Enclosure



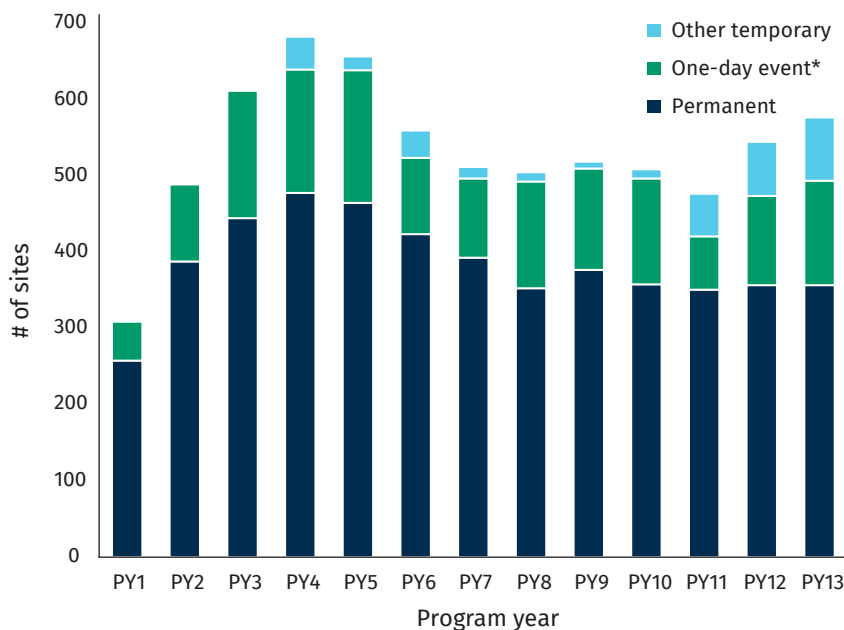
# E-Cycle Wisconsin 2022 report summary

Figure 1: Pounds collected by registered collectors



"Ineligible pounds" means pounds that would have been eligible for manufacturer credit if sent to a registered recycler, but that collectors dismantled themselves or sent to a non-registered recycler.

Figure 2: Registered collection sites over time



\* Sites were registered only as "Temporary" from program year 1 to 3.

## Program highlights

Between July 2021 and June 2022 (program year 13), registered collectors took in 23.1 million pounds of electronics, or 4 pounds per Wisconsin resident. This brought the total collected for recycling through E-Cycle Wisconsin since January 2010 to more than 370 million pounds.

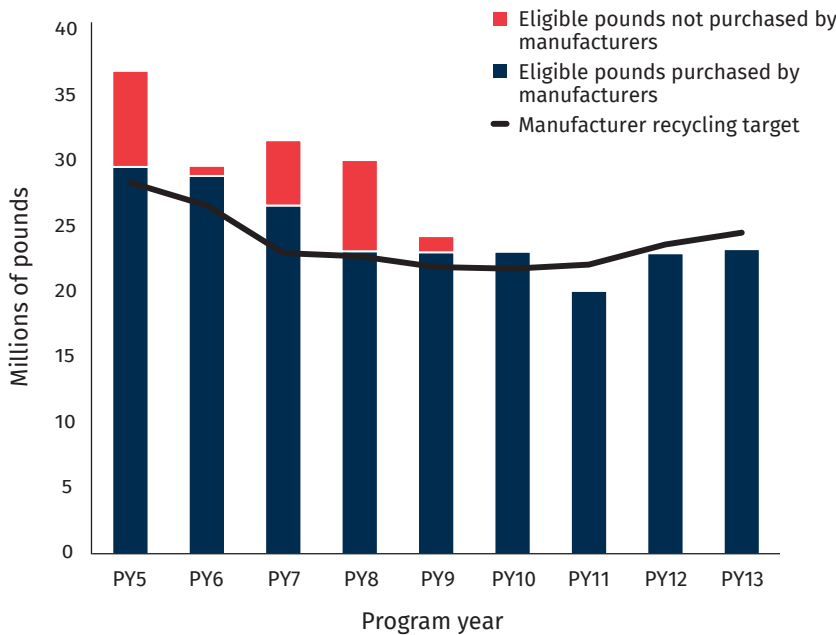
Nearly all electronics collected under E-Cycle Wisconsin were processed initially in Wisconsin or other Midwest states, contributing to continued growth in the region's electronics recycling industry. Wisconsin recyclers accounted for 62% of weight processed.

The number of registered collection sites and events was the highest it has been in eight years, at 577, and 99% of the state's population lived in a county with at least one collection site or event. Most manufacturers met their recycling targets.

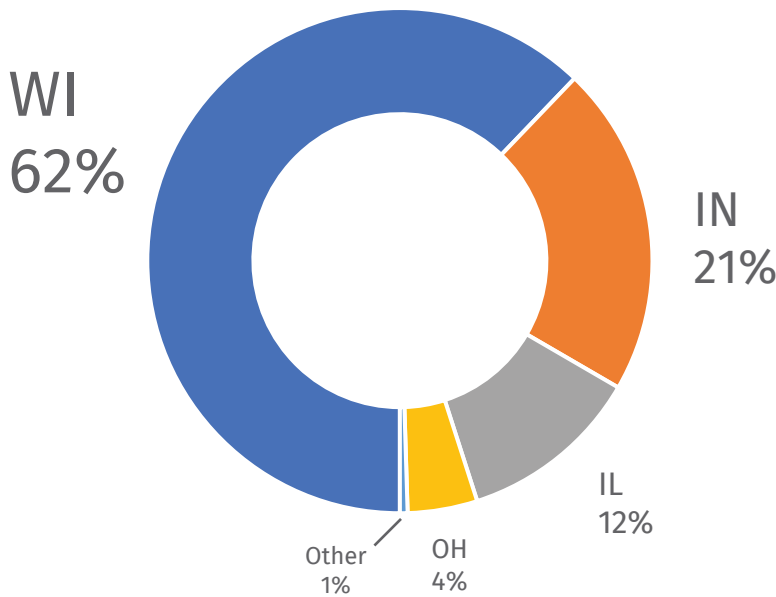
Nearly all manufacturers, recyclers and collectors are complying with the law, and the DNR continues to work to ensure a level playing field for program participants.

Report and other info at [dnr.wi.gov/topic/ecycle](https://dnr.wi.gov/topic/ecycle)

**Figure 3: Comparison of weight recycled and manufacturer targets, by program year**



**Figure 4: Percent of pounds received by registered recyclers, by state, program year 13**



**Table 1: Pounds of electronics reported by registered recyclers, program year 13**

Type	Pounds
Urban received	19,327,367
Rural received	3,225,955
Rural credit	806,489
Available for manufacturers	23,359,811
Sold to manufacturers	(23,306,990)
<b>Not sold to manufacturers</b>	<b>52,821</b>

Rural credit is 1.25 pounds per pound collected. Urban and rural pounds differ slightly from Table 2 because some recyclers count all pounds as urban.

**Table 2: Program year 13 collection, by product type**

Product type	% of total weight
TVs	50%
Monitors	2%
Computers	7%
Other EEDs	40%

EEDs are eligible electronic devices. Other EEDs include printers, computer accessories, DVD players, VCRs and fax machines.

**Table 3: Registered collectors charging fees, program year 13**

Fee type	% of active collectors
Price per item	63%
Price per pound	14%
Mixed type or other	15%
<b>Total, any type</b>	<b>92%</b>

There were 118 active registered collectors during PY13. Of these, 11 did not charge for any eligible electronics, and 53% took some electronics for free. "Mixed type or other" means a collector charged per pound for some electronics and per item for others, or had a fee for pickup.



TVs at an October 2022 Polk County electronics collection event funded by an E-Cycle Wisconsin grant. Photo courtesy Polk County.

## Addressing challenges

E-Cycle Wisconsin participants have praised many aspects of the law, but noted areas of concern, including a lack of affordable, convenient recycling in some areas; gaps in consumer awareness about the need to responsibly recycle electronics; a need for more actions to deter bad actors; economic and safety issues the changing material stream has brought to collectors and recyclers; and the disconnect between sales-based manufacturer recycling targets and the weight of electronics being recycled.

In 2022, the DNR worked to address some of these concerns through implementation of a new E-Cycle Wisconsin Electronics Collection Grant Program, authorized by a 2021 law; expanded outreach efforts; work toward finalizing an administrative rule to set standards for proper management of e-waste; and collaboration with stakeholders to understand and address the changing economic and safety issues for E-Cycle Wisconsin participants.

The DNR's new grant program—which awarded \$87,772 to 15 projects in 13 counties in June 2022—is improving access and reducing costs for consumers in underserved areas of the state, though its limited funding means it can't address all needs. Manufacturers' efforts to meet their higher recycling targets are also creating more free electronics recycling opportunities, both through one-day events and reduced fees at a handful of permanent collection sites.

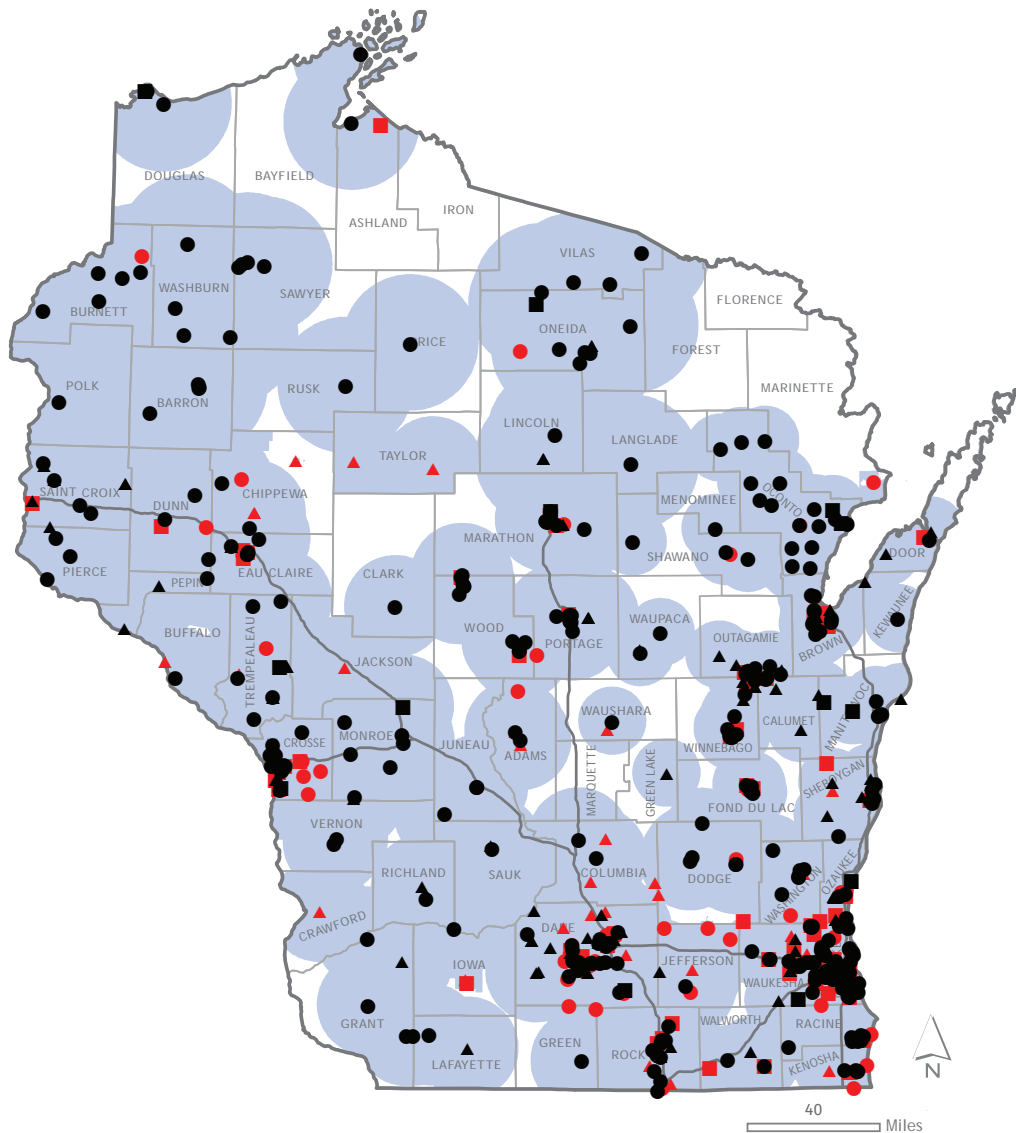
While the 2021 statutory changes and proposed administrative rule represent significant improvements that address many stakeholders' concerns, there is still more work to be done to ensure the long-term success of E-Cycle Wisconsin, particularly in terms of how manufacturer recycling obligations are set and ensuring affordable and convenient consumer access to electronics recycling throughout the entire state.









## Recommendations for potential legislative changes

The electronics recycling law directs the DNR to examine several aspects of the law within the annual report and make suggestions for possible changes. The following is a list for the Legislature's consideration, based on stakeholder input, of changes that could improve the law and ensure its continued effectiveness.

- To better meet the electronics recycling needs of Wisconsin households and schools, and to make the program more predictable for recyclers and manufacturers, the Legislature could change or replace the manufacturer target formula and method of encouraging collection in rural areas.
- To improve the function of the market-based system Wisconsin's electronics recycling law creates, and to allow recyclers to recoup as much of their costs as possible, the Legislature could add a provision to the law to allow registered E-Cycle Wisconsin recyclers to carry over credits for weight they have recycled, but not sold to manufacturers, for one or two program years.
- To make it easier for the DNR and manufacturers to determine whether the law covers newer devices and improve proper management of newer problem components, such as lithium-ion batteries, the Legislature could update and clarify device definitions.

# Map of collection sites registered under E-Cycle Wisconsin during program year 13



 <p>20-mile coverage area: Northern*</p>	 <p>Permanent collection sites</p>	 <p>Interstate highways</p>
 <p>15-mile coverage area: South Central, West Central*</p>	 <p>One-day collection sites</p>	
 <p>10-mile coverage area: Northeast, Southeast*</p>	 <p>Temporary collection sites</p>	
<p>*Based on the 2021 DNR Household Recycling Survey question, "How far would you be willing to travel to recycle electronics?"</p>	 <p>Collection sites available only to employees and customers of a company or residents of a village, town, city or county.</p>	



**Wisconsin Department of Natural Resources**  
**Bureau of Waste and Materials Management**  
 P.O. Box 7921, Madison, WI 53707 | [DNRWle-cycling@wisconsin.gov](mailto:DNRWle-cycling@wisconsin.gov)

The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services, and functions under an Affirmative Action Plan. If you have any questions, please write to Chief, Public Civil Rights, Office of Civil Rights, U.S. Department of the Interior, 1849 C. Street, NW, Washington, D.C. 20240.

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# E-CYCLE WISCONSIN 2022 REPORT

Wisconsin DNR annual report to the Legislature and governor  
under s. 287.17(10), Wis. Stats.

November 2022



**370 MILLION  
POUNDS  
RECYCLED SINCE  
2010**

**577  
COLLECTION SITES  
IN 68 COUNTIES**



**\$87,772 AWARDED IN GRANTS  
FOR 15 COLLECTION PROJECTS  
IN 13 COUNTIES**

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## Executive summary

Wisconsin's electronics recycling law has produced many successes since it took effect in 2010, recycling more than 370 million pounds of electronics and expanding electronics recycling access for state residents. Most electronics collected under the manufacturer-funded E-Cycle Wisconsin program are processed in the state, contributing to capital investments and job growth at high-tech recycling facilities.

Successes for program year 13 (July 2021 to June 2022) include the following:

- Registered collectors took in 23.1 million pounds of electronics, or 4 pounds per Wisconsin resident.
- Nearly all electronics collected under E-Cycle Wisconsin were processed initially in Wisconsin and other Midwest states. Wisconsin recyclers accounted for 62% of weight processed.
- The number of registered collection sites and events was the highest it has been in eight years, at 577, and 99% of the state's population lived in a county with at least one collection site or event.
- Most manufacturers met or exceeded their recycling targets.
- Nearly all manufacturers, recyclers and collectors are complying with the law, and the DNR continues to work to ensure a level playing field for program participants.

### Addressing program challenges

In conversations with the Department of Natural Resources (DNR), E-Cycle Wisconsin participants have praised many aspects of the law, but noted several areas of concern. These include:

- a lack of affordable, convenient recycling in some areas;
- gaps in consumer awareness about the need to responsibly recycle electronics;
- a need for more actions to deter bad actors;
- economic and safety issues the changing material stream has brought to collectors and recyclers; and
- the disconnect between sales-based manufacturer recycling targets and the weight of electronics being recycled.

In 2022, the DNR worked to address some of these concerns through implementation of a new E-Cycle Wisconsin Electronics Collection Grant Program, authorized by a 2021 law; expanded outreach efforts; work toward finalizing an administrative rule to set standards for proper management of e-waste; and collaboration with stakeholders to understand and address the changing economic and safety issues for E-Cycle Wisconsin participants.

The DNR's new grant program—which awarded \$87,772 to 15 projects in 13 counties in June 2022—is improving access and reducing costs for consumers in underserved areas of the state, though its limited funding means it can't address all needs. Manufacturers' efforts to meet their higher recycling targets are also creating more free electronics recycling opportunities, both through one-day events and reduced fees at a handful of permanent collection sites.

While the 2021 statutory changes and proposed administrative rule represent significant improvements that address many stakeholders' concerns, there is still more work to be done to ensure the long-term success of E-Cycle Wisconsin, particularly in terms of how manufacturer recycling obligations are set and ensuring affordable and convenient consumer access to electronics recycling throughout the entire state.

### Recommendations for potential legislative changes

The electronics recycling law directs the DNR to examine several aspects of the law within the annual report and make suggestions for possible changes. Continued evolution in consumer electronics, along with fluctua-

tions in sales of electronic devices, will present challenges unless the program can be made more adaptable and flexible. The following is a list for the Legislature's consideration, based on stakeholder input, of changes that could be made to improve the electronics recycling law and ensure its continued effectiveness.

- To better meet the electronics recycling needs of Wisconsin households and schools, and to make the program more predictable for recyclers and manufacturers, the Legislature could change or replace the manufacturer target formula and method of encouraging collection in rural areas.
- To improve the function of the market-based system Wisconsin's electronics recycling law creates, and to allow recyclers to recoup as much of their costs as possible, the Legislature could add a provision to the law to allow registered E-Cycle Wisconsin recyclers to carry over credits for weight they have recycled, but not sold to manufacturers, for one or two program years.
- To make it easier for the DNR and manufacturers to determine whether the law covers newer devices and improve proper management of newer problem components, such as lithium-ion batteries, the Legislature could update and clarify device definitions.

## Introduction

Wisconsin's electronics recycling law establishes a statewide program to collect and recycle certain electronics. Under this product stewardship-based law, manufacturers of TVs, computers, monitors and desktop printers must register with the DNR the brands they sell to Wisconsin households and schools. Those manufacturers also must recycle a target weight of electronics each year based on their sales. Manufacturers contract with state-registered recyclers and collectors to meet their targets. This manufacturer-funded recycling program is called E-Cycle Wisconsin. The law also bans landfill and incinerator disposal of many electronics.

This report fulfills the annual reporting obligation in s. 287.17 (10), Wis. Stats., which specifies several metrics on which the DNR must report to the Legislature and governor. These include the weight of electronics collected and other information provided by program participants, an outline of electronics recycling outside of E-Cycle Wisconsin, a summary of compliance and enforcement actions related to the electronics disposal ban, and suggestions for changes needed.

To help evaluate the law and the DNR's administration of it, the DNR also examines whether the law is meeting these six general criteria:

- Keeping electronics out of landfills and the environment.
- Using a market-based approach to manage e-waste in the most efficient and cost-effective manner possible, with minimal government intervention.
- Reducing electronics recycling costs and improving recycling convenience for consumers.
- Reducing the financial and administrative burden on local and state governments of managing e-waste.
- Ensuring a level playing field for all participants in the electronics recycling program, including accountability for environmental and worker safety, along with other standards.
- Encouraging and supporting a strong electronics recycling industry in Wisconsin and the Midwest.

Several developments in the past year are helping Wisconsin achieve greater success in meeting these criteria. These included bipartisan legislation, 2021 Wisconsin Act 79, that fulfilled many of the recommendations from previous reports, along with proposed administrative rules the DNR drafted with stakeholder input. In addition, DNR studies showed the electronics recycling law has helped greatly reduce the number of TVs and monitors going to Wisconsin landfills, and more Wisconsin households have been recycling more of their unwanted electronics instead of storing them.



The DNR continues to engage with program stakeholders and the public to get feedback on challenges facing E-Cycle Wisconsin and potential solutions. Input from stakeholders contributed to the sections of this report concerning current challenges and opportunities for addressing them through the DNR’s administration of the program, voluntary stakeholder actions and potential legislative changes.

## Program participation

Table 1 shows program year 13 (July 2021 through June 2022) registrations, and Figure 1 illustrates registration trends over time. Recycler registrations increased from 17 to 21, with nine of the 18 active recyclers in Wisconsin. The number of registered manufacturers and brands dropped slightly, continuing a trend over the last few program years.

The number of active registered collectors—including local governments, retailers, other for-profit businesses and non-profits—dropped slightly, from 125 to 118. As shown in Figure 2, the number of registered collection sites also increased, with 577 total permanent sites, one-day events and other temporary sites, compared with 545 in program year 12. The increase was primarily due to an increase in the number of one-day collection events. For-profit collectors registered the highest number of sites (263, or 46%), though about half of these—particularly one-day events—were at government-owned locations, as shown in Figure 3.

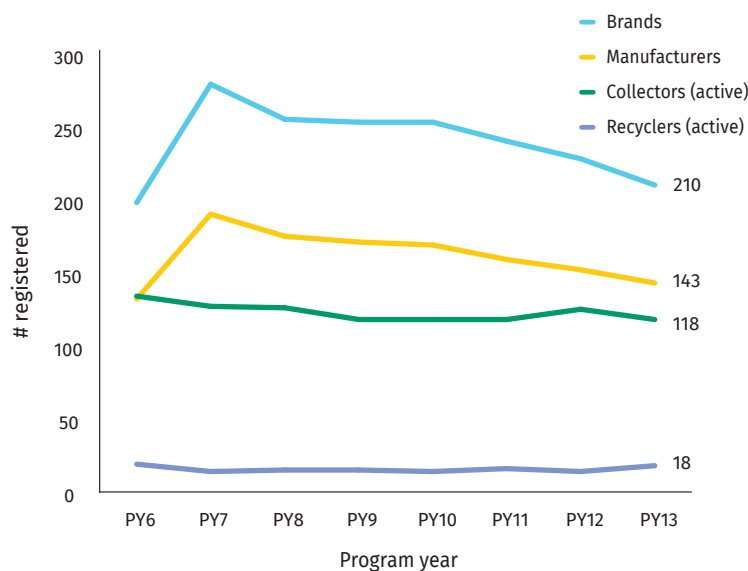
**Table 1: Program year 13 registration and participation**

Category	Registered	Active
Collectors	130	118
Recyclers	21	18
Manufacturers	143	n/a
Brands	210	n/a

*“Active” means a collector that sent electronics to a registered recycler or a recycler that received electronics from registered collectors.*

During program year 13, there were E-Cycle Wisconsin collection sites in 68 of Wisconsin’s 72 counties, covering 99% of the state’s population. The map in Appendix B shows permanent and temporary collection sites registered during program year 13. Each site is surrounded by shading in a radius of 10 miles in the northeastern and southeastern parts of the state, 15 miles in western and south-central areas, and 20 miles in the northern part of the state, reflecting the median distance respondents reported they were willing to drive to recycle electronics on the 2021 DNR household survey. The gaps without shading illustrate the mostly rural portions of the state that lack convenient access to collection sites.

**Figure 1: Summary of E-Cycle Wisconsin registrations**



## Collection and recycling totals and analysis

From July 2021 through June 2022 (program year 13), registered collectors took in 23.1 million pounds of electronics from Wisconsin households and schools (see Table 2), roughly equal to 4 pounds per capita.

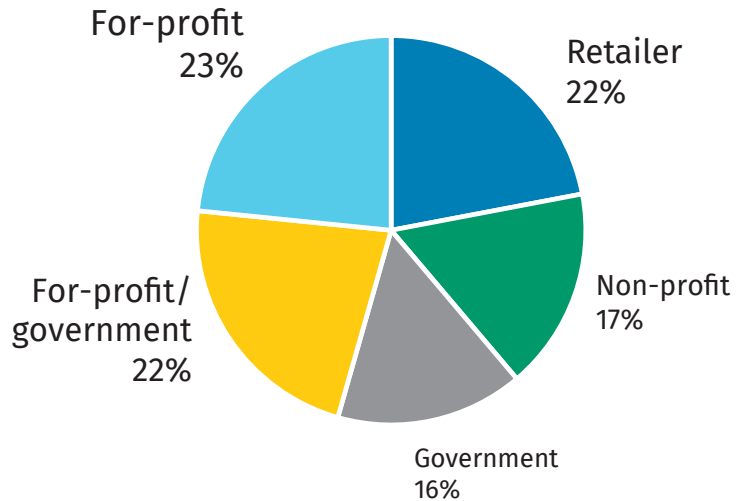
As shown in Figure 4, the weight of eligible electronics collected remained steady from program year 12 to 13. The ineligible weight dismantled by collectors or sent to non-registered recyclers declined from 928,000 to 516,000 pounds. This was primarily due to businesses that were previously only registered as collectors choosing to register as recyclers, thus keeping more of what was collected eligible for manufacturer credit.

The DNR estimates the breakdown of electronics collected by device type based on voluntary reporting by collectors. Over the last few program years, the mix among the weights of electronics collected has shifted, with TVs no longer dominating. TVs accounted for 50% of the total in program year 13 (see Figure 5). Reasons for this likely include the shift from heavier, tube-style TVs to flat panels in the waste stream, and also the high prices many collectors are charging consumers to recycle older TVs.

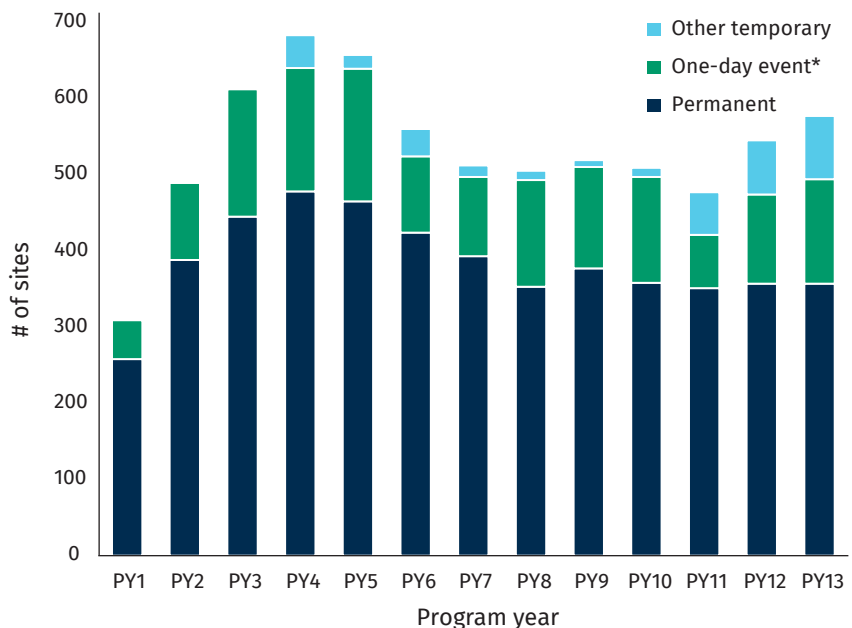
With the rural credit (1.25 pounds counted toward manufacturer targets for each pound collected in a rural county) included and non-recycled pounds subtracted, Table 3 shows 23.4 million eligible pounds were available for purchase by manufacturers—to fund the recycling of the electronics—in program year 13. This was up 1% from the weight available in program year 12.

During program year 13, Wisconsin recyclers processed 62% of the total weight recycled, a significant drop from 77% in program year 12, due mainly to an increase in recycling by an Indiana recycler. Essentially all electronics collected under E-Cycle Wisconsin continue to be processed in the Midwest, as shown in Figure 6.

**Figure 2: Program year 13 collection sites, by type**



**Figure 3: Registered collection sites over time**

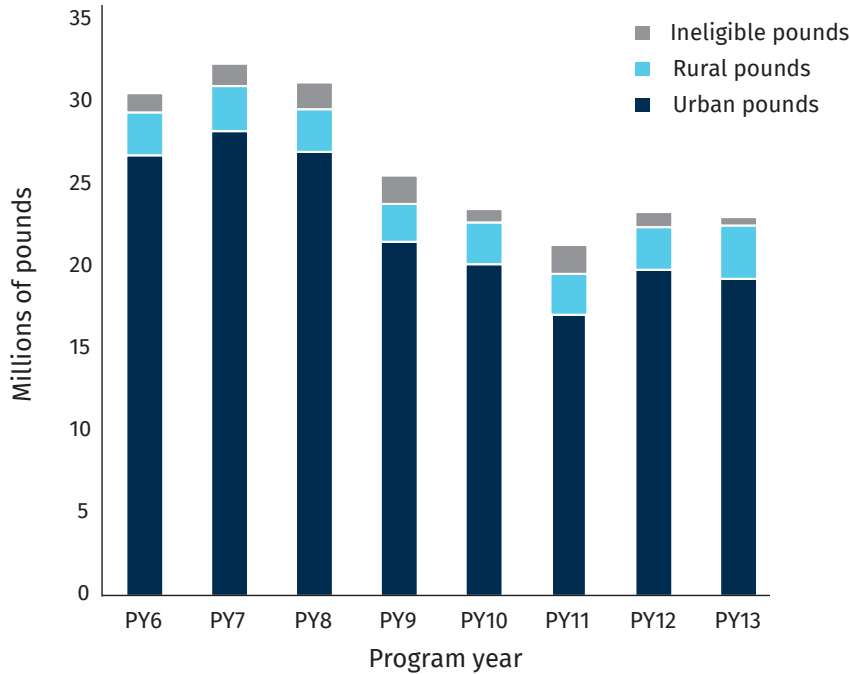


\* Sites were registered only as “Temporary” from program year 1 to 3.

**Table 2: Pounds collected by registered collectors, program year 13**

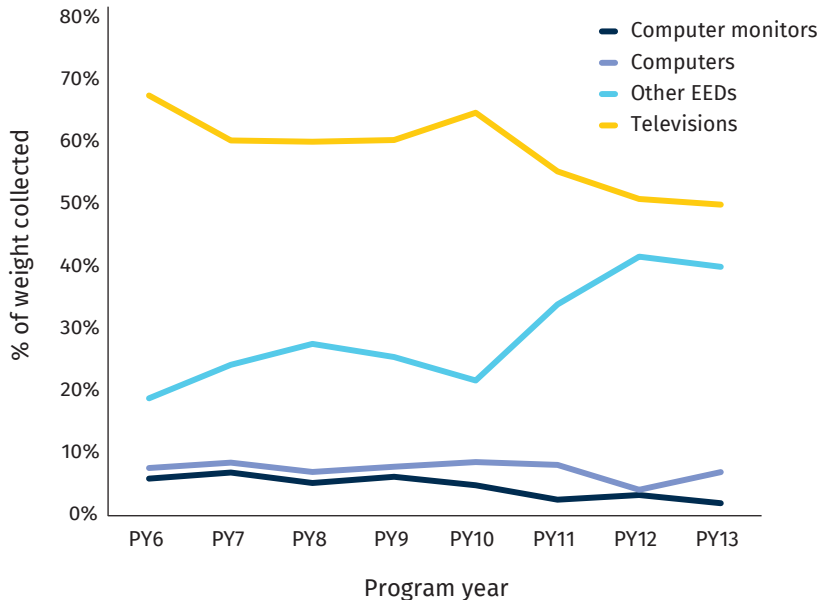
Type	Pounds
Eligible urban	19,301,935
Eligible rural	3,251,058
Dismantled by collector	486,839
Sent to non-registered recycler	29,399
<b>Total collected</b>	<b>23,069,232</b>

**Figure 4: Pounds collected by registered collectors**



“Ineligible pounds” means pounds that would have been eligible for manufacturer credit if sent to a registered recycler, but that collectors dismantled themselves or sent to a non-registered recycler.

**Figure 5: E-Cycle Wisconsin collection, by device type**



EEDs are eligible electronic devices. Other EEDs include printers, computer accessories, DVD players, VCRs and fax machines.

or set up collection networks. Prominent exceptions include the Dell Reconnect program, in which Dell works with several networks of Goodwill stores; Best Buy’s in-store and haul-away collection programs; a partnership between Hewlett Packard and Staples; and Apple’s recycling program for schools. Samsung and TCL also sponsored free collection events in Madison and Janesville during program year 13.

## Manufacturer recycling targets and programs

The overall manufacturer target, set by a statutory formula that uses manufacturer-reported sales of covered devices in Wisconsin, was 24.6 million pounds in program year 13, up from 23.7 million pounds in program year 12, due largely to higher sales during the pandemic.

Figure 7 shows manufacturer recycling targets and weight manufacturers purchased from recyclers to meet their targets. It also illustrates the gap between pounds recycled and pounds paid for by manufacturers in the years before program year 11. Due in part to COVID disruptions and in part to increasing manufacturer targets with continued high recycling fees charged to consumers, the weight recycled during program years 11-13 was less than the overall manufacturer target. Nearly all weight recycled was sold to manufacturers during these years. As discussed below, manufacturers used credits earned during previous program years to make up some of the difference, and paid higher shortfall fees for program year 13 than in most previous years.

Based on DNR surveys of registered manufacturers and discussions with stakeholders, most manufacturers rely on recyclers or group plan managers to find and/

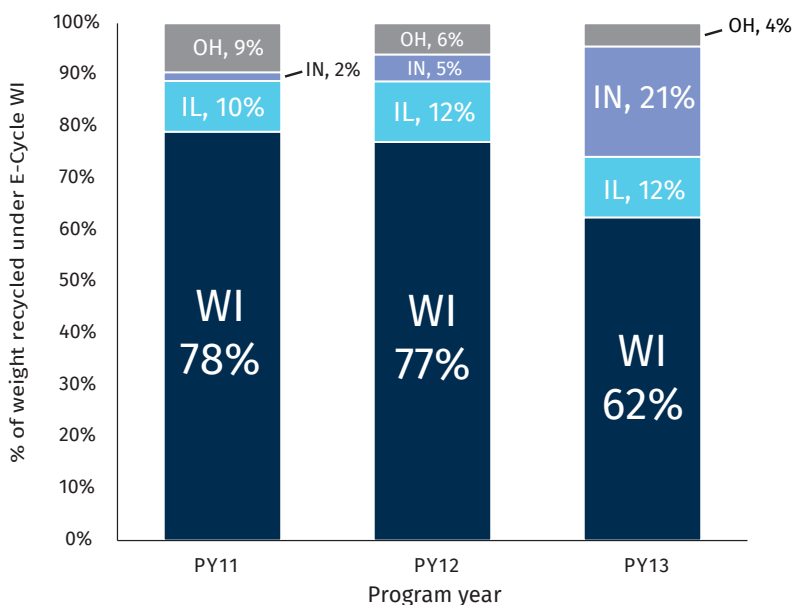
During program year 13, 52 registered manufacturers participated in collectives—similar to “group plans” in other states—that contracted with recyclers for a large total sum of pounds and distributed the pounds among its members. The collectives were administered by DNA Group, MRM, Reverse Logistics Group and Sims Recycling Solutions. These collectives were responsible for about 43% of pounds purchased by manufacturers.

Most manufacturers continued to meet or exceed their sales weight-based recycling targets in program year 13. Forty-one manufacturers recycled more than their targets and therefore earned a total of just under 145,000 credits that can be used during the next three program years (see Table 4). Three manufacturers used just under 160,000 credits from previous years to meet their targets, the most in any program year. At the end of program year 13, just under 200,000 credits were available to manufacturers for future use, the lowest since program year 1. Figure 8 summarizes credits applied or expired, credits earned, and total credits available from program years 6 to 13.

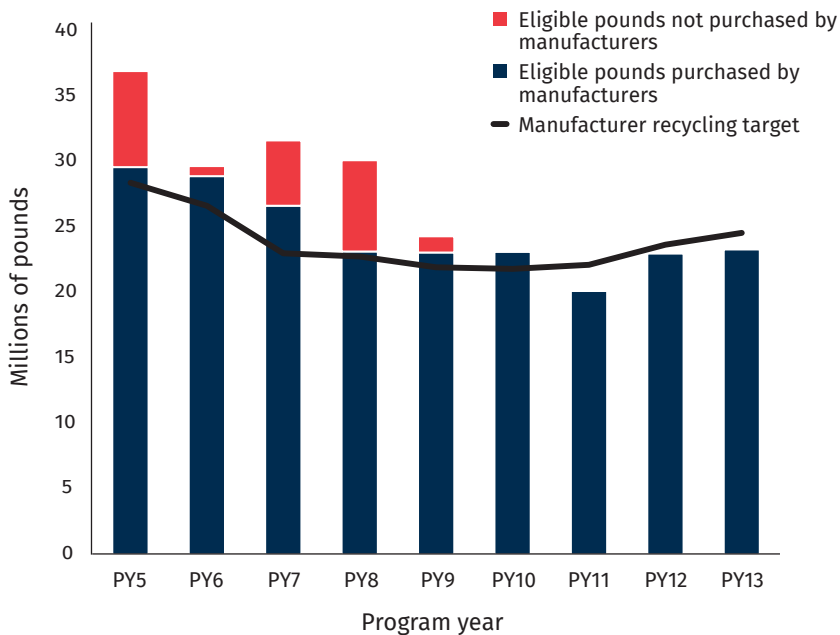
Each year, the DNR encourages manufacturers to purchase eligible recycled pounds rather than pay a shortfall fee, but several with very small targets have said it is more convenient to pay the fee than to go through the process of contracting with a recycler. In addition, the tight supply of pounds in program year 13 made it more difficult for manufacturers to make last-minute weight purchases after the end of the program year. In total, 41 manufacturers had paid a shortfall fee as of November 2022. The amounts ranged from \$0.06 to \$7,300.40.

Table 5 summarizes registration and shortfall fees paid under E-Cycle Wisconsin. Ensuring a level playing

**Figure 6: Percent of pounds received by registered recyclers, by state, over time**



**Figure 7: Comparison of weight recycled and manufacturer targets, by program year**



**Table 3: Pounds of electronics reported by registered recyclers, program year 13**

Type	Pounds
Urban received	19,327,367
Rural received	3,225,955
Rural credit	806,489
Available for manufacturers	23,359,811
Sold to manufacturers	(23,306,990)
<b>Not sold to manufacturers</b>	<b>52,821</b>

*Rural credit is 1.25 pounds per pound collected. Urban and rural pounds differ slightly from Table 2 because some recyclers count all pounds as urban.*

**Table 4: Program year 13 manufacturer credit transactions**

	Credits
Beginning balance	212,317
Credits applied	(158,821)
Credits expired	(2,177)
New credits earned	144,826
<b>Total available for future use</b>	<b>196,144</b>

**Table 5: Manufacturer registration and shortfall fees**

Program year	Registration fees	Shortfall fees
6	\$328,750	\$12,379
7	\$408,750	\$8,812
8	\$375,000	\$8,124
9	\$370,000	\$14,066
10	\$338,750	\$9,607
11	\$358,750	\$21,203
12	\$361,250	\$67,868
13	\$311,250	\$23,765

*Shortfall fees for program year 13 as of November 2022.*

field within E-Cycle Wisconsin

Much of the DNR’s administration of the electronics recycling law focuses on maintaining a level playing field for E-Cycle Wisconsin participants and identifying problems at collectors or recyclers that might endanger human health or environmental quality.

### Manufacturer registration compliance

Manufacturers must comply with Wisconsin’s electronics recycling law by registering their covered electronics and paying applicable registration and shortfall fees. During program year 13, the DNR revoked 17 manufacturers’ registrations for failure to submit required forms or payments. Five returned to compliance. The remaining manufacturers had either stopped selling covered electronics, the DNR could not find current contact information for them, or they remained out of compliance as of November 2022.

To ensure a level playing field among electronics manufacturers, the DNR continued its effort to bring manufacturers of unregistered brands into compliance. In addition to retailer compliance efforts described below, the DNR contacts manufacturers to inform them of their obligation to register, and communicates with other state programs about brand status. The DNR maintains lists of registered and unregistered brands on its website to help retailers and manufacturers stay up-to-date with registration status. As of November 2022, there were 204 unregistered brands tracked by the DNR, primarily from manufacturers selling a low volume of covered electronics through online retailers.

In May 2022, the DNR sent notices of noncompliance to 29 unregistered manufacturers deemed “high priority” because they had previously been registered or were selling covered electronics through multiple retailers. Eight subsequently returned to compliance, and the DNR determined two were no longer selling covered electronics. As of November 2022, the DNR was continuing to work with the remaining 19 manufacturers.

### Electronics retailer compliance

Under Wisconsin’s electronics recycling law, retailers must sell only registered brands to Wisconsin households and schools. They also must inform customers that electronics may not go into the trash and provide information about how to recycle electronics. These requirements apply to brick-and-mortar stores as well as online stores. The DNR reviews electronics retailer inventory online and in stores, and checks stores and websites for compliance with the customer education requirements.

In program year 13, the E-Cycle Wisconsin program conducted one round of online brand checks and 20 in-store inspections of brick-and-mortar stores. The DNR notified retailers of the results of these checks, with a reminder about retailer requirements under the law. Several

manufacturers registered or re-registered with the program after retailers contacted them based on the DNR’s checks. The DNR also continued to follow up with retailers regarding customer education requirements and suggested changes to ensure full compliance with Wisconsin’s law.

### Registered recycler compliance

All electronics recyclers operating in Wisconsin must comply with solid and hazardous waste regulations. Registered E-Cycle Wisconsin recyclers must meet additional requirements, which apply

whether the facility is located in-state or out-of-state. These include maintaining owner financial responsibility (OFR) to cover facility closure and at least \$1 million in pollution liability insurance; reporting to the DNR twice a year; and providing information on the weight of electronics recycled, sources of those electronics, and which downstream vendors received the electronics and their components.

The DNR conducts annual inspections of all in-state registered recyclers. The inspector reviews inventory, shipping and downstream vendor records to determine whether electronics are flowing through the facility in a timely manner and ending up at a legitimate end market or properly disposed. The inspector also reviews the facility’s closure plan and OFR to ensure the amount of money set aside is adequate to properly close the facility.

Out-of-state recyclers are also inspected, but less often because of travel constraints. For these recyclers, the DNR conducts desktop record reviews for closure cost estimates, OFR and pollution liability insurance. In addition, DNR staff check in with recyclers if questions arise regarding downstream vendors, sources of materials received or changes to their recycling process.

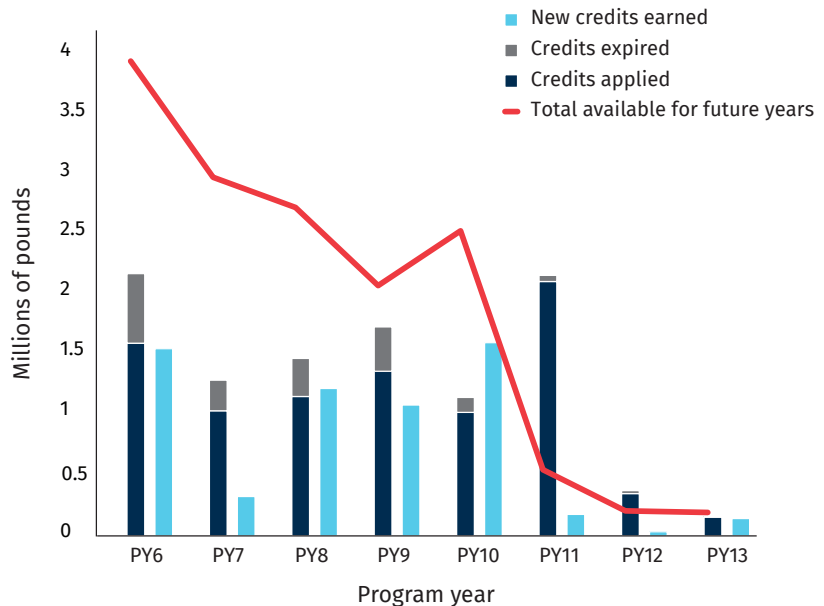
During program year 13, the DNR conducted in-person inspections at all nine in-state recyclers and one virtual inspection of an out-of-state recycler. The DNR issued one notice of noncompliance to a registered recycler for failure to respond to an inspection request. The recycler chose not to renew its E-Cycle Wisconsin registration.

Table 6 lists the number of collection site and recycler inspections the DNR has conducted for the last several program years.

### Registered collector compliance

The DNR assesses collector compliance through annual reports and inspections. Due to the large number of collection sites (averaging between 350 and 400 permanent sites), E-Cycle Wisconsin staff are unable to inspect all sites on a routine basis, and therefore prioritize inspections on sites where they can have the most impact. This includes inspecting new sites to provide technical assistance during the start-up phase, collectors that receive large amounts of electronics either on their own site or by operating as a consolidation point,

**Figure 8: Manufacturer credit use, by program year**



**Table 6: DNR inspections conducted, by program year**

Time period	Recyclers	Collection sites
July 1, 2014, to June 30, 2015	18	28
July 1, 2015, to June 30, 2016	7	37
July 1, 2016, to June 30, 2017	8	73
July 1, 2017, to June 30, 2018	9	60
July 1, 2018, to June 30, 2019	8	64
July 1, 2019, to June 30, 2020	3	24*
July 1, 2020, to June 30, 2021	7	71
July 1, 2021, to June 30, 2022	10	61

\* Includes 13 in-person inspections of collection sites and 11 phone inspections with collectors due to the COVID-19 pandemic.

were meeting program requirements and following best management practices. A handful of sites had broken glass that had not been cleaned up. The DNR also suspended one collector’s registration for failure to submit its annual report. The collector subsequently submitted the form.

and collectors that also dismantle some electronics. In addition, the DNR addresses complaints received about sites through an inspection or phone call. Occasionally, staff inspect non-registered collection sites to provide technical assistance or investigate complaints.

In program year 13, E-Cycle Wisconsin staff conducted 57 in-person inspections at registered collection sites and four at non-registered sites. Nearly all sites

## Electronics recycling separate from E-Cycle Wisconsin

Currently, collectors and recyclers that perform basic disassembly of electronics are considered to be exempt from most solid and hazardous waste requirements if the materials are handled appropriately. Consequently, only recyclers participating in E-Cycle Wisconsin are operating under DNR regulatory oversight. Monitoring recycling activities that occur outside of E-Cycle Wisconsin has been challenging. Often these activities only come to the DNR’s attention when a problem occurs.

DNR staff continue to receive a few contacts each year from people interested in starting a new electronics recycling business. Staff explain the rules, provide guidance documents for managing electronics and encourage them to develop a business plan that will ensure they have legitimate outlets for all electronic components. Staff encourage others who may have contact with small-scale recyclers—such as local governments, other recyclers and collectors, and salvage yard operators—to help advise small recyclers about the proper way to manage electronics. In 2023, DNR staff will be increasing outreach to electronics recyclers outside of E-Cycle Wisconsin to notify them of new requirements for all electronics recyclers to obtain a solid waste processing license, if the proposed administrative rules are approved.

### Illegal disposal and irresponsible electronics processing

Over the years, DNR staff have worked on several enforcement cases for alleged hazardous waste violations related to cathode ray tube (CRT) storage and improper management of leaded CRT glass.

In 2022, a U.S. District Court judge accepted a guilty plea from the final defendant in a criminal case against former leaders of 5R Processors, based in Ladysmith, Wisconsin, related to mismanagement of hazardous waste (leaded glass from CRTs). 5R was registered as a collector and recycler under E-cycle Wisconsin from 2010 until 2014, when questions arose about its handling of CRT glass. According to the charging documents filed in the case, 5R had accumulated and stored more than 7 million pounds of leaded CRT glass at a facility in Tennessee and 1.3 million pounds of leaded glass at several sites in Wisconsin as of November 2016. The defendant agreed to pay \$100,000 to the DNR to cover a small portion of cleanup costs.

In spring 2022, the Legislature passed and Gov. Evers signed a bill (2021 Wisconsin Act 234) providing \$2.5 million in state funding to remove waste at sites formerly operated but no longer owned by 5R processors. The DNR issued a Request for Bid in October 2022 to begin the waste removal work, which will be completed by the end of June 2023.



*View of broken CRT glass stored in a Glen Flora, Wis., warehouse where 5R Processors previously operated, taken during a September 2021 DNR inspection. This is one of the sites slated for waste removal under a DNR contract in 2023.*

DNR staff responded to a handful of complaints regarding broken CRTs and electronics between July 2021 and June 2022. One of the cases had additional solid waste violations and was issued a Notice of Violation (NOV). There was also concern from a landfill operator regarding

customers trying to dispose of broken CRT glass and electronics. Staff will continue working with landfill operators to provide resources to educate their customers on the proper way to manage electronics.

## Disposal ban compliance and outreach

In addition to the cases of irresponsible recycling discussed above, the DNR continues to receive reports of electronics being dumped on public lands, in ditches and in vacant lots, along with reports of electronics put in the trash. Often, these are cases of an individual dumping one or two items, most commonly TVs, and are difficult to track in a systematic way.

The electronics recycling law requires the DNR to promote public participation in electronics recycling and facilitate communication among local governments and electronics collectors, recyclers and manufacturers. The DNR meets this requirement through advertising and social media campaigns, news releases and providing outreach materials for local governments and E-Cycle Wisconsin participants to distribute. These efforts help ensure households and schools are aware of the statewide disposal ban on electronic devices and that manufacturers meet their recycling targets.

## Addressing program challenges

In evaluating whether changes are needed to make the electronics recycling law function better, the DNR has gathered input through surveys and conversations with program participants, other stakeholders and the public. In particular, stakeholder meetings, collector workshops, surveys of registered E-Cycle Wisconsin participants, and statewide household surveys have provided valuable input.

Wisconsin's law is designed to operate on free-market principles, with collectors, recyclers and manufacturers



conducting private negotiations to set recycling prices. In recent years, consumers and collectors have paid an increasing share of the costs of recycling. Combined with limited access to registered collection sites in some parts of the state, this has led to cases of illegal disposal and dumping, stockpiling by irresponsible recyclers and, recently, challenges for manufacturers in meeting their recycling targets.

The DNR has worked with the Legislature, Gov. Evers and program stakeholders to identify and implement policy solutions for these challenges, and the DNR's E-Cycle Wisconsin staff have focused their work on addressing barriers to electronics recycling and providing technical assistance.

### **Addressing electronics recycling barriers**

The DNR's household recycling surveys have asked respondents about reasons they were unable to recycle electronics despite wanting to do so. The top reasons have consistently been not knowing where or how to recycle electronics, cost, lack of convenient recycling options, and concerns about data security.

To help address lack of awareness, cost and lack of convenient recycling locations, the DNR continues to maintain and promote its online list of registered E-Cycle Wisconsin collection sites and manufacturer mail-back programs, including updating it throughout the year with information about one-day collection events. In 2022, the DNR added a Spanish-language option to the list.

The DNR's 2021-22 advertising campaign used digital advertising, paid search ads, paid and unpaid social media, sponsorship messages on Wisconsin Public Radio and ads on Spanish-language radio stations to drive Wisconsin residents to the DNR's list of registered collection sites and mail-back programs. Overall, the DNR's electronics recycling webpages received more than 360,000 visits between July 2021 and June 2022.

To address concerns about data security, collectors can ensure their operations securely handle data-containing devices and work with recyclers to provide customers information on how data are kept secure and destroyed. Collectors and recyclers could also explore options like hosting events with on-site hard drive shredding. The DNR provides information on its website to help consumers protect data security when recycling electronics.

#### **Improving access to responsible electronics recycling in underserved areas**

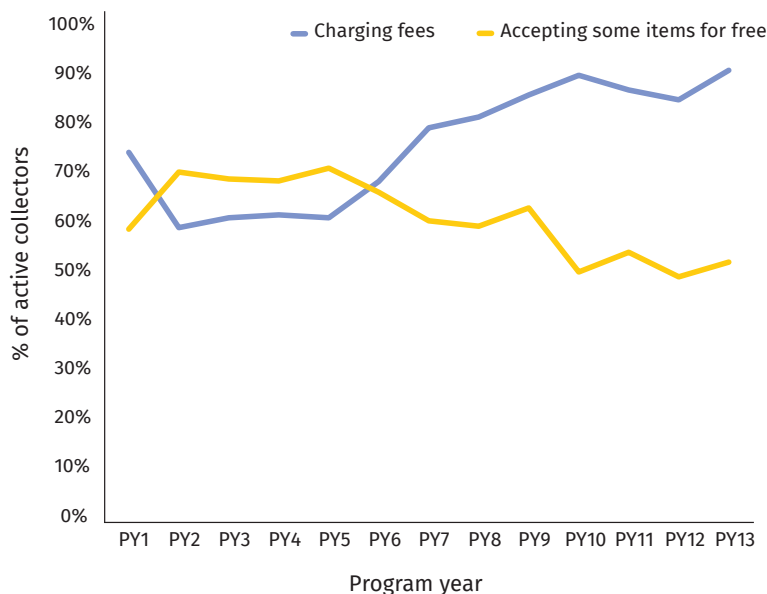
While all Wisconsin counties have had at least one registered collection site or event since 2010, the reduction in collection opportunities has affected residents in both rural and urban areas. Though only a small portion of residents live in counties without registered collection sites, there are parts of the state where residents would have to drive a significant distance to properly recycle electronics, increasing the likelihood of illegal dumping or disposal (see map in Appendix B). And while urban areas generally had sites available, they were sometimes limited to residents of specific municipalities, leaving residents outside of those municipalities without convenient recycling options.

In June 2022, the DNR awarded its first round of grants under the new E-Cycle Wisconsin Electronics Collection Grant Program, authorized by 2021 Wisconsin Act 79. The program, funded by manufacturer shortfall fees, aims to improve access to electronics recycling in underserved areas of the state by funding one-day collection events or establishing a permanent collection site in counties that have lacked registered collection sites or events. The DNR awarded \$87,772 to 15 projects in 13 counties, which will help fund three permanent electronics collection sites and up to 16 one-day collection events. This included projects in four of the five highest priority counties, which had not had any registered collection sites during the July 2020-June 2021 program year. The projects are taking place between July 2022 and June 2023.

### **Reducing costs for consumers and collectors**

As shown in Figure 9, the percentage of collectors charging consumers fees for electronics has increased in recent years. In program year 13, 92% of active collectors charged consumers a collection fee of some sort, compared with 62% in program year 5. The percentage of active collectors taking at least some items for free fell from 72% in program year 5 to 53% in program year 13. Most collectors charged a per-item fee, with a smaller portion charging a per-pound fee or using a combination of fee types. Nearly all sites that charged a fee did so for TVs, and some limited the size or type of TVs accepted, or did not accept TVs at all. These

**Figure 9: Percent of registered collectors charging fees and accepting some items for free**



fees reflect charges recyclers pass on to collectors. In the last few years, nearly all collectors have been paying for packaging, transportation and/or recycling of eligible electronics under the program.

In the past, consistent oversupply of eligible pounds, rising manufacturer compliance costs across programs in all states, and competition among recyclers led many manufacturers to push for lower per-pound payments to recyclers. This meant more of the recycling cost is passed on to collectors and, ultimately, consumers. As the overall manufacturer target has increased in the last two years, many manufacturers have increased the amount they are paying per pound, allowing some collection sites and events to begin accepting more items for free. In 2022, TCL and Samsung sponsored free collection events.

The DNR’s new grant program is also helping to reduce costs for consumers in underserved areas of the state. In 2022, grant recipients held free collection events in Iron and Kewaunee counties, and Marquette and Polk counties offered steeply reduced fees at one-day events.

### Getting electronics to registered recyclers

In program year 13, approximately 516,000 pounds of eligible electronics that collectors received did not go to registered recyclers. This was the lowest amount since program year 1, due primarily to a handful of registered collectors becoming registered recyclers. The DNR will continue to encourage collectors that are dismantling electronics to register as recyclers and keep more pounds eligible for manufacturer credit. This effort will be helped by increasing manufacturer payments and implementation of the DNR’s proposed rule requiring all Wisconsin facilities that dismantle electronics to set aside money for closure and cleanup costs and meet additional standards.

### Ensuring safe management of hazardous materials in consumer electronics

#### *Video display recycling costs*

Video display devices (TVs and monitors) have made up the majority of weight collected under E-Cycle Wis-

consin (see Figure 5). They are some of the most difficult and expensive devices to recycle, particularly older CRT models, which contain leaded glass. Flat-panel liquid crystal display (LCD) devices are also costly to recycle, because they are lit by thin, mercury-containing fluorescent tubes. Manual disassembly of the displays is time-consuming and thus expensive. One Wisconsin recycler uses automated processing technology to reduce costs, but the value of commodities in flat panels is less than the cost of processing and handling the mercury.

Several recyclers—including some involved in E-Cycle Wisconsin—have mismanaged or abandoned stockpiles of CRT glass. While there has been recent progress in cleaning up these hazardous stockpiles, the DNR has spent considerable time following up on these cases and making sure mismanaged glass is not counted for manufacturer credit under E-Cycle Wisconsin.

The DNR's proposed administrative rules are designed to help prevent future expensive cleanups and ensure proper management of hazardous materials in electronics by setting clear standards for collection and transportation of electronics and requiring a solid waste processing license, along with money set aside for closure and cleanup costs, for Wisconsin facilities that dismantle or process electronic waste.

### *Safe handling of lithium batteries*

Lithium-ion batteries—used in many portable electronics—can retain a considerable charge even after a consumer has discarded a device and can spark and cause fires if damaged. Lithium batteries from devices thrown in trash or recycling bins, and even those properly brought to electronics drop-off sites, have caused many fires nationally in the last several years. A 2021 U.S. Environmental Protection Agency study documented 245 fires between 2013-2020 that were likely attributed to lithium-ion batteries and concluded that 89% of them were definitively caused by lithium-ion batteries. The number is likely far below the number of fires actually caused by lithium-ion batteries because there is not a requirement to report fires. Although numbers have not been tracked, the DNR has received several reports of fires likely or definitively caused by lithium-ion batteries in recycling/trash collection trucks and at transfer stations, recycling facilities and landfills in Wisconsin. Recyclers are spending additional money to train workers, revise procedures and invest in fire-suppression systems. The challenge will grow as more electronics containing these batteries enter the waste stream.

The DNR has increased outreach efforts to better inform Wisconsin residents of how to safely manage used batteries and electronics that contain them. In an effort to reduce the risk of fires and encourage proper recycling, the DNR's proposed administrative rules would add telephones with a video display, as well as phone accessories and video gaming devices/accessories that contain batteries, to the list of electronics that can be recycled through E-Cycle Wisconsin. The DNR will continue to work with stakeholders to increase public outreach about batteries and identify potential additional policy solutions.

## **Recommendations for potential legislative changes**

Based on the first 13 years of implementation and positive feedback from stakeholders, most of the fundamental elements of Wisconsin's electronics recycling law are sound and have proven effective.

Despite recent positive changes, some challenges remain that could best be addressed through additional legislation. These ideas for the Legislature's consideration, submitted under s. 287.17(10), Wis. Stats., are based on extensive conversations with stakeholders over the last several years, in addition to analysis of program data.

## **Consider updating or replacing the manufacturer target formula to ensure consistent and affordable consumer access to electronics recycling and predictable costs for manufacturers**

To better balance the supply of electronics that need to be recycled with manufacturer obligations, the Legislature could consider adjusting the manufacturer target formula. In earlier program years, the challenge was overcollection of pounds. More recently and going forward, it is becoming difficult for manufacturers to meet their recycling targets as sales increase and the weight of devices Wisconsin homes decreases. For this reason, it may work better to set targets by taking an average of weight received for recycling under the program over previous program years and allocating it among manufacturers by market share. Minnesota, which has a program similar to Wisconsin's, now uses this approach and its law could be used as a model. Other states have moved to a "convenience standard" approach, where manufacturers pay for all eligible electronics that are collected by a network of sites set up to provide coverage throughout the state. Though convenience standard models implemented so far would not be a perfect fit for Wisconsin because they rely heavily on county governments opting in to a program and have left out many rural areas in those states, this is another option the Legislature could explore.

In addition, the current rural incentive could be replaced with an alternative method to ensure that, regardless of the overall manufacturer target, manufacturers and recyclers would provide more consistent opportunities for recycling in rural areas.

## **Consider allowing registered recyclers to carry over credits**

Allowing registered recyclers to carry over to the subsequent program year (or years) any eligible weight they recycled that was not purchased by manufacturers would help smooth out annual fluctuations in both manufacturer targets and collection weights. It could also reduce the number of "lost" pounds for which manufacturers do not cover any portion of recycling costs, thus reducing costs recyclers pass down to collectors and consumers. The Legislature could consider allowing recyclers to carry over excess eligible weight for one or two subsequent program years, after which point unused credits would expire, to reduce incentives for recyclers to pursue more weight than they have a realistic chance of selling to manufacturers.

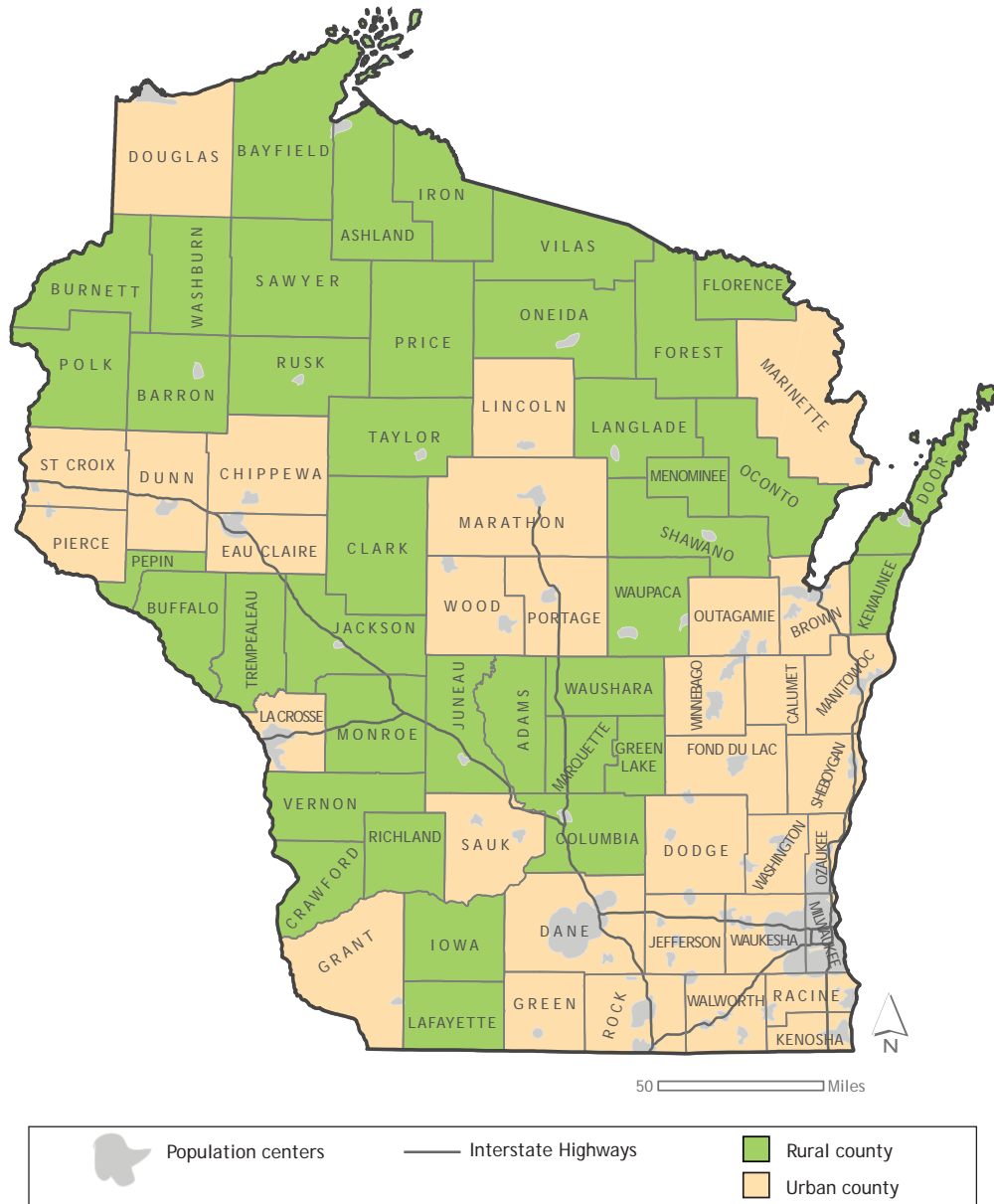
## **Consider updating device definitions to address today's consumer electronics**

As technology changes, it has been difficult for the DNR to determine whether devices are covered by the definitions in s. 287.17(1), Wis. Stats. Examples of these "gray area" products include smartphones, digital picture frames, photo printers and portable DVD players. In addition, the increased use of lithium-ion batteries in consumer electronics, along with the fact that the majority of these devices store personal data, make this a good time for the Legislature to take a fresh look at which devices are included in E-Cycle Wisconsin and are therefore banned from disposal in landfills or incinerators.

Device definitions and program requirements could be revamped to:

- Update the definition of consumer computer so that it is easier to determine whether new or updated products with video displays smaller than 7 inches are included.
- Broaden the definition of video display device so that it includes items with screen sizes greater than 7 inches, such as portable DVD players, that are very similar to TVs and monitors but not currently included.
- Broaden the definition of "peripheral" to include items used with video display devices, not just computers. This would allow items such as coaxial cables and digital converter boxes to count toward a manufacturer's recycling target, making the recycling program clearer for consumers and requiring less sorting by recyclers.
- Include more devices with lithium-ion batteries and set standards for how battery-containing and data-containing devices must be managed under E-Cycle Wisconsin.

# Appendix A: Map of urban and rural counties under E-Cycle Wisconsin



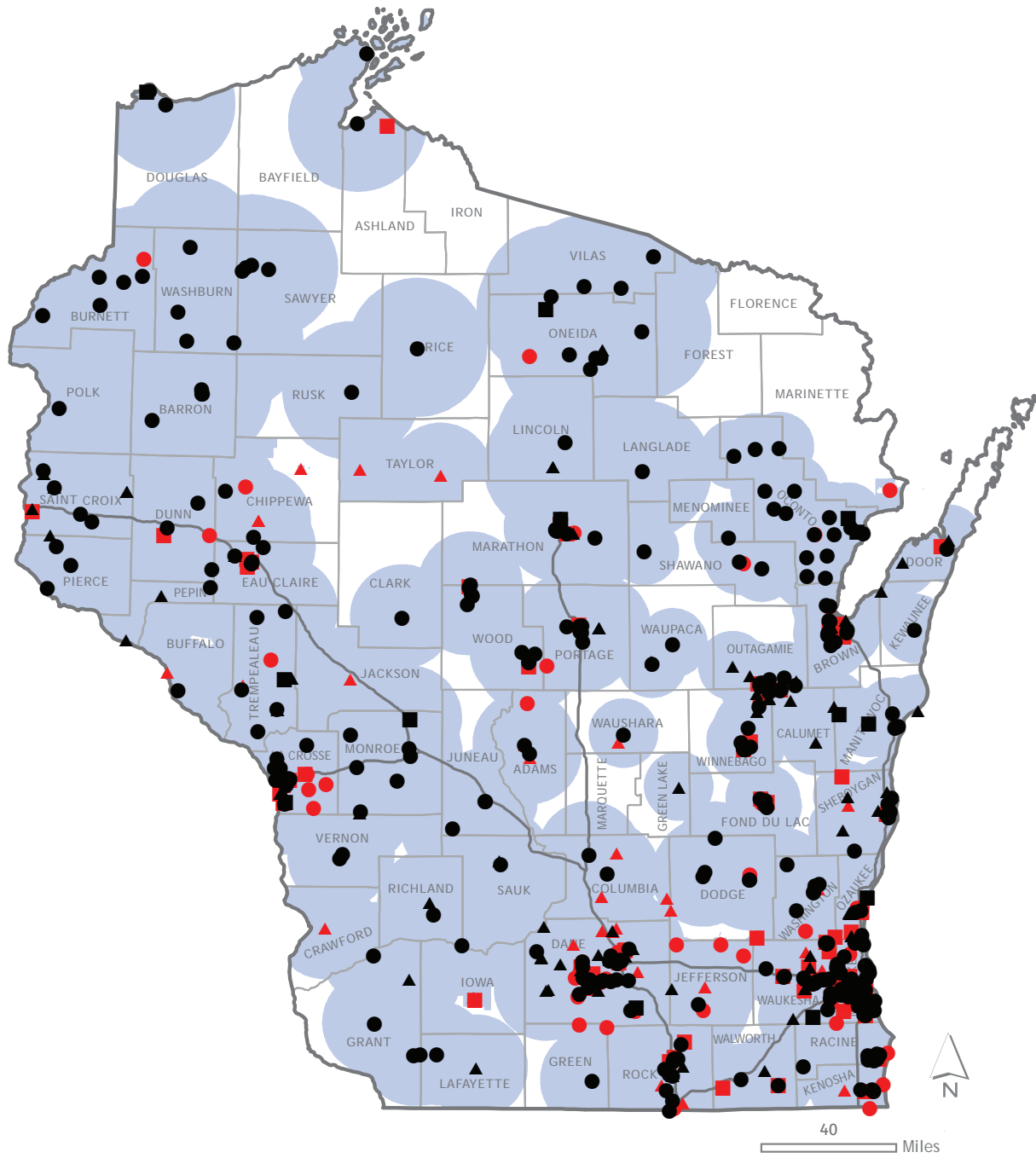
**Wisconsin Department of Natural Resources  
Bureau of Waste and Materials Management**  
P.O. Box 7921, Madison, WI 53707 | [DNRWle-cycling@wisconsin.gov](mailto:DNRWle-cycling@wisconsin.gov)

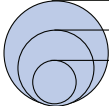
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# Appendix B: Map of collection sites registered under E-Cycle Wisconsin during program year 13



 <p>20-mile coverage area: Northern*</p> <p>15-mile coverage area: South Central, West Central*</p> <p>10-mile coverage area: Northeast, Southeast*</p>	<p>● Permanent collection sites</p> <p>▲ One-day collection sites</p> <p>■ Temporary collection sites</p>	<p>— Interstate highways</p>
<p>● ■ ▲ Collection sites available only to employees and customers of a company or residents of a village, town, city or county.</p>		

\*Based on the 2021 DNR Household Recycling Survey question, "How far would you be willing to travel to recycle electronics?"