



# E-Cycle Wisconsin 2015 report

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

December 2015

---

## Executive summary

Wisconsin's electronics recycling law has achieved many successes since it took effect in 2010, most notably recycling nearly 200 million pounds of electronics and expanding electronics recycling access for Wisconsin residents. Wisconsin has been a leader among state electronics recycling programs when it comes to the number of collection sites available and weight of electronics collected per person, and many stakeholders have praised the structure and overall administration of the program.

Since 2010, however, both the nature of electronics being sold and the markets for materials found in electronics have changed dramatically. Due to the popularity of smaller and lighter electronics and manufacturers' design improvements to reduce product weight, the weight-based manufacturer recycling targets, which are set by a statutory formula, have declined substantially over the last three years. Dwindling markets for the leaded glass in cathode ray tubes (CRTs), along with lower commodity prices, have increased recyclers' per-pound costs, but manufacturer payments have not always risen to match.

As a result, unless manufacturer recycling targets are updated, the collection and recycling system funded by manufacturers will continue to fall short of the electronics recycling demand of Wisconsin households and schools, particularly in rural areas. Since 2014, many recyclers have dropped collection sites and collection events (especially in rural areas), and are charging collectors more or higher fees to take electronics for recycling. DNR surveys indicate that fewer collection sites and higher costs can lead to increased illegal dumping of electronics. Economic pressures in the electronics recycling industry have also led to irresponsible practices among some recyclers. These trends are also likely to increase the financial burden on taxpayers to either collect electronics or clean up dumped devices.

## Table of contents

Introduction	3
Program participation	4
Recycling totals & analysis	7
Compliance & enforcement within E-Cycle Wisconsin	9
Electronics recycling outside E-Cycle Wisconsin	13
Disposal ban compliance	16
Program challenges	16
Recommendations	20

---

## Other program results

Find earlier E-Cycle Wisconsin annual reports, survey summaries and other program results at <http://dnr.wi.gov/topic/Ecycle/wisconsin.html#tabx2>.

In summary, the basic structure of the law is still sound, and there are many successes to celebrate. Changes will be needed to maintain Wisconsin residents' access to affordable electronics recycling—particularly in rural areas.

### Program successes

- Between January 2010 and June 2015, Wisconsin households and schools recycled nearly 200 million pounds of electronics through E-Cycle Wisconsin. During program year 6 (July 2014 to June 2015), registered collectors took in 30.6 million pounds of electronics, or 5.3 pounds per Wisconsin resident.
- More than 90 percent of the electronics collected under E-Cycle Wisconsin are processed initially in Wisconsin or other Midwest states, contributing to continued growth in the region's electronics recycling industry. From program year 5 to program year 6 the share of electronics processed in Wisconsin increased from 49 to 60 percent.
- While the number of registered collection sites has declined, residents in 67 of Wisconsin's 72 counties, representing 99 percent of the state's population, had access to at least one registered electronics collection site during program year 6.
- During program year 6, nearly all manufacturers met or exceeded their recycling targets.
- The vast majority of manufacturers, recyclers and collectors are complying with the law, and the DNR has taken actions to ensure a level playing field for program participants. During program year 6, many small manufacturers registered with E-Cycle Wisconsin for the first time, thanks in part to compliance efforts by electronics retailers. The Department of Natural Resources (DNR) has stepped up efforts to ensure collectors and recyclers are properly handling electronics, through compliance assistance and enforcement measures.

### Recommendations per s. 287.17(10), Wis. Stats.

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 of relatively minor changes, based on both formal and informal stakeholder input, that could be made to improve administration of the electronics recycling law and ensure its continued effectiveness, for the Legislature's consideration.

- To better match the budget cycles of many manufacturers, recyclers and collectors, consider changing the annual program year so that it corresponds to a calendar year (Jan. 1 to Dec. 31), rather than the state fiscal year, and adjust reporting dates accordingly.
- To better meet the electronics recycling needs of Wisconsin residents and schools, consider changing the manufacturer target formula so that the aggregate target is based on the total weight of electronics received for recycling under the program during previous years.
- To ensure access to electronics collection in rural areas of the state, consider replacing the current rural collection incentive with an alternative method to ensure that, regardless of the overall manufacturer target, manufacturers and recyclers would provide attention to rural areas
- Consider assisting small businesses by reducing or eliminating registration fees paid to the state under s. 287.17(4)(b) by very small electronics manufacturers.
- Consider modifying the definition of "school" under s. 287.17(1)(np) to allow all K-12 schools in Wisconsin to recycle electronics through E-Cycle Wisconsin.
- Consider updating and clarifying device definitions so they better fit the changing nature of electronics.
- To help the DNR ensure materials are being managed properly, consider adding more detail to the reports registered recyclers are required to submit.

## 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 Department of Natural Resources (DNR) the brands they sell to Wisconsin households and schools, and 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.

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 under the program 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 recommendations for any 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, worker safety and other standards.
- Encouraging and supporting a strong electronics recycling industry in Wisconsin and the Midwest.

Wisconsin's electronics recycling law has produced many successes. In its 2014 report, however, the DNR discussed several challenges that were making it difficult for E-Cycle Wisconsin and the disposal ban to fulfil the first four of the above criteria. Evidence from 2015 shows these challenges persist. This is primarily due to declining manufacturer recycling targets—driven by a steady reduction in pounds per unit sold—and increasingly tight and expensive markets for recycling cathode ray tube glass, which makes up nearly half the weight of material collected under E-Cycle Wisconsin. Since 2014, lower prices for many of the commodities electronics contain have also negatively affected program economics by reducing the revenue

---

## E-Cycle Wisconsin program years

Program years run from July 1 to June 30. The first program “year” lasted just six months, to get the program on this calendar. Here are the dates for program years referenced in this report.

### Program year 1

January 1 to June 30, 2010

### Program year 2

July 1, 2010, to June 30, 2011

### Program year 3

July 1, 2011, to June 30, 2012

### Program year 4

July 1, 2012, to June 30, 2013

### Program year 5

July 1, 2013, to June 30, 2014

### Program year 6

July 1, 2014, to June 30, 2015

### Program year 7

July 1, 2015, to June 30, 2016

---

**Table 1: Program year 6 registration and participation**

Category	Registered	Active
Collectors	154	133 (86%)
Recyclers	26	19 (73%)
Manufacturers	132	n/a
Brands	198	n/a

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

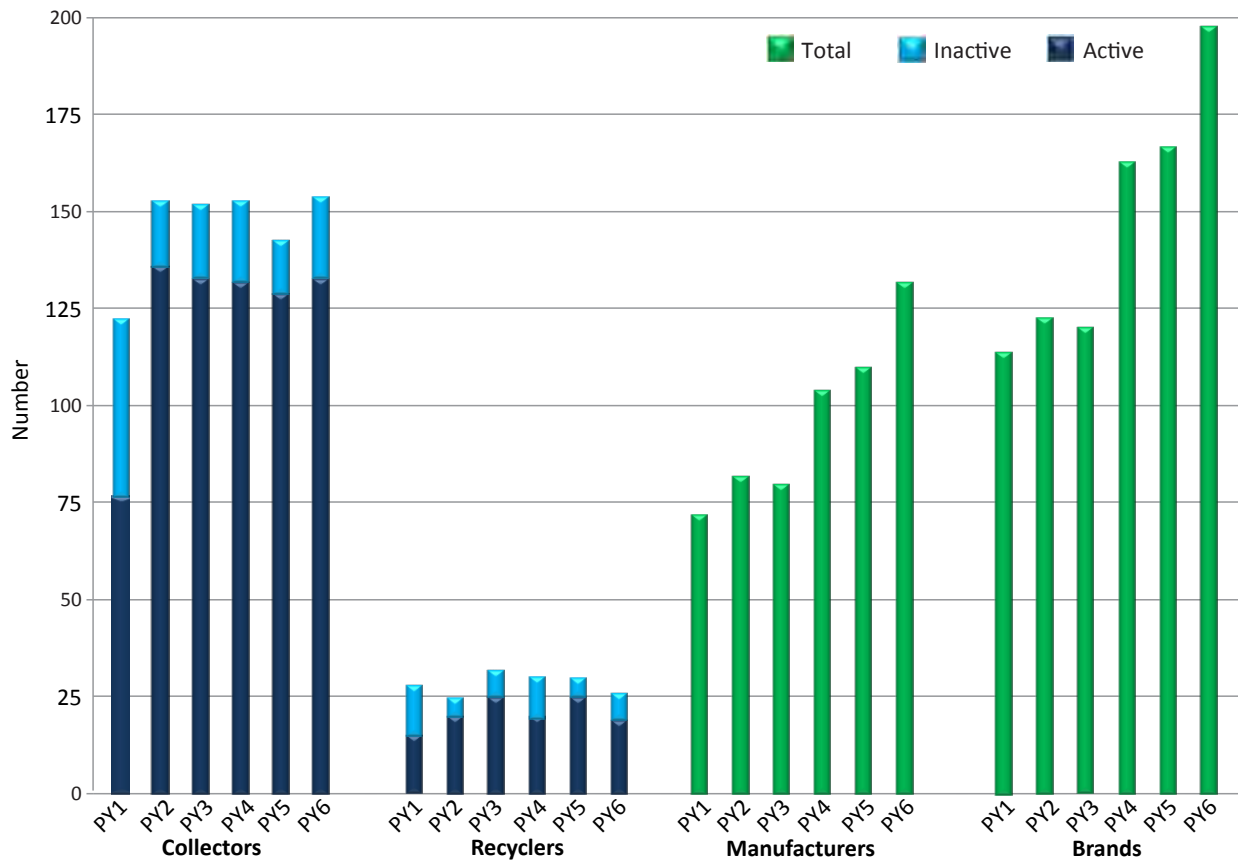
recyclers receive (from materials like steel, copper and precious metals) that traditionally offsets some of the costs for managing hazardous or low-value materials.

The DNR believes the fundamental structure of the law remains sound. However, the challenges require attention to ensure continued widespread public access to affordable electronics recycling. Further discussion of these issues and policy recommendations are included at the end of this report.

## Program participation

E-Cycle Wisconsin collector registrations were up slightly in program year 6 compared with program year 5, though the total was similar to earlier program years. Registered collectors include local governments, electronics retailers, other for-profit businesses and non-profits. The mix of collectors has remained relatively steady, though the number of local government collectors has increased slightly over the past few program years while the number of non-profit and electronics retailer collectors has dropped slightly.

**Figure 1: Summary of registration and participation**



PY = program year.

Program year 6 recycler registrations were down slightly from program year 5, and several recyclers did not renew their registrations for program year 7, due to going out of business or cutting back on their operations.

The number of registered manufacturers and brands increased sharply in program year 6 due to DNR compliance and enforcement efforts.

Table 1 shows registrations for program year 6, and Figure 1 illustrates registration trends over the first six program years.

Wisconsin has had one of the highest numbers of collection sites per capita among states with electronics recycling laws. During program year 5 and 6, however, the number of sites has declined, due largely to higher recycling costs that are being passed on to collectors, along with struggling recyclers unexpectedly dropping sites.

In program year 6, there were 424 permanent and 136 temporary or event collection sites registered with E-Cycle Wisconsin for at least part of the year, a total of 560 (down from the program year 4 high of 681). For-profit collectors operated the highest number of sites (283, or just over half), though many of these were at retail or government locations, as shown in Figure

Figure 2: Program year 6 collection sites, by type

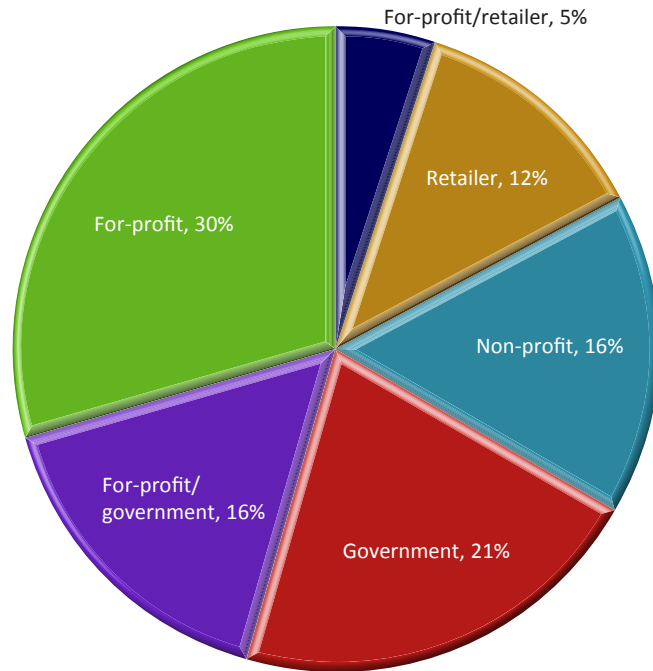
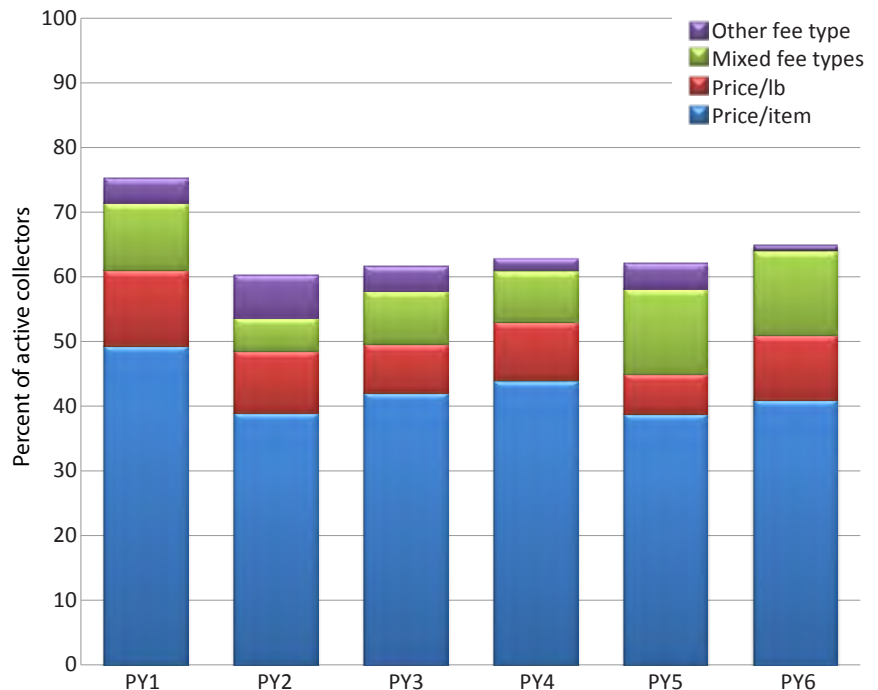
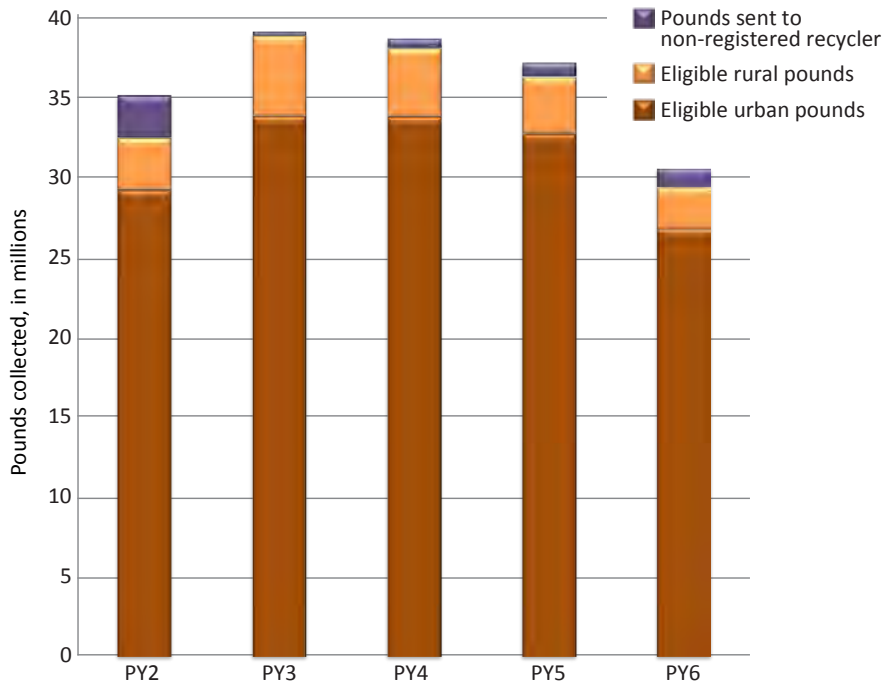


Figure 3: Fees charged by registered collectors, by year and fee type



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



**Table 2: Eligible electronics collected by registered collectors, program year 6**

Type	Pounds
Urban	26,822,835
Rural	2,619,375
Not sent to registered recyclers	1,168,139
<b>Total collected</b>	<b>30,610,349</b>

**Table 3: Pounds collected, by collector type**

Type	PY5	PY6
Retailer	7,137,265	6,512,415
Non-profit	8,523,474	5,976,652
Gov't	8,324,322	8,854,169
For-profit	13,204,858	9,267,113
<b>Total</b>	<b>37,189,918</b>	<b>30,610,349</b>

PY = program year

2. The percentage of sites hosted by local governments (either alone or in partnership with a business) increased from 30 percent in program year 5 to 37 percent in program year 6.

During program year 6, there were E-Cycle Wisconsin collection opportunities in 67 of Wisconsin's 72 counties, covering 99 percent of the state's population (see map in Appendix A).

In program year 6, 65 percent of active E-Cycle Wisconsin collectors charged consumers a collection fee of some sort, which is a slight increase from program year 5 (see Figure 3). Most collectors charged a per-item fee (e.g., \$10 for a TV). A smaller,

but growing, portion charged a per-pound fee (e.g., 20 cents a pound for TVs). Just two charged only a site-visit fee. Some used a combination of fee types. Just over half of the collectors charging fees did take some items for free.

Per-pound fees ranged from 10 to 50 cents a pound and per-item fees ranged from \$1 to \$60, similar ranges to last program year. Wisconsin residents were most likely to be charged for TVs and least likely to be charged for miscellaneous electronics like keyboards, mice and other peripherals. TVs were also the most expensive items to recycle. Among collectors that charged for TVs, prices ranged from \$5 for a small TV to \$60 for a projection TV, with the average hovering around \$17 to \$20. Monitors were the second most likely item to have a charge. The average price for monitors, laptops and central processing units (CPUs) was around \$10. The average price for printers was closer to \$7 and peripherals were around \$4.

Based on discussions with collectors and recyclers, the DNR expects that low commodity prices and high costs for managing CRT glass will put pressure on more collectors to charge consumers for accepting electronics, or to limit the types of items they accept, because manufacturer payments often no longer cover the full cost of collecting and recycling the electronics.

## Collection and recycling totals and analysis

Wisconsin households and schools have participated enthusiastically in E-Cycle Wisconsin, recycling nearly 200 million pounds of electronics since 2010. As shown in Figure 4, however, collection of eligible electronics during program year 6 declined about 18 percent from program year 5, and was down about 22 percent from the peak collection year (July 2011 to June 2012). From July 2014 through June 2015 (program year 6), registered collectors took in 30.6 million pounds of electronics from Wisconsin households and schools (see Table 2). This was equivalent to 5.32 pounds per capita.

Collection totals decreased from program year 5 to 6 among for-profit, non-profit and electronics retailer collectors, and increased slightly among local government collectors, as shown in Table 3. The overall trend seems to be toward more reliance on government collection programs, with the local government share of weight collection increasing from 18 percent in program years 2 and 3 to 29 percent in program year 6. (Note that the “for-profit” total includes collection from many sites or events hosted by the other groups, so the actual total from for-profit collectors is likely lower, while the actual totals for the other categories, particularly local governments, are likely higher.)

The overall decline in weight collected could be due in part to residents having fewer heavy devices (like large TVs with cathode ray tubes) to recycle. This seems unlikely to account for the full decline, however, as TVs continued to dominate the weight collected during program year 6 at 67 percent of weight collected (see table 4), which is similar to previous years (see Figure 5). Registered recyclers report that nearly all of the TVs received, by weight, are still CRTs. Given the decline in the number of registered collection sites (down 14 percent from program year 5 to 6), it seems more likely that the decline in weight collected is the result of more residents either storing their old electronics or finding alternative disposal methods (such as using non-registered collectors/recyclers, illegal landfill disposal or il-

Figure 5: E-Cycle Wisconsin collection, by product type

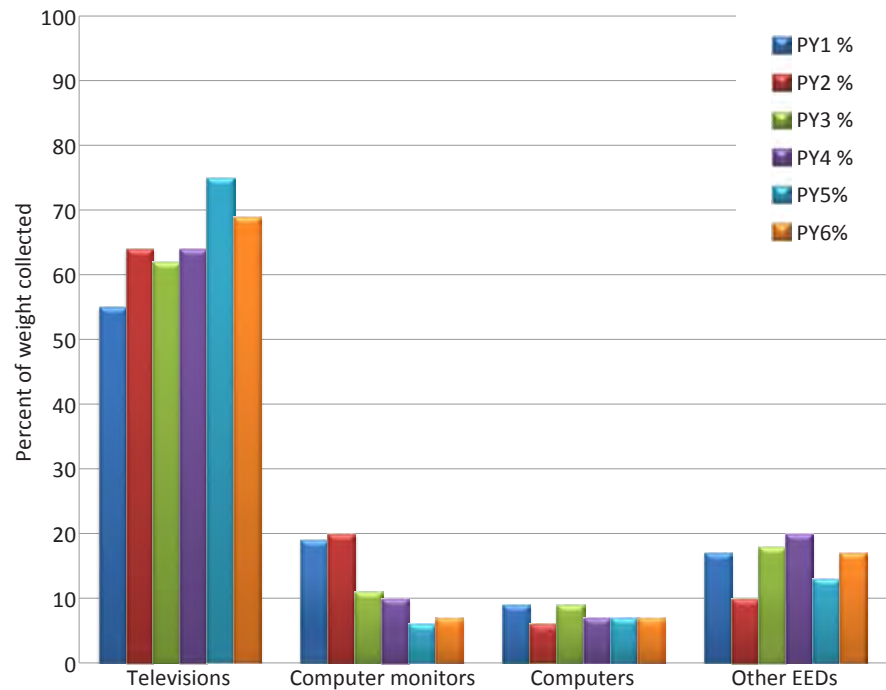
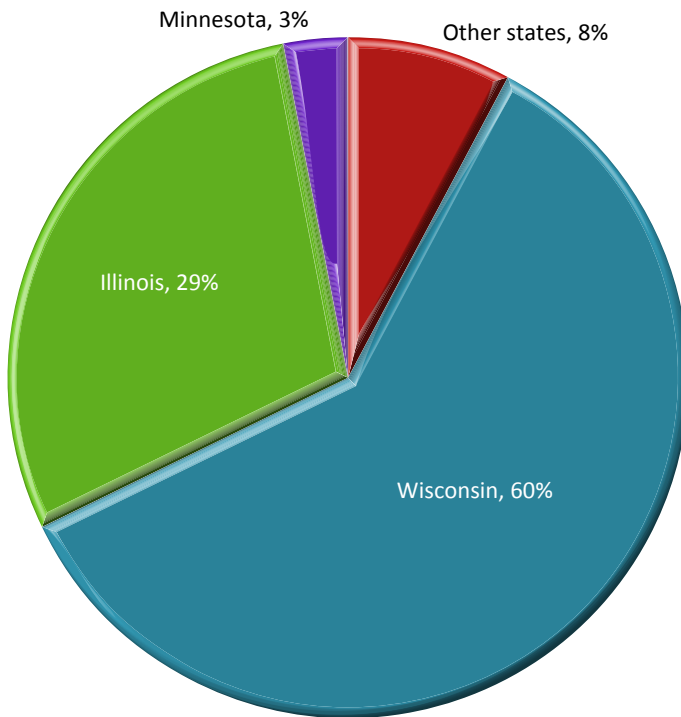


Table 4: Program year 6 collection, by product type

Product type	% of total weight
TVs	67%
Monitors	7%
Computers	8%
Other EEDs	18%

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

**Figure 6: Percent of program year 6 pounds received by registered recyclers, by state**



legal dumping). Surveys by the DNR and Consumer Electronics Association have shown that households store a large portion of their electronics, and that having to pay more than a few dollars, or not having a convenient collection site, make them less likely to recycle their electronics.

Nearly all electronics collected under E-Cycle Wisconsin in program year 6 were processed in the upper Midwest, as shown in Figure 6. Wisconsin recyclers processed the largest share (60 percent). The share of weight processed in Wisconsin increased from program year 5 to 6, while the share processed in Illinois and Minnesota decreased.

**Table 5: Eligible pounds received and recycled, program year 6**

Type	Pounds
Urban received	26,814,707
Rural received	2,435,002
Rural credit	608,751
Non-eligible glass	(160,439)
Available for manufacturers	29,698,021
Sold to manufacturers	28,953,088

*Rural credit is 1.25 pounds per pound collected. For a map of urban and rural counties, see Appendix D.*

*Urban and rural pounds differ slightly from Table 2 because of how collectors and recyclers report pounds collected before a program year end but not received by a recycler until the next year, and because some recyclers choose to count all pounds as urban.*

*Non-eligible glass is CRT glass the recycler received but that was not recycled, under the definitions in s. 287.17, Wis. Stats.*

With the rural credit (1.25 pounds counted for each pound collected in a rural county) factored in and non-recycled pounds subtracted out, Table 5 shows that registered recyclers had 29.7 million eligible pounds available for purchase by manufacturers in program year 6, and sold just under 29 million pounds. The gap between what recyclers received and what manufacturers purchased was much narrower in program year 6 than in earlier program years, indicating recyclers adjusted their contracts with collectors to better match the manufacturer targets. A handful of manufacturers that significantly exceeded their target weights also helped keep this gap narrow.

The overall manufacturer target was down about 1.8 million pounds from program year 5, due primarily to consumers buying smaller and lighter products, and manufacturers finding ways to reduce the weight of larger devices, such as TVs. The manufacturer target for program year 7 is down even more sharply, with a decrease of 3.8 million pounds from program year 6, to 22.8 million pounds.

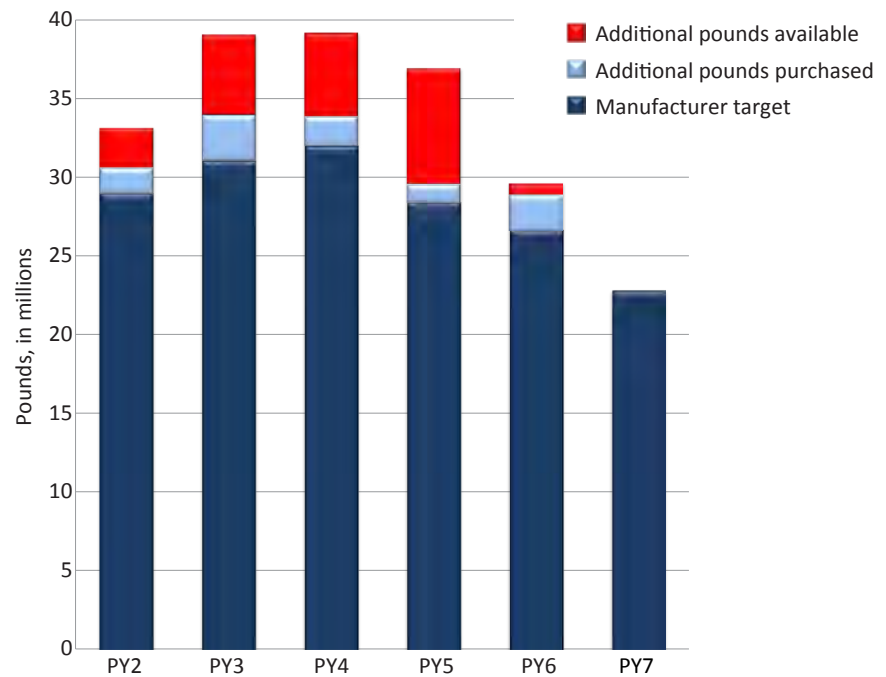
Figure 7 shows the manufacturer recycling targets and weight purchased by manufacturers, by program year.



## Compliance and enforcement within E-Cycle Wisconsin

Much of the DNR’s administration of the electronics recycling law is focused on maintaining a level playing field for E-Cycle Wisconsin participants and identifying problems at collection sites or recycling facilities that might endanger human or environmental health. Many stakeholders have cited Wisconsin as a national leader in these efforts, particularly in its use of online registration and reporting and careful accounting of collection and recycling transactions among program participants.

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



During 2014-2015, the DNR renewed its efforts to gain 100 percent compliance from electronics retailers and manufacturers, relying on both compliance assistance and enforcement. DNR staff have also been working to resolve significant compliance issues with a handful of program participants, and formalized procedures for suspending and revoking program registrations in a guidance document.

### Compliance among registered manufacturers

Manufacturers of all major electronics brands have complied with Wisconsin’s electronics recycling law by registering their brands of covered electronics and paying applicable registration and shortfall fees.

Based on discussions with stakeholders, it appears that most manufacturers rely on the recyclers they contract with to find and/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 collection program (Best Buy is also a manufacturer); a partnership between Hewlett Packard and Staples; and Apple’s recycling program for schools.

During program year 6, as in program year 5, just under one-third of registered manufacturers (38) participated in a manufacturer collective or brokering arrangement that contracts with recyclers for a large total sum of pounds and distributes the recycled pounds among its members. The largest collective was MRM (21 manufacturers), with a smaller number of manufacturers participating in Reverse Logistics Group America (7), E-World Online (5), 3R Network (4) and WM Recycle America (2). These collectives were responsible for about 43 percent of recycled pounds purchased by manufacturers during program year 6.

Most manufacturers continued to successfully meet or exceed their sales weight-based recycling targets in program year 6. Fifteen manufacturers recycled more than their targets and earned credits that can

## Registration lists

The DNR keeps updated lists of registered and unregistered manufacturers and brands, registered recyclers and collectors, and registered collection sites on its website. Lists are available at <http://dnr.wi.gov/topic/ecycle/wisconsin.html>.

**Table 6: Program year 6 manufacturer credit transactions**

	Credits
Beginning balance	4,477,082
Credits applied	(1,609,790)
Credits expired	(565,635)
New credits earned	1,564,635
<b>Total available for future use</b>	<b>3,866,292</b>

**Table 7: Manufacturer registration and shortfall fees**

Program year	Registration fees	Shortfall fees
1	\$261,250	n/a
2	\$270,000	\$8,453
3	\$275,000	\$19,210
4	\$310,000	\$10,105
5	\$310,000	\$9,467
6	\$328,750	\$11,199

*Shortfall fees for program year 6 as of December 2015. The law did not assess shortfall fees for program year 1.*

be used during the next three program years (though in some cases, the amounts were negligible—a few pounds or less). In total, manufacturers earned just over 1.5 million credits (see Table 6). Sixteen manufacturers used just over 1.6 million credits they had earned in a previous year or purchased from another manufacturer to meet their program year 6 targets. At the end of program year 6, just under 3.9 million pounds of credits were available to manufacturers for future use. Through program year 6, manufacturers let just under 1 million credits expire without using them.

Each year, the DNR works with manufacturers to help them purchase eligible recycled pounds rather than pay a shortfall fee, but several with very small targets have said it is more convenient for them to pay the fee than to go through the process of contracting with a recycler. For program year 6, 30 manufacturers paid or owed a shortfall fee as of November 2015. The amounts ranged from \$1 to \$2,999.

Table 7 summarizes the registration and shortfall fees paid during the first six E-Cycle Wisconsin program years.

### Manufacturer registration compliance efforts

The DNR made great strides in 2014 and 2015 in bringing more of the smaller manufacturers into compliance. Through a combination of techniques, including increased coordination with other states, increased interaction with retailers, a new focus on brand prioritization and use of the DNR’s stepped enforcement process, many of the manufacturers that had long been on Wisconsin’s unregistered list are now registered. Between Nov. 1, 2014, and Nov. 1, 2015, 70 previously non-compliant brands registered with E-Cycle Wisconsin.

In June 2014, the DNR issued 13 notices of noncompliance (NON) to manufacturers that had previously been notified of registration requirements under Wisconsin’s law and whose brands were being sold by multiple retailers. Eleven of the manufacturers came into compliance without further enforcement action. The DNR sent notices of violation (NOV) to two that had failed to comply as of October, and both subsequently came into compliance (see Table 8). No cases were referred to the state Department of Justice for further action.

New manufacturers continue to appear on the market every month, and in many cases these manufacturers are unaware of their obligations under Wisconsin’s law. Leveling the manufacturer playing field remains a priority for the DNR. Staff are working with retailers to have brands register before they are sold and with DNR IT personnel to find software that can assist in finding new brands when they first arrive on the marketplace.

## Retailer compliance

To inform and complement manufacturer compliance efforts, the DNR has conducted quarterly “brand checks” on electronics retailers to determine how many unregistered brands they are selling. Thorough checks of more than 20 online retail websites in November 2014 and February, May and August 2015 helped paint a clearer picture of which unregistered brands were the highest priority for compliance efforts, as well as which retailers were making efforts to comply with Wisconsin’s electronics recycling law. Figure 8 illustrates the resulting decline in the number of brand violations found during these checks, and Figure 9 offers a snapshot of the types of products found in violation during the August 2015 check.

Following the November, May and August compliance checks, the DNR emailed a list of non-compliant brands for sale on retailer websites to each relevant retailer contact. Most retailers responded rapidly to the lists by asking the brands on their list to register, blocking sales of those products to Wisconsin or a combination of both techniques.

Between July and October 2015, the DNR issued notices of non-compliance to eight retailers that did not appear to be blocking sales or removing products. Most of the retailers that received NONs subsequently began to block sales of unregistered brands to Wisconsin. As of Nov. 10, two retailers were still

Table 8: Summary Of 2015 manufacturer/retailer enforcement actions

	NONs issued	NOVs issued	Returned to compliance
Manufacturers	13	2	13
Retailers	8	1	6

“Returned to compliance” numbers as of Nov. 10, 2015.

Figure 8: Electronics retailer unregistered brand violations, 2014-2015

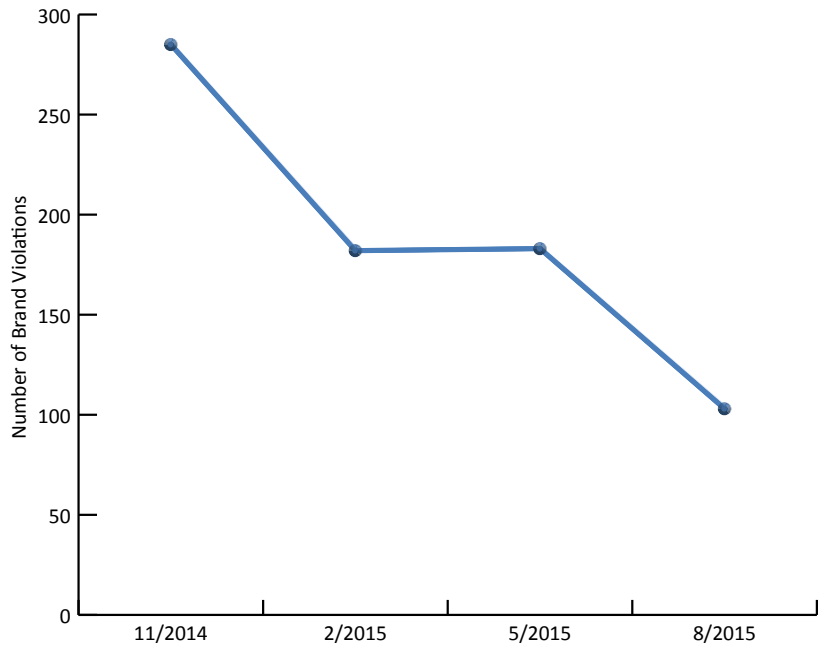
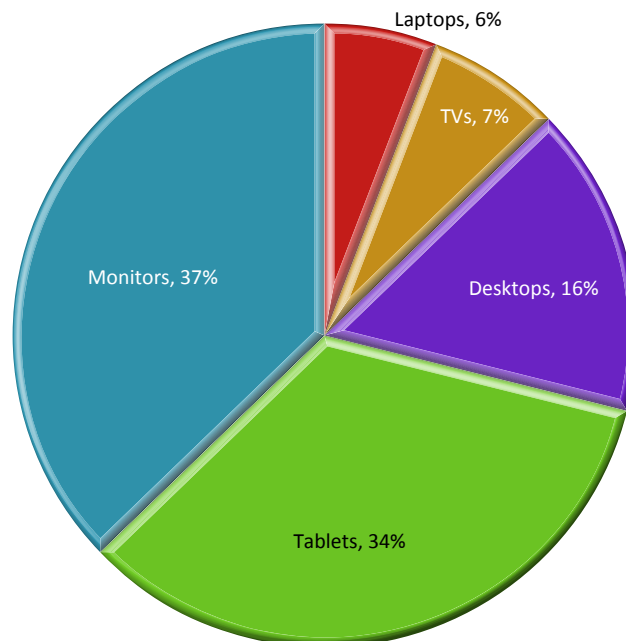


Figure 9: Electronics retailer unregistered brand violations, by device type, August 2015



moving through the stepped enforcement process (see Table 8).

In addition to online brand checks, the DNR also conducted 10 in-store inspections of major chain retailers in February 2015. Only two retailers had unregistered brands on their shelves. These brands have all either registered or been removed from Wisconsin stores.

### Inspections of registered recyclers and collectors

All registered recyclers, both those located in-state as well as out-of-state, must comply with program requirements as well as other solid and hazardous waste regulations. Registered recyclers must provide documentation showing that they carry adequate owner financial responsibility (OFR) for facility closure and at least \$1 million in pollution liability insurance. Reports from registered program participants also help verify that electronics collected under E-Cycle Wisconsin are properly managed, but on-site inspections are important to completely understand how a recycler is operating. In-state recyclers are inspected approximately once a year and out-of-state recyclers are also subject to inspections.

Due to travel considerations, most out-of-state recyclers have not been inspected, but DNR staff have visited three of these recyclers since the program began. During this past program year, staff visited one Illinois-based recycler and the four sites it uses for managing glass. More inspections of Illinois-based recyclers are planned for the current program year.

Since on-site inspections for out-of-state recyclers are difficult to conduct, DNR staff have developed procedures to conduct desktop audits. These audits will provide greater assurance that facilities are being managed in an environmentally sound manner. Part of the desktop audit will include working more closely with recyclers to verify that the weight of materials brought in for recycling is close to the amount of materials sent to downstream vendors.

During 2014 and 2015, DNR staff increased efforts to track electronics and their components through the recycling chain. This included working closely with collectors and recyclers to verify the amount of materials received and where they went for recycling. When possible, staff reviewed records and contacted downstream recyclers to verify the amount of materials received. The main focus was on video display devices, especially those that contain cathode ray tubes, because of dwindling CRT glass markets and several reports of CRT glass mismanagement nationwide. The DNR has continued to apply its 2014 guidance on what downstream recycling markets for CRT glass are acceptable for manufacturer credit, and disqualified some pounds during program year 6 based on this guidance. Efforts to more closely monitor these problem material streams will continue in 2016.

Collectors registered with E-Cycle Wisconsin must also meet minimum standards, including recordkeeping and reporting, and are subject to DNR inspections. Following a major collector compliance initiative in 2013 and 2014, the DNR has continued its efforts to educate collectors about proper site management and recordkeeping. These have included mailing a packet of information on best management practices to all registered collectors in January 2015 and holding a collector best management practices workshop in November 2015. In 2016, the DNR plans to hold additional collector workshops around the state and launch another initiative to inspect a large number of registered collection sites.

Table 9 lists the number of inspections the DNR has conducted each program year.

## Compliance among registered collectors and recyclers

Since E-Cycle Wisconsin began, several recyclers and collectors have been removed from the program through suspension or revocation of their registrations. In all cases, the DNR gave collectors and recyclers extra time to submit paperwork (several weeks or more) and offered technical assistance to help them comply.

Table 9: DNR inspections conducted, by program year

Time period	Recyclers	Collection sites
Jan. 1 to June 30, 2010	4	5
July 1, 2010, to June 30, 2011	8	20
July 1, 2011, to June 30, 2012	8	29
July 1, 2012, to June 30, 2013	10	65
July 1, 2013, to June 30, 2014	10	116
July 1, 2014, to June 30, 2015	18	28

The most common reason for recycler removal has been failure to maintain adequate owner financial responsibility. Other reasons for removal of recyclers and collectors include failure to submit registration forms or meet reporting requirements. Many recyclers and collectors have voluntarily left the program because it no longer fit with their business plans or other activities.

During program year 6, the DNR suspended, and then revoked, the E-Cycle Wisconsin collector and recycler registrations for a company that failed to provide adequate records of downstream markets for materials derived from electronics it received under E-Cycle Wisconsin. A portion of the weight the recycler had received from registered collectors was disqualified because of the suspension and failure to provide records. The company was also issued a notice of violation and is currently in the DNR's stepped enforcement process.

During program year 7 registration process, two collectors had failed to submit complete re-registration and report forms, and the DNR suspended and then revoked their collector registrations. Two registered recyclers went out of business and failed to submit completed annual reports. One of the recyclers had worked with manufacturers before going out of business, and the DNR worked with collectors and downstream vendors to verify the weights recycled. A portion of the weight the recycler received was disqualified because there was no proof it was recycled.

## Electronics recycling separate from E-Cycle Wisconsin

Currently, collectors and recyclers that perform basic disassembly of electronics are treated as exempt from most solid and hazardous waste requirements, as long as 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.

### Inquiries from aspiring recyclers

Since before E-Cycle Wisconsin began, electronics recycling has appealed to some as a business opportunity, based on increased demand for recycling and the misinformed idea that recycling electronics is simple. DNR staff received questions from potential recyclers once or twice a month during 2015. Sometimes these questions come from the processors after they have already accumulated a stockpile of materials and they are looking for help finding an outlet to recycle or dispose of the materials. Unfortunately, that can be



Aug 7, 2015, 8:32:59 AM  
44.91002924, -88.20737737



Both photos above are from an Oconto County site where a couple was dismantling and burning electronics. The site was cleaned up by the U.S. Environmental Protection Agency in 2015 at a cost of \$120,000. Photos courtesy U.S. EPA.

come very expensive for the processor. DNR staff have no way to know who might be engaging in small-scale “backyard recycling” activities, so staff have tried to reach these people by encouraging others who may have contact with them—such as local government recycling programs, other recyclers and collectors, and salvage yard operators—to help advise these backyard scrappers about the proper way to recycle electronics.

### Illegal and irresponsible electronics processing

DNR staff responded to more than a dozen complaints involving mismanaged electronics during the last program year. Many of these complaints involve concerns about stockpiling, abandoned electronics or improper management of dismantled electronics, especially CRT glass. Electronics and their components are exempt from hazardous and solid waste rules as long as the materials are being recycled, which makes it difficult for DNR staff to take action on many of the complaints. There were several cases with clear hazardous waste violations the DNR was able to resolve, but

in many cases there isn't a clear violation. In those situations, DNR staff inform the property owners of the rules and what they need to do to remain in compliance.

Often the complaints involve individuals who have started recycling electronics to make money without understanding the financial implications of managing the entire electronic device. It is easy for them to remove metals and sell them to local scrapyards, but the remaining components are often expensive to manage properly. These individuals typically do not realize the items they are managing contain hazardous materials, such as lead and mercury. In the end, they often hurt themselves financially when they contaminate their properties and incur costs to properly dispose of the remaining materials.

Some small-scale recyclers try to piggyback on official collections to gain materials. The organizer of a



*The above photo was taken in August 2015 at a recycling facility in Michigan's Upper Peninsula. Some of the material came from Wisconsin collectors. The Michigan Department of Environmental Quality is pursuing enforcement. Photo courtesy Michigan DEQ.*

Clean Sweep event told the DNR that a small salvage/recycling business set up shop along the road on the way to the Clean Sweep event, offering to take electronics for recycling. This is a practice that other registered collection events have reported in recent years.

During 2015, several cases involved working cooperatively with other governmental agencies to get sites cleaned up; for example:

- An elderly couple in Oconto County had been breaking CRTs and taking the metals for scrap on their home property. The house became uninhabitable and the property was condemned by the county, which is how the site was discovered. The county requested DNR's assistance with property clean-up in September 2014. DNR staff collected samples and the results indicated leachable lead levels in the processed electronic piles more than 40 times the hazardous waste standard of 5 mg/L. These piles were not covered and were directly on the ground, posing a contamination risk to a drinking water well less than 100 feet away and to surrounding wetlands. Since there was a potential threat to the environment and no responsible party able to manage a cleanup of the site, the DNR requested assistance from the U.S. Environmental Protection Agency. The EPA and its contractors removed 120 tons of lead-contaminated glass and debris that was disposed of as hazardous waste. They were able to recover and recycle 8.3 tons of cathode ray tubes, 1,346 pounds of miscellaneous electronics, and 148 intact TVs and monitors. The cleanup project cost the EPA approximately \$163,000.
- While in Michigan's Upper Peninsula investigating small electronics recyclers, a representative of the Michigan Department of Environmental Quality discovered a stockpile of stripped CRTs, some of which were broken, and learned from the business owner that some of them had come from collection sites in Wisconsin. The DNR followed up with a Wisconsin collector, who admitted that he sent materials to the location, but said that he thought the facility was legitimately recycling them. The Michigan DEQ is currently exploring options for cleanup.
- The village of Weston requested DNR assistance to follow up with a business that was dismantling electronics and bringing in other waste materials for recycling and disposal. DNR staff investigated and had concerns about waste management practices, but did not find clear solid or hazardous waste violations. Therefore, staff sent a letter explaining the rules regarding proper waste management for electronics, fluorescent bulbs and refrigerants and referred the case back to the village. The village is continuing to work with the property owner to clean up the site through its zoning ordinance.

# Disposal ban awareness and compliance

## DNR public and stakeholder awareness efforts

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. This helps ensure households and schools are aware of the statewide disposal ban on electronic devices, and that collectors and recyclers are able to supply manufacturers with sufficient recyclable material to meet their recycling targets each year.

The E-Cycle Wisconsin team fulfilled its obligation to provide compliance assistance to the general public in program year 6 through several methods. The newest was a multi-platform advertising campaign. The DNR used results from its 2013 household survey to target certain ads to specific demographic groups and geographic areas least aware of the ban on electronics disposal. The campaign used radio stations, cable TV, Internet radio, YouTube, digital advertising and movie theater advertising to spread the message, “Your old electronics need to be recycled. E-Cycle Wisconsin can show you how.” Ads ran during the holiday season (when many people are looking to dispose of old electronics) and again in early spring (when many collection sites are running events). Web statistics show a strong correlation between these efforts and increased visits to the DNR’s electronics recycling Web pages.

The DNR also developed new publications and instructional videos to assist registered collectors and local units of government in complying with the electronics recycling law. In February 2015, the DNR mailed packets to all collectors and all local government recycling responsible units with information on best practices, selecting recyclers and reporting requirements. In response, the DNR received an increase in publication orders and requests for collector trainings and held a collector workshop in November 2015.

While increased traffic to the DNR website during advertising campaigns and increased orders for publications following the registered collector and responsible unit mailings provide the DNR with a sense that public and stakeholder awareness of the law is increasing, the DNR intends to measure general public awareness again in 2016. The last household survey the DNR conducted was completed in 2013. That survey showed a statistically significant decrease in public awareness of the disposal ban and the E-Cycle Wisconsin program. The DNR would like to see if the increase in advertising has had its intended effect in increased public awareness.

## Illegal dumping and disposal of electronics

The DNR continues to receive anecdotal reports of electronics dumped on rural lands, in ditches and in vacant lots. Often, these are cases of an individual dumping one or two items, most commonly TVs. There are also cases where the electronics likely came from a business. See the 2014 E-Cycle Wisconsin report for a discussion of results from 2014 surveys of landfills, transfer stations and public lands managers about electronics dumping on their properties and the 2013 E-Cycle Wisconsin report for a discussion of dumping seen by local governments. The DNR plans to follow up on these surveys in the next year.

## Program challenges

In evaluating whether changes might be needed to make the electronics recycling law function better, the DNR has gathered input through surveys of, and conversations with, program participants, other stakeholders and the public. Collectors, recyclers, manufacturers and other program stakeholders had the op-



portunity to meet and discuss the E-Cycle Wisconsin program at a May 2015 stakeholder meeting. This meeting focused on the challenges the program has been facing and helped the DNR better understand the perspectives of different stakeholders. The discussions at the meeting helped inform the discussion below, as did conversations throughout the year with program participants and other stakeholders.

Wisconsin’s law is designed to operate on free-market principles, with collectors, recyclers and manufacturers conducting private negotiations to set recycling prices. However, decreasing manufacturer targets, combined with low commodity prices and steady collection of mainly CRT devices, is distorting the market. Without changes, the program likely faces increased consumer costs for recycling, decreased recycling opportunities and greater potential for illegal disposal and dumping.

### Declining consumer access to recycling

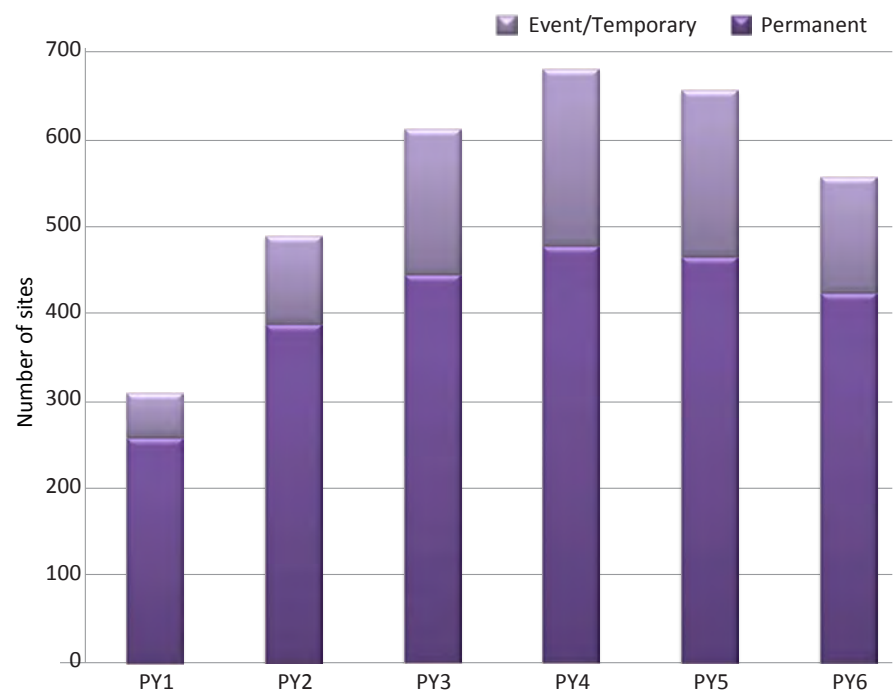
Over the past two years, economic challenges have affected Wisconsin residents’ access to electronics recycling. According to program participants, decreasing manufacturer targets, low commodity prices and increasing CRT recycling costs have been the primary reasons for recyclers dropping collection sites and increasing charges to collectors (a change from previous program years, when many recyclers paid collectors). This is leading some collectors to drop out of the program, limit or stop TV collection, or increase charges to consumers. The fact that pricing has been changing frequently has put additional pressure on some collectors, especially local governments, whose budgets are set on a calendar year basis and who can therefore have trouble accommodating higher costs that take effect mid-year.

The economic pressures have exacerbated some poor planning—including unrealistic pricing and faulty volume estimates—and mismanagement by collectors and recyclers that has also led to collection sites dropping out of the program. Some recyclers have become overextended and could not deliver on services they had promised. Others have dropped sites with high transportation or logistics costs (often rural areas). Collectors that cannot deliver full truckloads or that have significant breakage or contamination in their loads have had a harder time finding recyclers to work with at a low price.

As discussed earlier and shown in Figure 10, the number of collection sites registered with E-Cycle Wisconsin steadily increased through program year 4, but then began to decline. In program year 6, there were 560 registered sites, down 18 percent from the program year 4 high of 681 sites.

The reduction in collection opportunities has affected residents in rural areas the most. All of Wisconsin’s 72 counties except Florence have had at least one permanent collection site or col-

Figure 10: Registered collection sites over time



lection event since the program began in 2010. In many of the state's more rural areas, though, these collection opportunities have remained few and far between, and five counties had no collection opportunities during program year 6 (see map in Appendix A).

Many stakeholders have cited a lack of free or low-cost recycling options as a primary cause of illegal electronics dumping. During program year 6, about 80 percent of sites accepted at least some items for free, but again, there were fewer opportunities for free recycling in rural areas (see map in Appendix B).

Recycling opportunities—especially for older TVs—are also declining in urban areas. In the southeastern part of the state in particular, the number of locations accepting CRT TVs and other large TV models dropped off significantly during program year 6, leaving many residents with no local recycling options for large TVs under the program, even if they were willing to pay for recycling. Only 452 of the 560 sites registered in program year 6 took TVs, and many of those did not accept large CRT TVs, wood console TVs or rear projection TVs (see map in Appendix B). TV recycling opportunities were particularly lacking for residents of communities that did not collect electronics, as many local government collectors restrict electronics collection to their residents only.

### Problem materials and program economics

As discussed above, difficult economic conditions within E-Cycle Wisconsin and the broader electronics recycling industry are primary drivers behind the decline in consumer access to collection sites and free collection. Cathode ray tubes, with their hazardous leaded glass, have been the main area of concern for the last few years, but increasing attention is being given to flat-panel liquid crystal display (LCD) TVs and monitors, which include mercury lamps and are labor-intensive to recycle. Over the past year, lower commodity prices for metals and plastics in electronics have also presented a significant economic challenge.

#### *Cathode ray tubes*

CRT-containing devices (TVs and monitors) make up the majority of weight collected under E-Cycle Wisconsin (see Figure 5). They are also the most difficult and expensive devices to recycle. Based on program data and national research, the DNR estimates CRTs will continue to dominate the weight collected under E-Cycle Wisconsin for another four to five years.

Tightening CRT glass markets have been widely reported. The primary options for recycling the leaded portion of the glass have been the manufacture of new CRTs (called glass-to-glass) or smelting. However, only one glass-to-glass furnace is still operating (in India), and there are just a handful of smelting options in North America. These existing CRT end markets have raised prices and/or reduced the amount of glass they take in recent years. In 2015, the remaining glass-to-glass furnace shut down for several months for heavy maintenance, leading several recyclers to seek other outlets. Many began sending processed glass for use in tile and other ceramics in Spain and Brazil. Other recyclers have been pursuing construction of new furnaces to extract lead from the glass, though none were up and running as of November 2015.

Most recyclers have multiple outlets for their CRT glass. In 2014, nearly all registered E-Cycle Wisconsin recyclers sent at least a portion to the glass-to-glass furnace. Due to the 2015 shutdown, however, only a handful reported sending glass to this downstream market in fall 2015 (see Figure 11). More than half are pursuing the use of the glass in ceramics. Just under one-third are sending some glass to smelters, and about a third are sending glass to other downstream options, such as an Ohio firm that incorporates glass into materials used in a variety of construction applications.

The high cost of CRT recycling has also led several recyclers—including some involved in E-Cycle Wisconsin—to mismanage or abandon stockpiles of glass. The DNR spent considerable time during 2014 and 2015 following up on these cases and making sure glass that is not properly recycled is not counted for manufacturer credit under E-Cycle Wisconsin.

#### *Flat-panel displays*

While flat-panel displays make up a very small portion, by weight, of what is currently collected under E-Cycle Wisconsin, they represent another potentially problematic portion of the waste stream. Of primary concern are LCD monitors and TVs,

which were sold primarily between 2001 and 2014 and contain up to 20 thin fluorescent tubes, according to a presentation at the 2015 E-Scrap conference. The lamps, which are difficult to manually remove without breaking, contain between 1 and 10 milligrams of mercury. Most flat-panel displays also have a high number of screws, meaning manual disassembly is time-consuming (and thus expensive). Some recyclers have been exploring automated machinery for recycling the displays, but at least one company providing this service declared bankruptcy in 2015.

As of November 2015, nine of the 17 recyclers receiving flat-panel devices under E-Cycle Wisconsin reported they were manually dismantling flat-panel displays, while the rest sent them intact to downstream vendors. While many flat panels can be diverted to the reuse market and provide an income stream, flat panels that need to be recycled currently represent another negative cost on recyclers' balance sheets.

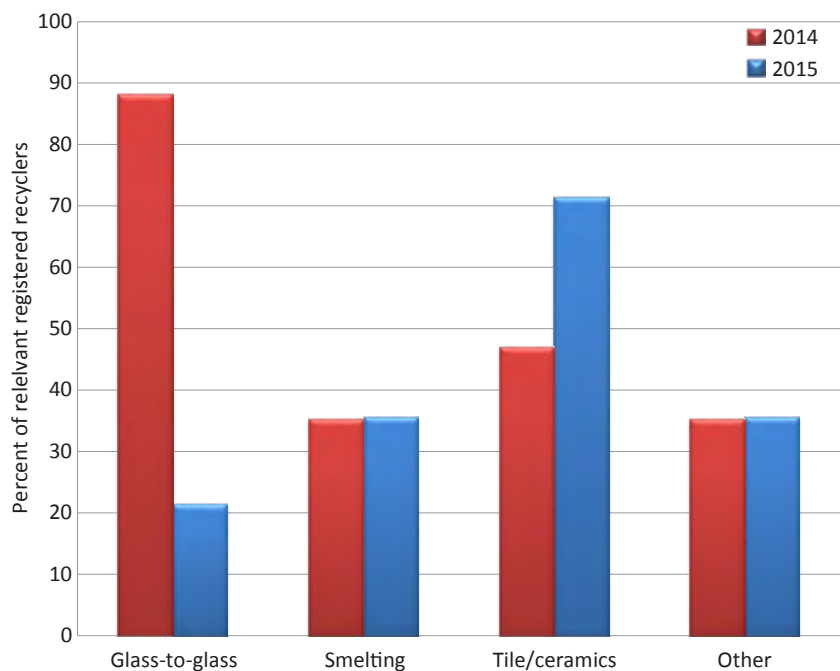
#### *Low commodity prices*

Recyclers have traditionally relied on some of the non-hazardous and more valuable materials in electronics—including steel, aluminum, precious metals and plastics—to offset the costs for more expensive materials. However, global commodity prices have declined sharply, further challenging recyclers' bottom lines. According to presentations at the September 2015 national E-Scrap conference, steel prices were at 13-year lows; gold, silver and copper prices had dropped 17, 25 and 27 percent over the past year; and aluminum prices had declined 22 percent in the past year. Commodity prices for many plastics are also down, due largely to low oil and natural gas prices.

### Declining manufacturer targets and collection gap

As mentioned above, an additional economic pressure point in the program has been that the overall collection significantly outpaced the overall manufacturer recycling target in program years 3, 4 and 5 (see Figure 6). As discussed in an earlier section, this gap was much narrower in program year 6, but evidence suggests this is due largely to recyclers and collectors cutting back on collection sites and raising fees,

**Figure 11: End-market destinations for E-Cycle Wisconsin CRT glass, September 2014 and November 2015**



rather than a steep drop in the number of electronics Wisconsin residents have available to recycle.

This problem is likely to continue because of trends in the electronics market. Consumers have been switching from larger, heavier desktop computers to laptops, tablets and smartphones, and manufacturers have found ways to make products such as TVs and laptops lighter. For example, one large TV manufacturer reported the average weight of its TVs has declined by about 5 pounds in recent years—which has a big impact over hundreds of thousands of units sold. Overall sales of some electronics have also declined in recent years, according to the Consumer Electronics Association.

As a result of these downward trends in new device weights, the overall manufacturer target for program year 7 is 22.8 million pounds, down 14 percent from the program year 6 target of 26.7 million pounds and 29 percent from the peak target of nearly 32 million pounds for program year 4. The DNR expects the weight of electronics collected for recycling to exceed manufacturer targets under the current formula for at least the next few years, due mainly to the persistence of CRT TVs in the recycling stream.

## Recommendations per s. 287.17(10), Wis. Stats.

Based on the first six years of implementation and continued positive feedback from stakeholders, most of the fundamental elements of Wisconsin’s electronics recycling law are sound. The changing nature of electronics and changes in the electronics recycling industry, however, are producing the challenges discussed above and risk reduced access to electronics recycling. These suggestions are based on extensive conversations with stakeholders over the last several years, including a May 2015 stakeholder meeting attended by representatives from all major stakeholder groups.

### Consider updating the manufacturer target formula

As discussed above, the overall manufacturer recycling target has declined significantly, from a high of 32 million pounds in program year 4 to an estimated 22.8 million pounds in program year 7. To better balance the weight of electronics that need to be recycled with manufacturer target weights, the manufacturer target formula could be adjusted to be based on weight received for recycling under the program during previous years.

### Consider changing the method for encouraging rural collection

The current rural incentive allows manufacturers to count 1.25 pounds for every pound collected in a county designated as rural under the law. Since the overall weight collected has consistently exceeded manufacturer targets, however, this incentive appears to have done little to encourage collection in rural areas.

One way to ensure residents in rural Wisconsin have access to electronics recycling opportunities could be to replace the current rural incentive with an alternative method to ensure that, regardless of the overall manufacturer target, manufacturers and recyclers would provide attention to rural areas. For a map of urban and rural counties under s. 287.17(1), Wis. Stats., see Appendix D.

### Consider changing program year dates

The current program year runs from July 1 through June 30. In many cases, contracts and pricing agreements among collectors, recyclers and manufacturers change at the beginning of a new program year. Since many of them—especially local governments and manufacturers—budget on a calendar year basis,

this makes it hard for them to anticipate and manage pricing changes that happen in the middle of the calendar year.

To better match the budget cycles of program participants, the annual program year could be changed so it corresponds to a calendar year (Jan. 1 to Dec. 31), rather than the state fiscal year. This would require switching the annual report/re-registration deadline for collectors and recyclers to Feb. 1 and for manufacturers to March 1, switching the recycler mid-year report deadline to Aug. 1, and changing the due date of this report to June 1. One way to accomplish the transition would be to have program year 8 run from July 1, 2016, through Dec. 31, 2017, with manufacturer targets adjusted accordingly.

### Consider reducing manufacturer registration fees

The graduated fee system (\$0 if fewer than 25 covered devices sold in Wisconsin; \$1,250 if 25 to 249 devices sold; and \$5,000 if 250 or more devices sold) has generally worked well. Some small manufacturers, however, have commented on difficulty paying these registration fees across many states. If the threshold for not paying a registration fee and the reduced fee level were raised, it could encourage compliance among smaller manufacturers and make the per-unit costs more equitable.

To help make the fees more equitable, registration fee levels in s. 287.17(4)(b) could be changed to the following:

- \$5,000 if the manufacturer sold 500 or more covered electronic devices in this state during the last program year.
- \$1,250 if the manufacturer sold 250 to 499 covered electronic devices.
- \$0 if the manufacturer sold fewer than 250 covered electronic devices.

### Consider updating device definitions

As technology changes, it is sometimes difficult for the DNR to determine whether devices are covered by the definitions in s. 287.17(1). Examples of these “gray area” products include smartphones, digital picture frames, photo printers, portable DVD players and video game consoles. The following adjustments could help make these definitions easier to consistently apply:

- 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, such as smartphones, are included, and add video game consoles to the list of covered electronics.
- Update the definition of consumer printer to explicitly include new types, such as small photo printers.
- Broaden the definition of video display device so that it includes items, such as portable DVD players, that are very similar to TVs and monitors but not currently included.

In addition, to make the collection and recycling process easier for consumers and recyclers, the DNR suggests broadening the definition of “peripheral” in s. 287.17(1) 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.

### Consider adding covered schools

Currently, E-Cycle Wisconsin includes only K-12 public schools and private schools participating in the Parental School Choice Program. Making all K-12 schools eligible under E-Cycle Wisconsin would be a more consistent approach, make outreach simpler and provide recyclers with another source of potentially higher-value material (more IT equipment than in the residential mix, which could help lower overall recycling costs). To accomplish this, the definition of “school” under s. 287.17(1)(np) could be modified

**Table 10: Proposed recycler reporting categories**

Devices received	Materials sent downstream
CRT TVs	CRT glass
Non-CRT TVs	Glass not from CRTs
CRT monitors	Metals
Non-CRT monitors	Plastics
Consumer computers	Other materials
Consumer printers	
Other EEDs	

to allow all K-12 schools in Wisconsin to recycle electronics through E-Cycle Wisconsin.

### Consider increasing recycler reporting requirements

At the 2015 E-Cycle Wisconsin stakeholder meeting, a major

topic of discussion was ensuring that registered recyclers are managing electronics—especially problem materials—properly, and thus maintain a level playing field for program participants. The current statute provides the DNR with many tools to accomplish this, but requiring additional detail on the annual reports recyclers submit to the DNR could help. A modest addition could be requiring recyclers to provide additional detail on the breakdown of devices they receive and the materials derived from the electronics, which is information that all responsible recyclers already track closely. Table 10 lists the proposed reporting categories.



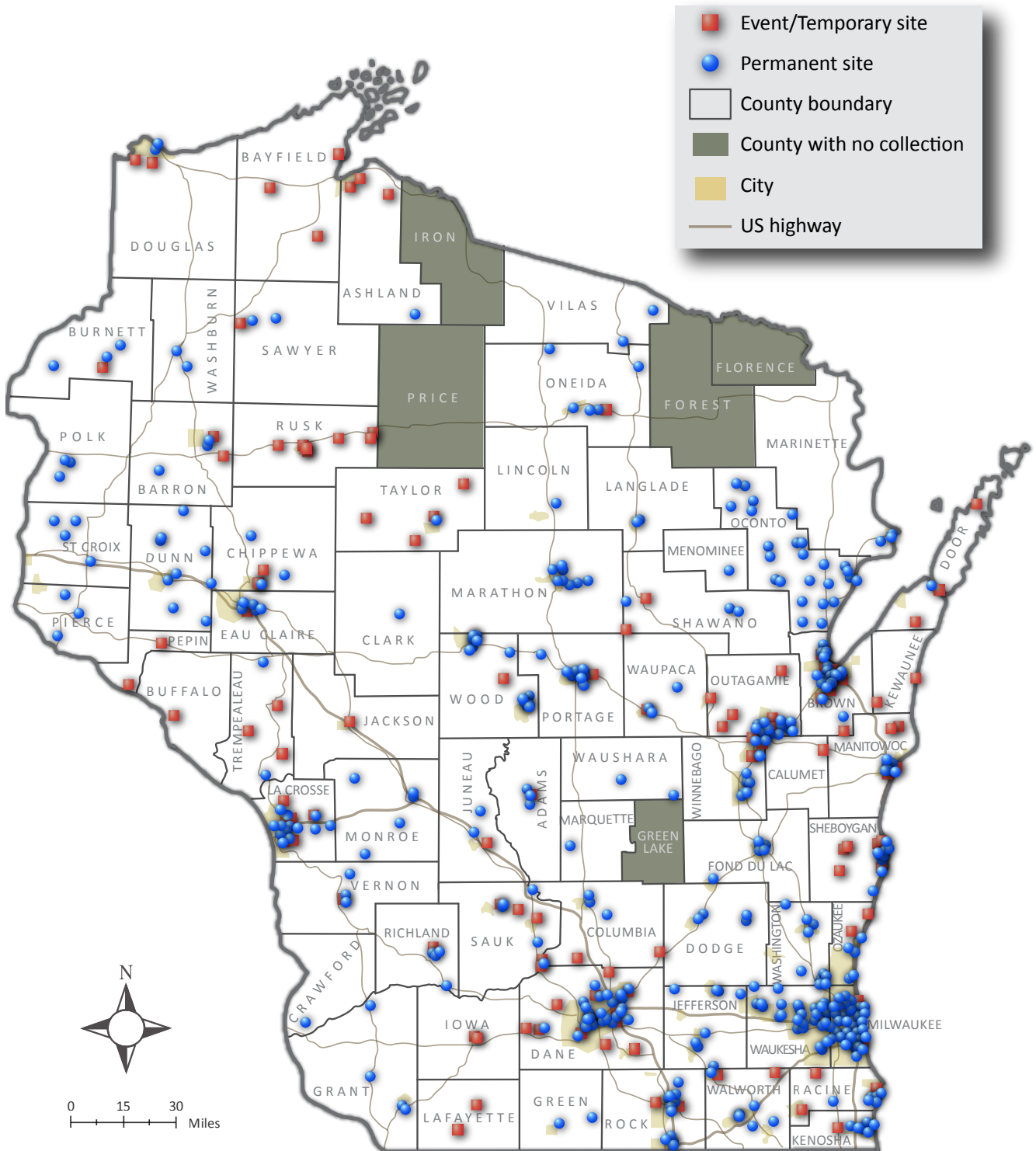
PUB-WA 1802 2015

Wisconsin Department of Natural Resources  
Bureau of Waste and Materials Management

P.O. Box 7921, Madison, WI 53707 | (608) 266-2111 | [DNRWae-cycling@wisconsin.gov](mailto:DNRWae-cycling@wisconsin.gov)

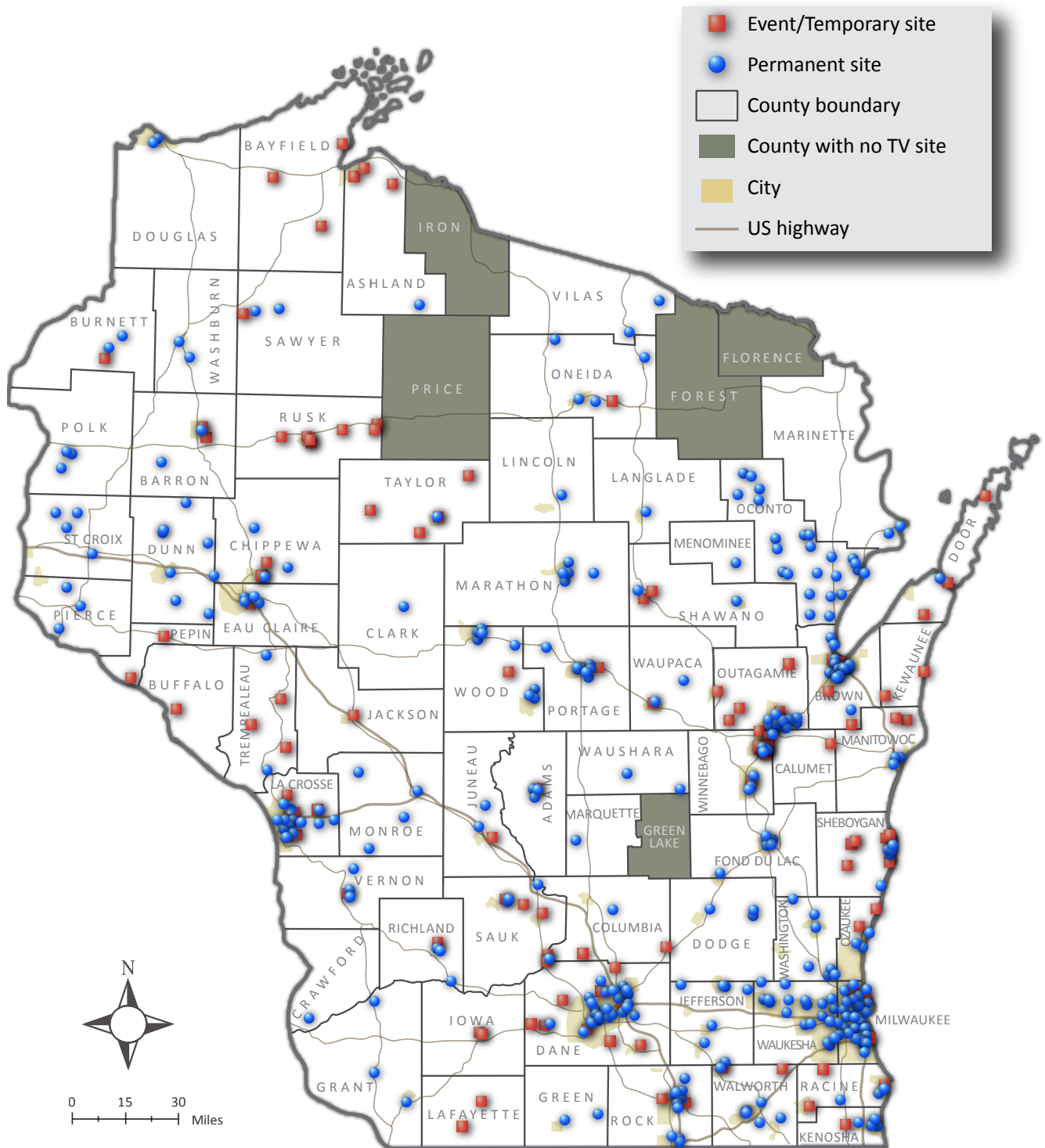
The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services and functions, under an Affirmative Action Plan. If you have any questions, please write to Equal Opportunity Office, Department of Interior, Washington, D.C. 20240. This publication is available in alternative format (large print, Braille, audiotope etc.) upon request. Please call (608) 266-2111 for more information.

# Appendix A: Map of collection sites registered under E-Cycle Wisconsin during program year 6



November 9, 2015

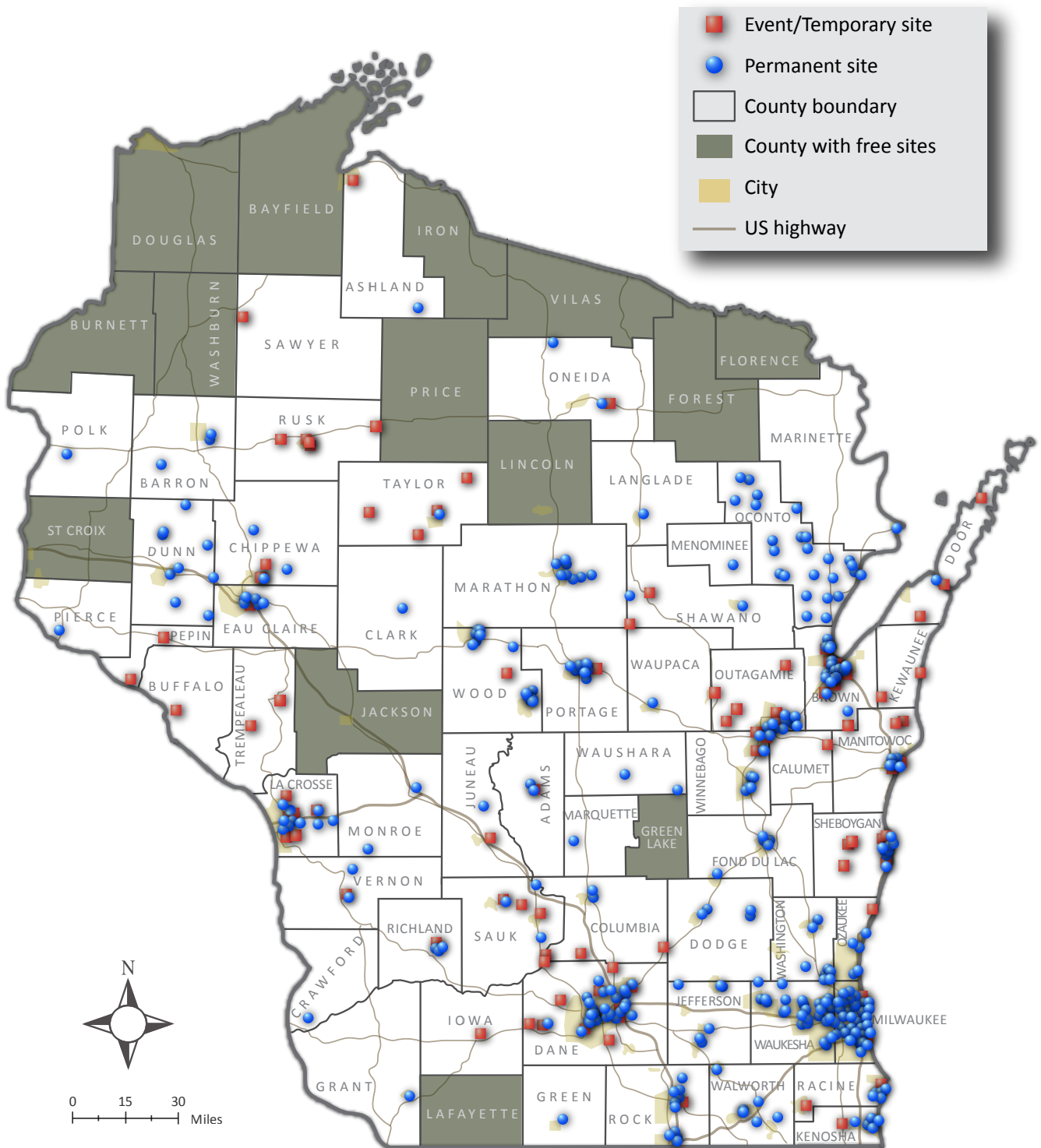
# Appendix B: Map of registered E-cycle Wisconsin collection sites accepting TVs during program year 6



November 9, 2015



# Appendix C: Map of registered E-Cycle Wisconsin collection sites accepting some items for free during program year 6



November 9, 2015

