E-Cycle Wisconsin 2016 report

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

December 2016 (revised May 2017)

Executive summary

Wisconsin's electronics recycling law has achieved many successes since it took effect in 2010, most notably recycling nearly 225 million pounds of electronics and expanding electronics recycling access for Wisconsin residents. Wisconsin has been a leader among state electronics recycling programs for the number of available collection sites and weight of electronics collected per person, and many stakeholders have praised the structure and administration of the program by the Department of Natural Resources (DNR).

Since 2010, however, both the nature of electronics being sold and the markets for materials electronics contain have changed dramatically. Due to the popularity of smaller and lighter devices and manufacturers' design improvements to reduce product weight, the weight-based manufacturer recycling targets, which are set by a statutory formula, have declined by more than 10 million pounds (32 percent) over the last four 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 2013, the number of registered electronics collection sites has dropped by 25 percent, and collectors are passing higher recycling costs on to consumers, meaning there are fewer convenient and low-cost recycling options throughout the state. The DNR has seen several cases in the last two years of irresponsible recycling. These cases threaten the environment and are driven in part by the higher costs for responsible recycling. These trends are increasing the costs shouldered by taxpayers to either collect electronics or clean up dumped devices.

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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 sound, and there are many successes to celebrate. However, changes will be needed to maintain Wisconsin residents' access to affordable electronics recycling—particularly in rural areas.

Successes for program year 7 (July 2015 to June 2016)

- Registered collectors took in 32.4 million pounds of electronics, or 5.6 pounds per Wisconsin resident. In total, between January 2010 and June 2016, Wisconsin households and schools recycled nearly 225 million pounds of electronics through E-Cycle Wisconsin.
- More than 99 percent of the 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 percent of the weight processed.
- While the number of registered collection sites has declined, residents in 63 of Wisconsin's 72 counties, representing 98 percent of the state's population, had access to at least one registered electronics collection site or event.
- 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. Seventy-three manufacturers registered with E-Cycle Wisconsin for the first time, thanks in part to compliance efforts by electronics retailers. The DNR increased 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.

Introduction

Wisconsin's electronics recycling law, 2009 Wisconsin Act 50, 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 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.

Wisconsin's electronics recycling law has produced many successes. Over the last few program years, however, changing market conditions and other challenges have made it difficult for E-Cycle Wisconsin and the disposal ban to fulfil the first four of the above criteria. The biggest obstacles to meeting these goals have been declining manufacturer recycling target weights—driven by a steady reduction in pounds per unit sold—and increasingly tight and expensive markets for recycling cathode ray tube (CRT) 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

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

Program year 8
July 1, 2016, to June 30, 2017

Table 1: Program year 7 registration and participation

Category	Registered	Active
Collectors	147	127 (86%)
Recyclers	20	14 (70%)
Manufacturers	190	n/a
Brands	279	n/a

"Active" means a collector that sent electronics to a registered recycler or a recycler that received electronics from registered collectors.

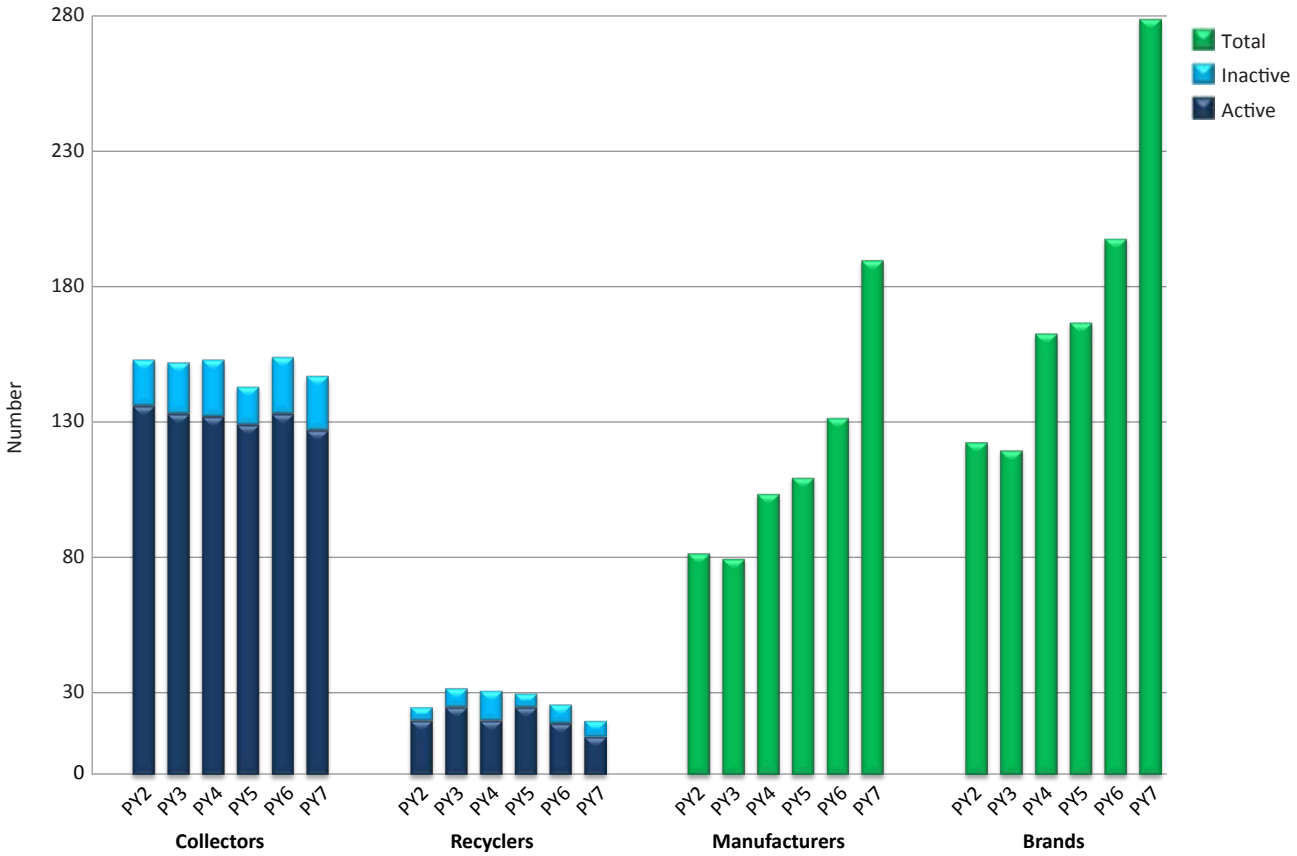
revenue recyclers receive (from materials like steel, copper and precious metals) that traditionally offset some of the costs for managing hazardous or low-value materials.

The fundamental structure of the law remains sound. However, the challenges have increased over the past several years and require attention to ensure continued widespread public access to affordable electronics recycling. Stakeholders are continuously providing input and want to work toward a solution. Further discussion of these issues and policy recommendations are included at the end of this report.

Program participation

E-Cycle Wisconsin collector registrations were down slightly in program year 7 from program year 6, but similar to the number in program year 5. Registered collectors include local governments, electronics retailers, other for-profit businesses and non-profits. The mix of collectors has remained relatively steady over the past few program years.

Figure 1: Summary of E-Cycle Wisconsin registration and participation



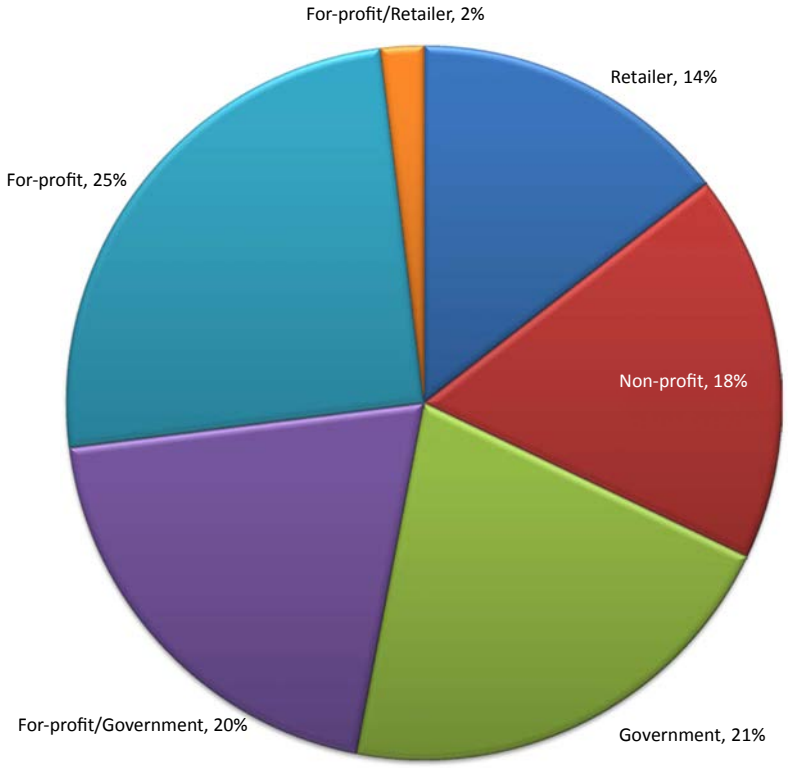
PY = program year.

Program year 7 recycler registrations were down slightly, continuing a trend. The number of registered recyclers has dropped nearly 40 percent from the high of 32 in program year 3, due to several companies going out of business or choosing to end their recycler registrations because of economic challenges.

The number of registered manufacturers and brands increased sharply in program year 7 due to DNR compliance and enforcement efforts, continuing a trend from program year 6.

Table 1 shows program year 7 registrations, and Figure 1 illustrates registration trends over the first six program years.

Figure 2: Program year 7 collection sites, by type



For-profit collectors registered the highest number of registered collection sites (240, or just under half of the 512 total), though many of these were at retail or government locations, as shown in Figure 2. The percentage of sites hosted by local governments (either alone or in partnership with a business) has jumped from 30 percent in program years 4 and 5 to 41 percent in program year 7.

Collection and recycling totals

Wisconsin households and schools have participated enthusiastically in E-Cycle Wisconsin, recycling nearly 225 million pounds of electronics since 2010. From July 2015 through June 2016 (program year 7), registered collectors took in 32.4 million pounds of electronics from Wisconsin households and schools (see Table 2). This was equivalent to 5.6 pounds per capita.

As shown in Figure 3, collection of eligible electronics during program year 7 was up about 6 percent from program year 6, following a steep drop between program years 5 and 6. The collection total in program year 6 was likely artificially low due to compliance and reporting problems with some recyclers and collectors, but the overall trend has been a steady decrease in the weight collected under E-Cycle Wisconsin over the last few years. The program year 7 collection total

Table 2: Eligible electronics collected by registered collectors, program year 7

Type	Pounds
Urban	28,299,749
Rural	2,746,315
Not sent to registered recyclers	1,360,691
Total collected	**32,406,755**

Table 3: Pounds collected, by collector type

Type	PY6	PY7
Retailer	6,546,680	8,835,454
Non-profit	5,976,652	3,639,192
Gov't	8,854,169	9,291,810
For-profit	9,232,840	10,640,299
Total	**30,610,341**	**32,406,755**

PY = program year

Figure 3: Pounds collected by registered collectors

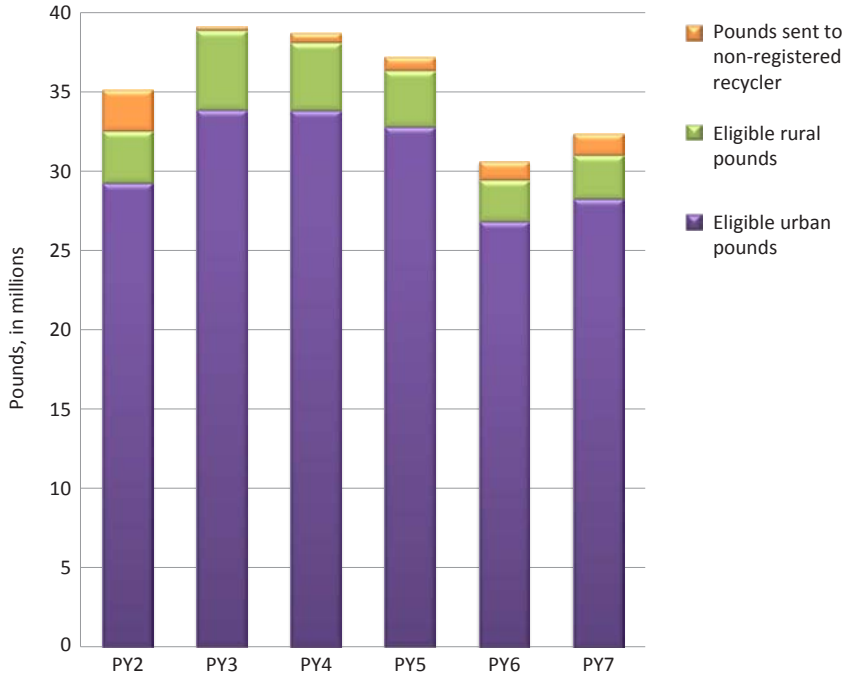
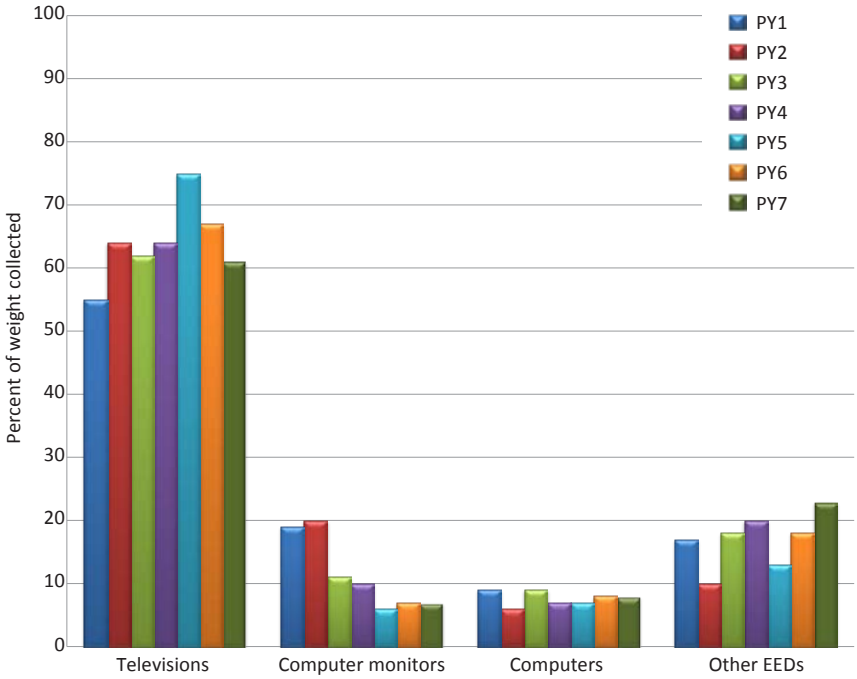


Figure 4: E-Cycle Wisconsin collection, by product type



was down about 17 percent from the peak of 39.1 million pounds in program year 3 (2011-2012).

As shown in Table 3, collection totals increased from program year 6 to 7 among electronics retailers, primarily due to more weight taken in by Best Buy, and also increased among for-profit and government collectors. The collection total decreased among non-profit collectors from program year 6 to 7, primarily due to the decision by many Goodwill locations to stop accepting TVs. (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.)

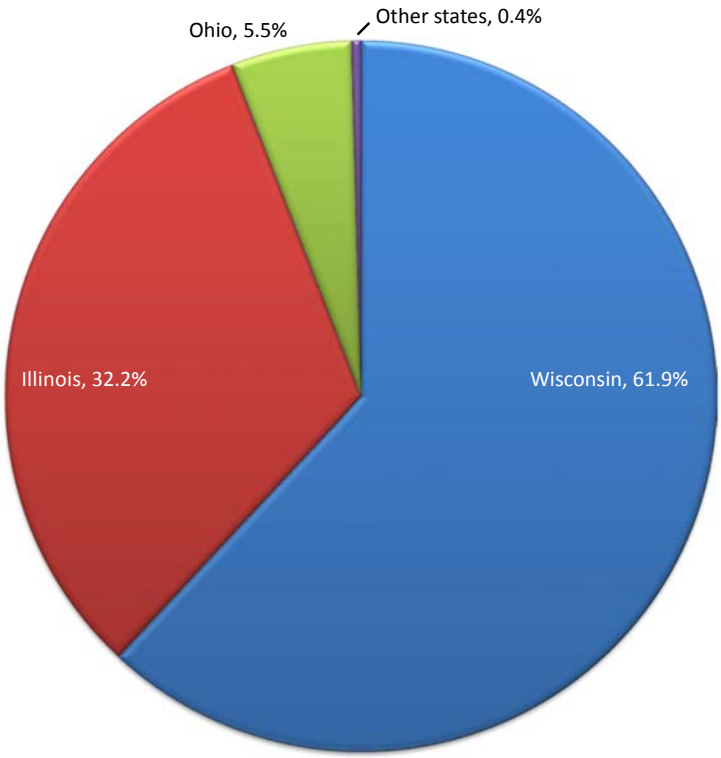
The overall trend seems to be toward more reliance on government collection programs, with the local government share of weight collection increasing from 18 percent in program years 2 and 3 to 29 percent in program years 6 and 7. Collection by electronics retailers has increased slightly over the same period, thanks primarily to Best Buy's collection program. In contrast, the share received by for-profit collectors fell from 45 percent to 33 percent during that period, and non-profit collection dropped off sharply in program year 7, as mentioned above.

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, though TVs have continued to dominate the weight collected,

accounting for 61 percent of the total in program year 7 (see Figure 4). Registered recyclers report that nearly all of the TVs received, by weight, are still CRTs, but some have said they have started to notice a change, with more flat-panel displays coming in and a slight decline in CRTs.

Nearly all electronics collected under E-Cycle Wisconsin in program year 7 were processed in the upper Midwest, as shown in Figure 5. Wisconsin recyclers processed the largest share (62 percent). The share of weight processed in Wisconsin has increased over the last few program years, thanks to the presence of several large recyclers and the closure of some out-of-state recycling facilities, most notably in Minnesota.

Figure 5: Percent of program year 7 pounds received by registered recyclers, by state



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 31.7 million eligible pounds available for purchase by manufacturers in program year 7, and sold just under 26.7 million pounds. There was once again a significant gap (nearly 5 million pounds) between what recyclers received and what manufacturers purchased, after a very small gap (less than 1 million pounds) in program year 6, due in part to compliance problems with some recyclers, which were noted previously. A handful of manufacturers that significantly exceeded their target weights also helped keep this gap narrower than it might otherwise have been.

Table 4: Program year 7 collection, by product type

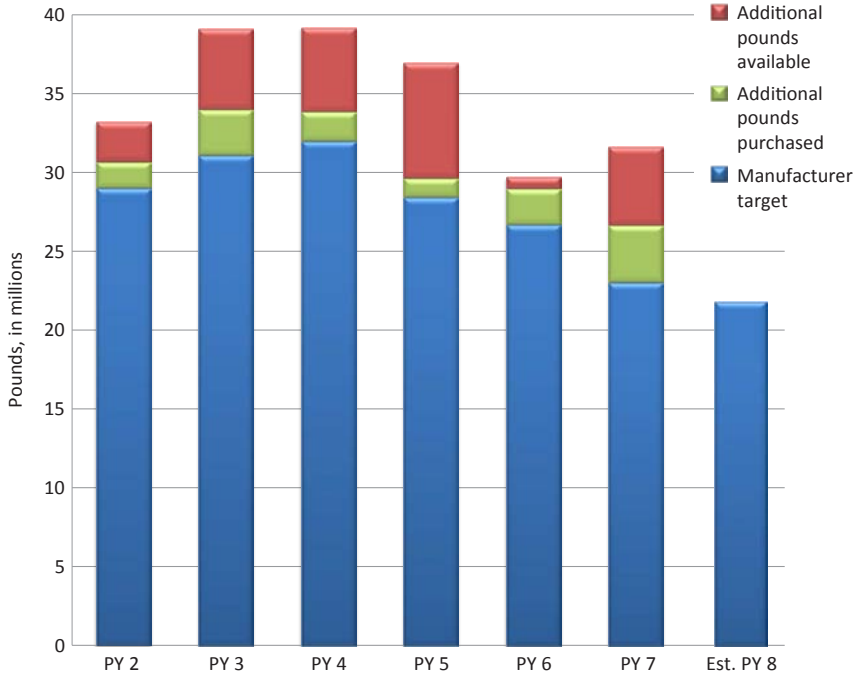
Product type	% of total weight
TVs	61%
Monitors	7%
Computers	9%
Other EEDs	23%

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

The overall manufacturer target for program year 7 was down about 3.6 million pounds from program year 6, due primarily to consumers buying smaller and lighter products, and manufacturers finding ways to reduce the weight of larger devices, such as TVs. The estimated manufacturer target for program year 8 is 21.9 million pounds, down nearly one-third from the peak target of 32 million pounds in program year 4.

Figure 6 shows the manufacturer recycling targets and weight purchased by manufacturers, by program year.

Figure 6: Comparison of weight collected and manufacturer targets, by program year



Ensuring a level playing 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 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, an effective use of modern technology to efficiently address compliance, and careful accounting of collection and recycling transactions among program participants.

During 2016, the DNR continued its efforts to gain 100 percent compliance from electronics retailers and manufacturers, relying on both compliance assistance and enforcement. The E-Cycle Wisconsin team added a half-time temporary employee to assist with more collection site inspections and inspections of brick-and-mortar retailers.

Table 5: Eligible pounds received and recycled, program year 7

Type	Pounds
Urban received	28,389,593
Rural received	2,667,750
Rural credit	666,937
Non-eligible glass	(74,845)
Available for manufacturers	31,649,435
Sold to manufacturers	26,664,250

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

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.

Compliance among registered manufacturers

Manufacturers of all major 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 7, 35 registered manufacturers 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 (20

manufacturers), with a smaller number of manufacturers participating in Reverse Logistics Group America (10), 3R Network (3) and WM Recycle America (2). These collectives were responsible for about 44 percent of pounds purchased by manufacturers during program year 7.

Most manufacturers continued to meet or exceed their sales weight-based recycling targets in program year 7. Thirteen manufacturers recycled more than their targets and earned one pound or more in credits that can be used during the next three program years. In total, manufacturers earned 330,000 credits, a much lower total than in previous years (see Table 6). Twelve manufacturers used just over 1 million credits earned in a previous year, or purchased from another manufacturer, to meet their targets. At the end of program year 7, just under 3 million pounds of credits were available to manufacturers for future use.

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 7, 39 manufacturers paid or owed a shortfall fee as of November 2016. The amounts ranged from $0.23 to $2,965.50.

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

Manufacturer registration compliance efforts

The DNR made great strides from 2014 through 2016 in bringing more of the smaller manufacturers into compliance. The DNR used a combination of techniques, including increased coordination with other states, increased interaction with retailers, a 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. During program year 7, 73 manufacturers registered with E-Cycle Wisconsin for the first time.

Leveling the manufacturer playing field through compliance efforts and information outreach remains a priority for the DNR. During 2016, the DNR sent five notices of noncompliance to manufacturers to facilitate compliance. Four of the manufacturers subsequently came back into compliance, and the DNR determined the fifth had gone out of business. The DNR also contacted manufacturers of new brands found during searches of online retailers, resulting in several registrations. A particular focus during 2016 was 3-D printers, with many brands coming into compliance.

As of October 2016, 253 brands were registered and 100 brands were on the DNR's "Do Not Sell" list because they were unregistered. New brands continuously show up or brands are discontinued, so the num-

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 7 manufacturer credit transactions

	Credits
Beginning balance	3,866,292
Credits applied	(1,045,587)
Credits expired	(154,892)
New credits earned	329,790
Total available for future use	**2,995,603**

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	$12,379
7	$408,750	$6,420

Shortfall fees for program year 7 as of November 2016. The law did not assess shortfall fees for program year 1.

ber of unregistered brands fluctuates over time.

Retailer compliance

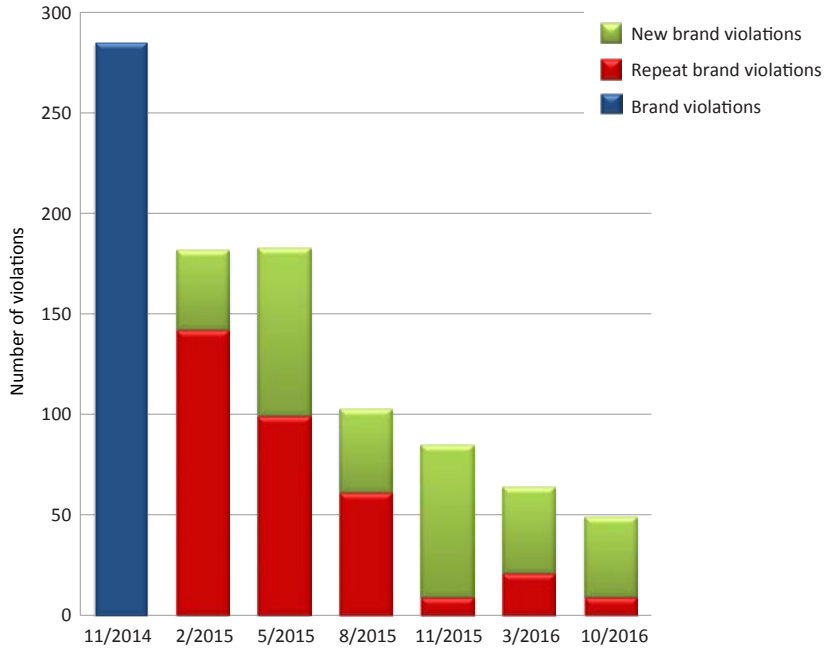
To inform and complement manufacturer compliance efforts, the DNR conducts "brand checks" of online electronics retailers to determine how many unregistered brands are available to Wisconsin consumers and who is selling them. DNR staff have reviewed more than 20 online retail websites for covered electronics. Several websites included in the retailer checks now have pages that educate customers on how to properly dispose of electronics.

To determine which unregistered brands are top priorities for follow-up, several criteria are reviewed including how many online retailers sell the product, number of repeat violations, how many items are available, and the length of time the item has been on the market. The method of follow-up with the retailer can range from thanking them for taking the proper action, notification and additional time for compliance, or the initiation or continuation of the stepped enforcement process.

Between November 2015 and October 2016, the DNR completed three rounds of retailer checks. Figure 7 illustrates the steady decline in unregistered brands sold online as a result of the DNR's compliance initiative. Engaging retailers in the effort to get manufacturers in compliance has been very effective. Several manufacturers have initiated the registration process after a retailer informed them of the need to register.

In July 2016, the DNR did a mass mailing to several major electronic retailers in the state. This method of outreach was first done in 2013 with success. The purpose was to remind retailers that the electronics recycling law states they must sell only registered brands, inform their customers that electronics may not be disposed of in the trash and educate their customers of where to recycle old electronics. For this mailing, the DNR's retailer toolkit along with a flash drive containing training materials and printable handouts were sent to physical stores along with a letter summarizing the purpose of the package.

Figure 7: Electronics retailer unregistered brand violations, 2014-2016



Additionally, the DNR has increased its number of inspections in stores across Wisconsin, conducting 16 inspections from April to October 2016. The inspections include checking for unregistered brands of covered electronics and found only four unregistered brands, two of which are now registered. The inspections also check whether stores educate customers about electronics recycling. Only four of the 16 stores had educational materials displayed and employees did not seem to receive training on electronics recycling unless it was on the recycling program run by the store. The DNR will continue its work

with retailers in 2017 to ensure compliance with the law's education requirements.

Table 8: 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
July 1, 2015, to June 30, 2016	7	37

Inspections of registered recyclers and collectors

All electronics recyclers in Wisconsin must comply with state solid and hazardous waste regulations, but registered E-Cycle Wisconsin recyclers are held to higher standards and must meet several additional requirements. These requirements apply to all registered recyclers whether they are located in-state or not. They must carry adequate owner financial responsibility (OFR) for facility closure and at least $1 million in pollution liability insurance. They are required to report to the DNR twice a year and provide information on amounts of materials recycled, the sources of those materials and their downstream vendors. They are also subject to regular inspections.

To ensure registered recyclers are in compliance with these requirements, DNR staff conduct regular inspections and examine documents that the law requires recyclers to provide to the DNR. There are six in-state recyclers, and E-Cycle Wisconsin staff inspect them about once a year. Staff also inspect registered recyclers located in neighboring states, averaging about one out-of-state inspection per year. (Currently, Illinois is the only neighboring state with registered recyclers.) On-site inspections are important to fully understand how a recycler is operating, but due to travel considerations, it is difficult to visit out-of-state facilities on a regular basis, especially those located a significant distance from Wisconsin.

Since the DNR has limited ability to conduct on-site inspections for out-of-state recyclers, reports are the primary tool used to ensure compliance. Staff have also developed procedures for desktop audits, which include working with recyclers to verify the weight of materials brought in for recycling matches the weight of materials sent to downstream vendors. This information provides greater assurance that materials are not being stockpiled and facilities are being managed in an environmentally sound manner. DNR staff also work with counterparts at other state agencies to verify the environmental compliance of recyclers in their states.

During 2016, DNR staff continued to track electronics and components by working with collectors and recyclers to verify weights of materials received by recyclers. Staff also reviewed documentation and contacted downstream recyclers to verify weights of materials received and pounds eligible for manufacturer credit. Recyclers continue to have challenges finding adequate and cost-effective markets for video display devices, especially those with CRTs. Therefore, DNR staff continue to have a primary focus on tracking those devices and their components to downstream markets. Using the DNR's 2014 guidance, pounds are disqualified for manufacturer credit if they do not go to acceptable downstream recycling markets for CRT glass.

Collectors registered with E-Cycle Wisconsin must meet minimum standards, including recordkeeping and reporting, and are subject to DNR inspections. Typically, there is high turnover for collection site operators, so DNR staff maintain frequent contact to ensure they understand how to best manage their programs and the electronics that come through their doors. In program year 7, the DNR held two collector best management practices workshops, in Oshkosh and Eau Claire that reached approximately 70 electronics collectors. In their evaluations, participants said they found the workshops to be valuable learning opportunities. Therefore, the DNR plans to continue holding collector workshops around the state.

Due to the large number of registered collection sites, it is difficult to inspect them all on a regular basis. In 2016, DNR hired an additional half-time staff person to assist with collection site inspections. Inspections are an excellent way to help inform the site operators of proper site management techniques as well as to provide an opportunity to discuss the program with stakeholders.

Table 8 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 (several weeks or more) to submit paperwork and offered assistance to help them comply.

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 7, the DNR suspended one collector for failure to provide documentation for downstream vendors, but the collector quickly came back into compliance by providing the requested documents. The DNR suspended another collector at the beginning of program year 8 for issues with how it was managing material, which are now being addressed through the hazardous waste program.

The DNR issued one recycler a notice of noncompliance during program year 7 for failure to provide downstream vendor records and documentation regarding owner financial responsibility. Staff received the necessary records, but are continuing to work with the recycler to increase the company's owner financial responsibility.

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 a handful of questions from potential recyclers during 2016. In general, though, DNR staff have no systematic 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 backyard scrappers about the proper way to recycle electronics before problems arise.

Illegal disposal and irresponsible electronics processing

DNR staff continue to receive complaints regarding the mismanagement of electronics. Complaints typically come from citizens concerned about trash, including some electronics, piling up or being burned on

neighboring properties, or from property owners who discovered abandoned electronics after a tenant left. Oftentimes, landlords will contact DNR staff to request assistance to properly manage the materials. Those cases typically involve individuals attempting to recycle electronics to make money without understanding or considering the financial implications of managing the entire device. Typically they will remove the metals that they can easily sell to salvage yards and abandon the components that are more difficult or expensive to recycle, such as CRTs.

The photos above are from a property whose occupants were accepting TVs and other electronics for free, including from a county collection site and an appliance store, and dismantling them.

The problem of collectors, especially local governments, turning to cheap but irresponsible recyclers because of high costs for responsible recycling is one of the DNR's main concerns as the economics of E-Cycle Wisconsin have changed in recent years. A registered collector notified the DNR in late 2015 that one of its sites, a county landfill, had switched to using local residents who were accepting TVs for free. Upon investigating, the DNR learned that the individuals had been dismantling electronics at their residence, illegally disposing of some CRT glass at another county landfill, and leaving a large number of CRTs behind. The residents doing the recycling were later evicted from the property, and the DNR is exploring options for the costly cleanup.

Other cases in 2016 included:

- DNR staff were notified of a barn full of electronics in Manitowoc County. The cleaning company hired by the out-of-state property owner was looking for help finding a location to take the electronics.
- DNR staff learned of several storage lockers in Rock County that were abandoned with electronics. The case is currently under investigation.
- Multiple DNR staff received complaints about an individual burning waste, including electronics, on a property in Washington County. DNR hazardous waste staff and wardens visited the site, and issued follow-up letters to the owner. The case was still active at the end of 2016.
- New owners of a scrap yard in Ashland County contacted the DNR's Remediation and Redevelopment Program with questions about cleaning up a large amount of abandoned material, including electronics.

- E-Cycle Wisconsin staff continued to hear from many DNR public lands managers about electronics, especially TVs, dumped on state properties.
- DNR staff continued to assist the Michigan Department of Environmental Quality with a large CRT dumping/abandonment case in the Upper Peninsula that involved material from Wisconsin.

Disposal ban awareness and compliance

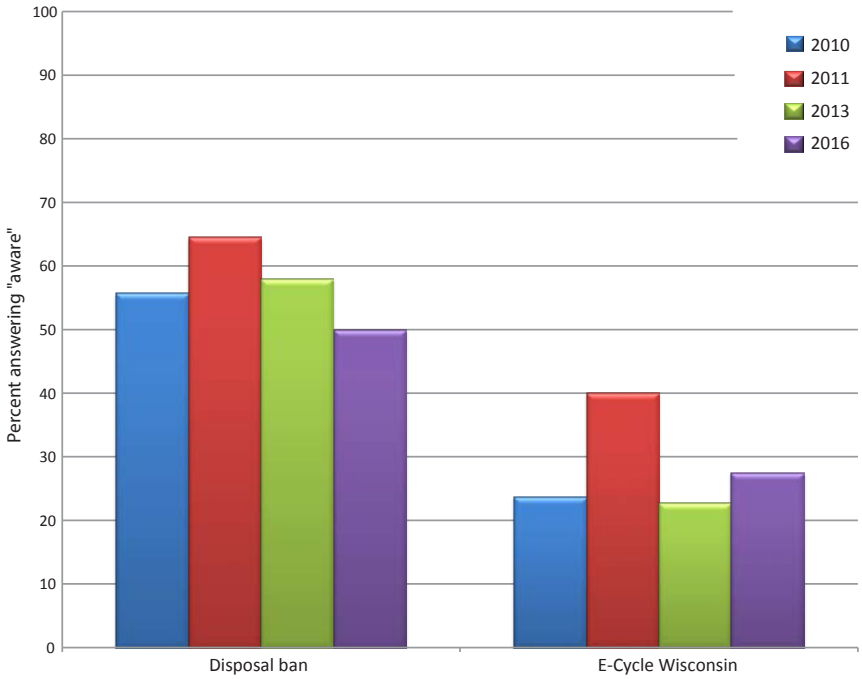
As mentioned above, the DNR continues to receive reports of electronics being dumped on public lands, in ditches and in vacant lots, along with reports of electronics put in the trash. Often, these are cases of an individual dumping one or two items, most commonly TVs. There are also cases where the electronics likely came from a business. The 2014 E-Cycle Wisconsin report discusses the 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 discusses dumping seen by local governments.

DNR public awareness efforts and awareness trends

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 7 through several methods, including a very successful holiday 2015 advertising campaign and exhibits at events. The holiday ad campaign included advertising on internet and traditional radio, along with digital advertising. As part of the campaign, the DNR updated its list of registered electronics collection sites to make it more user-friendly and mobile-friendly. Traffic to the DNR website increased substantially during the campaign, with more than twice the baseline traffic during the peak of the campaign. Overall in 2015, the DNR's electronics recycling webpages received more than 100,000 visits, up more than 30 percent from 2014.

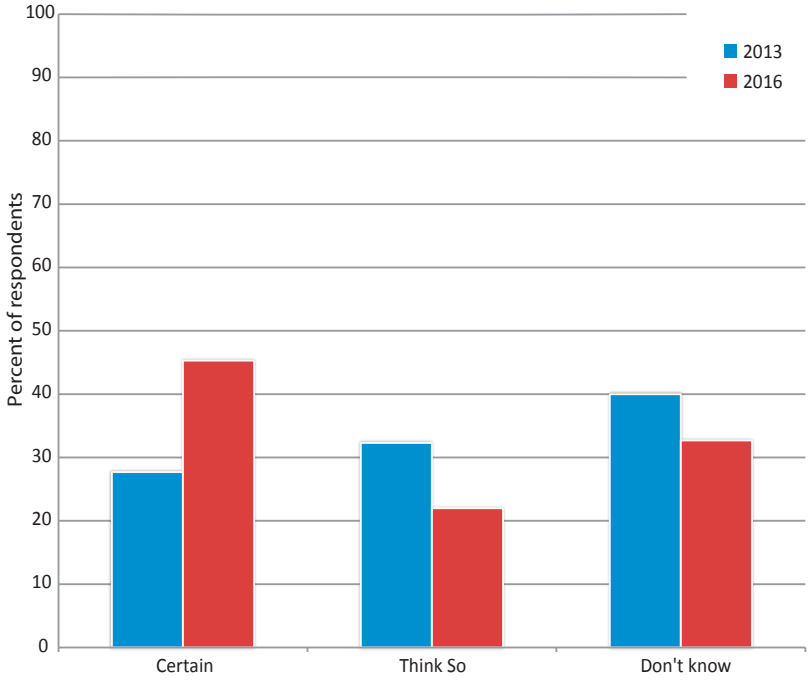
Figure 8: Wisconsin household awareness of electronics disposal ban and E-Cycle Wisconsin, over time



In 2016, the DNR conducted its fifth statewide household recycling survey with questions about electronics recycling. (Previous surveys were in 2006, 2010, 2011 and 2013.) One of

the primary reasons for the survey was to measure changes in residents' awareness of the electronics recycling law and knowledge of where to recycle electronics.

Figure 9: Wisconsin household awareness of where to take electronics for recycling, 2013 and 2016



After rising in 2011, following the implementation of the electronics recycling law, awareness of the electronics disposal ban has continued to fall. Awareness of E-Cycle Wisconsin, however, rebounded in 2016 to its highest level except in 2011 (see Figure 8). Residents' knowledge of where to recycle electronics also rose between 2013 and 2016 (see Figure 9). In 2016, 45 percent of respondents said they were "certain" of where to take electronics for recycling compared with only 28 percent in 2013. The portion of respondents who "don't know" where to take electronics for recycling has dropped from 40 percent to 33 percent in that same time period.

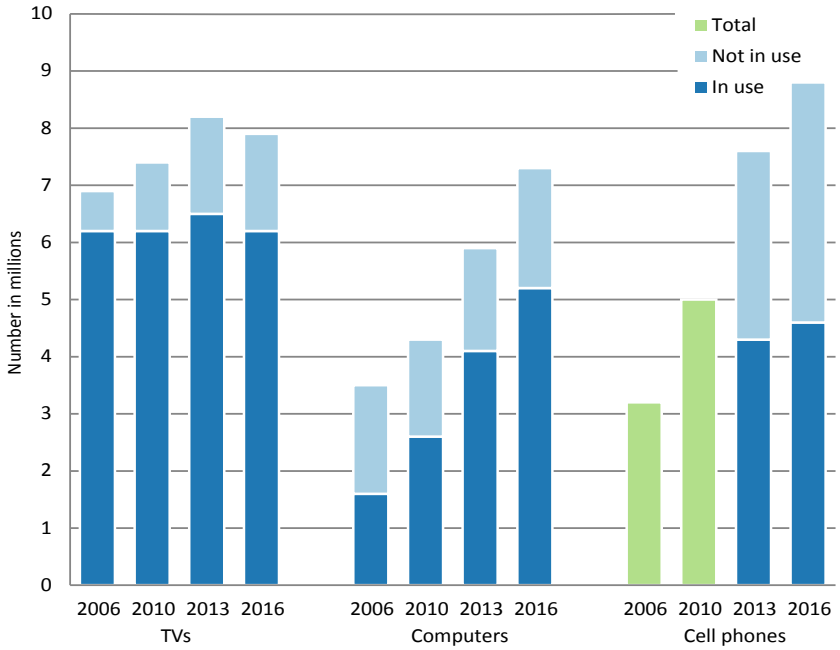
The changes in awareness described above likely reflect both the passage of time since heavy media coverage surrounding the law's initial implementation, and the DNR's outreach efforts over the past few years, which have focused on E-Cycle Wisconsin helping people find responsible places to recycle old electronics.

Trends in consumer management of unwanted electronics

As in previous years, the 2016 survey asked respondents how many computers, TVs and cell phones they had in their homes. Based on their answers, the DNR estimates Wisconsin households had a total of 7.9 million TVs, 7.3 million computers (including tablets) and 8.8 million cell phones in 2016. These estimates show an increase in computers and cell phones, but a slight decrease in the number of TVs. The decrease in the number of TVs could be due to the DNR's methods of estimation, or it could be attributed to mobile devices taking the place of traditional TVs. The trend in Wisconsin up to this point has been toward an increasing number of electronics in all categories.

The survey also asked respondents how many of each of the devices were currently not in use. Twenty-two percent of the TVs, 29 percent of the computers and 48 percent of the cell phones in peoples' homes were not being used (see Table 9). This translates into approximately 1.7 million TVs, 2.1 million computers and 4.2 million cell phones ready for disposal. This is a large increase in the number of cell phones ready for disposal over 2013 estimates, a slight increase in the number of computers and a relatively stable number of TVs (see Figure 10). These 8 million devices sitting unused in homes reinforces the importance of informing Wisconsin residents on how to find responsible reuse or recycling choices.

Figure 10: Estimated number of electronics in Wisconsin households over time, in millions



The "not in use" question was not asked for cell phones in 2006 and 2010.

Table 9: Estimated number of electronics in WI households, 2016

Device	Avg # per household	Total in state households	Total unused
TVs	3.46	7.9 million	1.7 million (22%)
Computers	3.17	7.3 million	2.1 million (29%)
Cell phones	3.82	8.8 million	4.2 million (48%)

Table 10: Electronics disposal choices by WI households, 2016

Method	TVs	Computers	Cell phones
Stored	39.4%	54.6%	53.2%
Donated to charity	6.5%	4.5%	5.2%
Gave away to family/friends	10.8%	4.6%	5.6%
Sold	4.8%	1.5%	4.1%
Returned to retailer	5.7%	5.7%	17.3%
Recycled	28.2%	23.9%	9.2%
Put in trash	3.7%	4.2%	2.3%
Other	0.9%	0.9%	3.0%

The 2016 survey asked questions about electronics disposal in a different way than in previous years and, more importantly, offered two new response categories, "exchanged/returned to retailer" and "stored," which dramatically changed the disposal results when compared with previous years. The results for 2016 show that more than half of respondents who had a computer or cell phone they "no longer wanted" put the item in storage, rather than use a recycler or other disposal method. Nearly two-fifths of people who no longer wanted a TV also put it in storage (see Table 10).

With "stored" responses removed from consideration, recycling was the most common answer for computers and TVs, while for cell phones, exchanging/returning to a retailer was about twice as common as recycling (see Figure 11). In many cases, the phones returned to retailers are recycled, and when respondents to earlier surveys had written "returned to retailer" as an "other" response, this was recoded "recycled."

While comparisons between 2016 and previous results should be done with some caution due to a lower response rate in 2016 and the change in survey question format, the surveys show positive trends in how residents manage unwanted electronics. The percentage of 2016 respondents who reported recycling TVs or computers was higher than in previous surveys, and the "recycled" percentage was much higher for all three device types with the 2016 "recycled" and "exchanged/returned to retailer" percentages combined. The share of respondents that had donated, sold, or given a device away to family or friends was much lower in 2016 than in 2013, perhaps indicating the appeal of older devices has waned.

While the trend toward recycling was strong, the 2016 survey also showed an increase in residents putting

computers and TVs in the trash. The percentage of respondents reporting they had put computers in the trash in 2016 was higher than all other surveys, at 9.3 percent. This percentage of respondents putting TVs in the trash was also up slightly, from 4.5 percent in 2013 to 6.1 percent in 2016 (but still lower than in earlier surveys). Cell phones represent an area of improvement; the percentage of respondents putting these in the trash in 2016 was at its lowest level since the DNR began conducting these surveys, at just 4.9 percent.

The increase in trashing computers is surprising because, unlike TVs, there are many free options for recycling computers. It could be that the change is due to the margin of error for the disposal question's small sample size, If there has been a true increase, it could be due to data security concerns (as discussed below, this emerged as one of the primary reasons respondents gave for not recycling).

Figure 12 shows disposal trends over time for TVs, which have seen the most dramatic reduction in the "put in trash" category.

The DNR also uses these surveys to track why people are unable or choose not to recycle electronics. Knowledge of barriers helps the DNR focus outreach messages to fulfill its statutory mandate, and to suggest possible policy adjustments. The 2016, 2013 and 2010 surveys assessed barriers by asking if respondents had electronics they were unable to recycle in the previous 12 months despite wanting to do so. If so, the surveys asked which of the listed reasons best described why they were unable to recycle. Wording changes prevent direct comparison with a similar question from 2011, but the most-selected barrier that year was "too expensive."

Figure 11: WI household electronics disposal methods, 2016

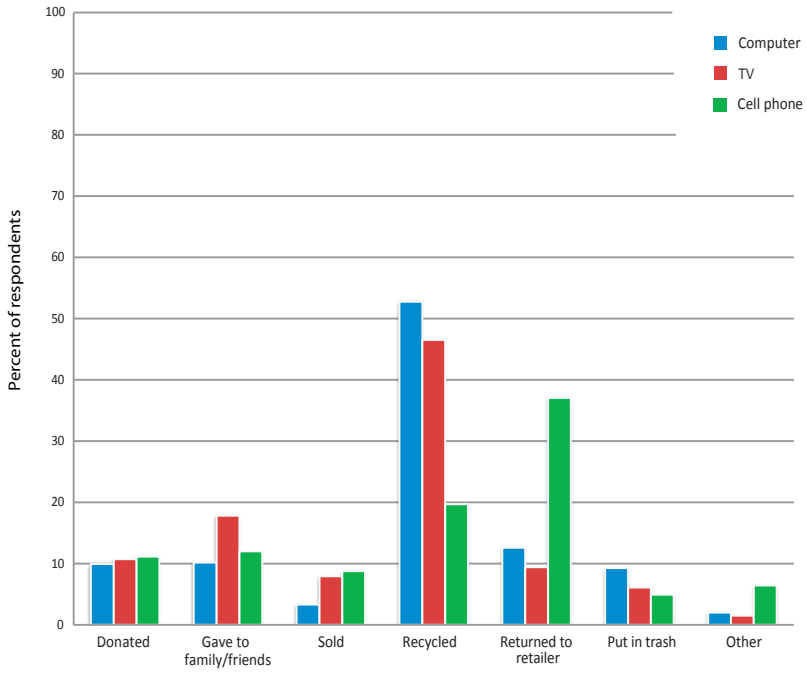


Figure 12: WI household TV disposal methods over time

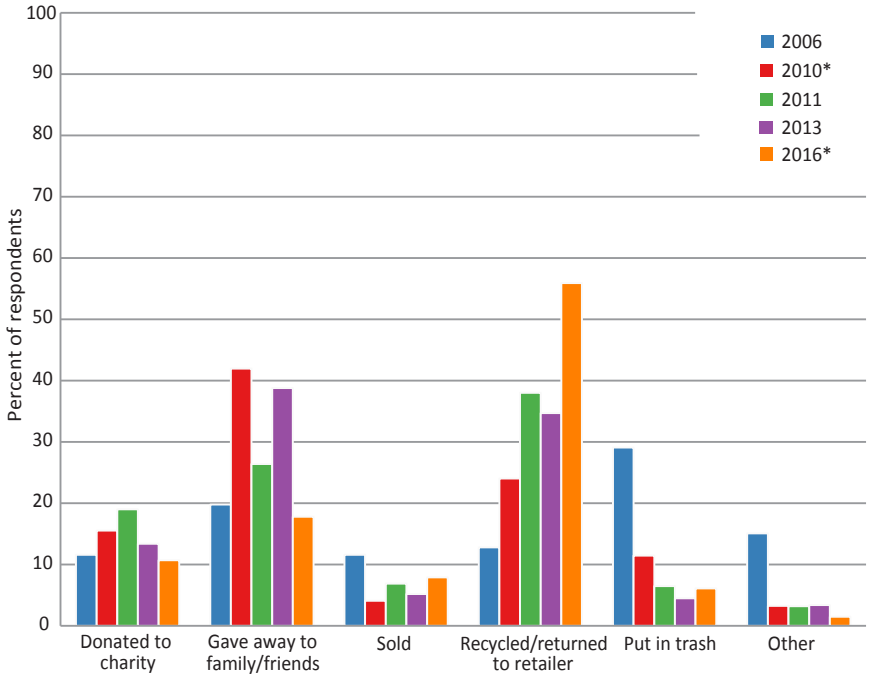
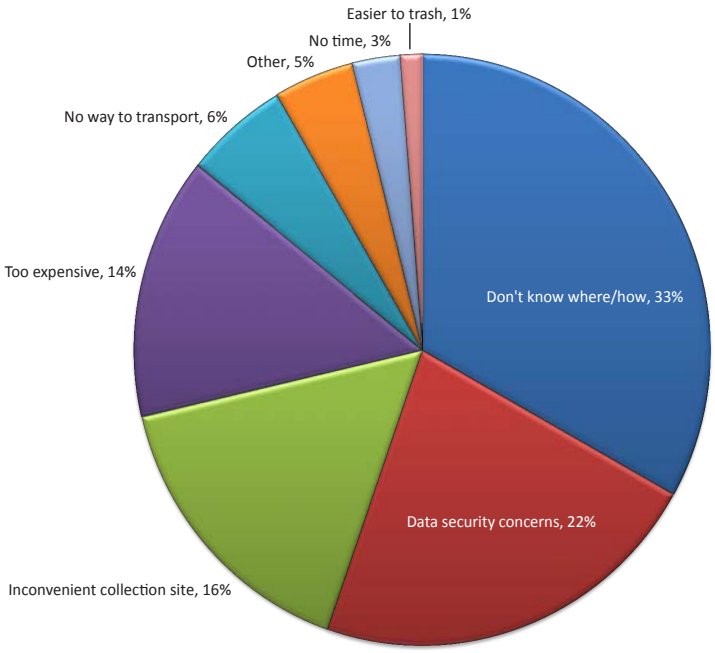


Figure 13: Barriers to recycling electronics, 2016



According to the 2016 survey, the primary barrier to e-cycling was not knowing where or how to do so (32 percent), as shown in Figure 13. Despite being the most common barrier, however, lack of knowledge dropped sharply from the 59 percent of respondents who selected this option in 2013, perhaps reflecting positive results from increased outreach efforts between the two surveys. (In 2010, not knowing where/how to recycle electronics was not an official response option, but 26 percent of respondents entered it as an "other" response, making it the second most common barrier behind "inconvenient collection site" that year.)

The 2016 survey added three new categories of barriers, "data security concerns," "easier to put in the trash" and "no time." One-fifth of respondents said data security concerns (i.e., concern that information on hard drives could be stolen) were the primary reason they didn't recycle electronics, making this the second most common reason selected on the 2016 survey. The share of respondents citing "too expensive" as their primary reason for not e-cycling was up slightly, from 11 percent in 2013 to 14 percent in 2016.

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 opportunity to meet and discuss the E-Cycle Wisconsin program at a June 2016 stakeholder meeting attended by manufacturers, recyclers, collectors and others interested in the law. The discussions at the meeting and similar meetings in 2014 and 2015 helped inform the discussion below, as did conversations throughout the year with program participants and other stakeholders.

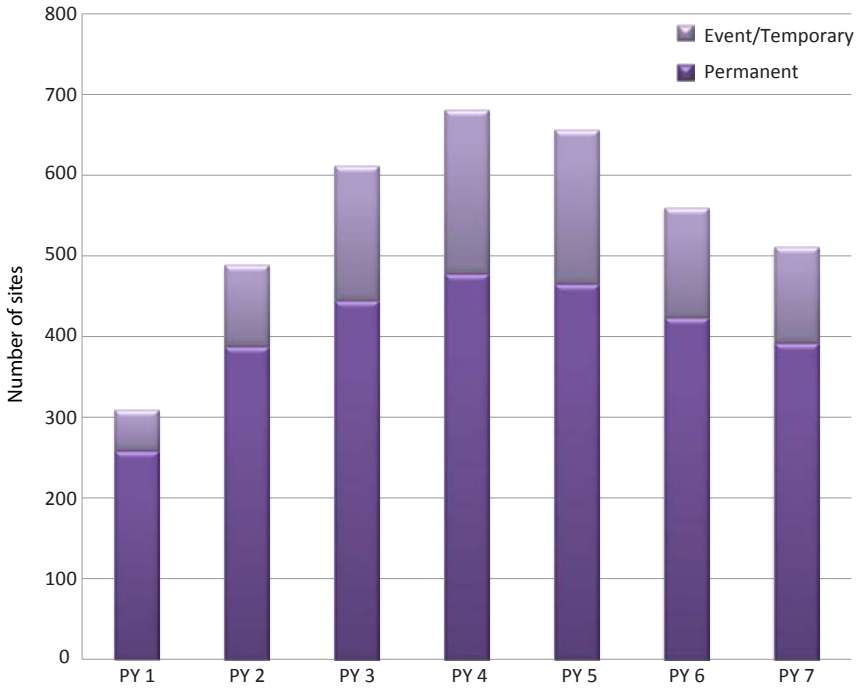
Wisconsin's law is designed to operate on free-market principles, with collectors, recyclers and manufacturers conducting private negotiations to set recycling prices. However, decreasing manufacturer targets, combined with low commodity prices and steady collection of mainly CRT devices, is distorting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

Barriers to e-cycling: declining access and rising costs

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. This is leading some collectors to drop out of the program, stop TV collection, or increase fees to consumers. The frequent pricing changes have put additional pressure on some collectors, especially local governments, whose budgets are set for a calendar year and therefore have trouble accommodating a rise in costs.

Figure 14: Registered collection sites over time



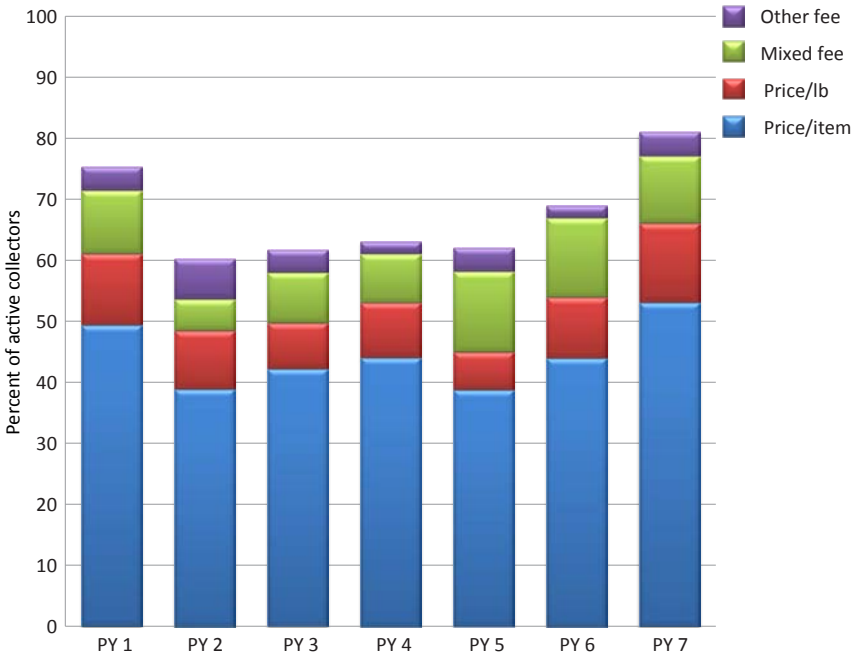
The economic pressures have exacerbated some poor planning—including unrealistic pricing and faulty volume estimates—and mismanagement by collectors and recyclers that has also led to collection sites dropping out of the program. Some recyclers became overextended and could not deliver on services they had promised. Others 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 shown in Figure 14, the number of collection sites registered with E-Cycle Wisconsin steadily increased through program year 4, but then began to decline. In program year 7, there were 393 permanent and 119 temporary or event collection sites registered with E-Cycle Wisconsin for at least part of the year, a total of 512 (down 25 percent from the program year 4 high of 681).

The reduction in collection opportunities has affected residents in rural areas most. All of Wisconsin's 72 counties except Florence have had at least one permanent collection site or collection event since the program began in 2010. In many of the state's more rural areas, though, these opportunities have remained few and far between. During program year 7, there were E-Cycle Wisconsin collection opportunities in 63 of Wisconsin's 72 counties (down from 67 in program year 6), covering 98 percent of the state's population (see map in Appendix A). While this means that only a small portion of the state's population lived in counties without registered collection sites, there are parts of the state where residents would have to drive a very long distance to properly recycle electronics, increasing the likelihood of illegal dumping or disposal.

In areas with collection sites, stakeholders have cited a lack of free or low-cost recycling options as a cause of illegal electronics dumping. As shown in Figure 15, there has been a substantial increase in the percentage of collectors charging consumers fees to accept electronics. In program year 7, 80 percent of active E-Cycle Wisconsin collectors charged consumers a collection fee of some sort, a large increase from program year 6 (69 percent) and program year 5 (62 percent). The percentage of active collectors taking at least some items for free has fallen from 72 percent in program year 5 to 61 percent in program year 7 (see Appendix B).

Figure 15: Fees charged by registered collectors, by program year and fee type



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). Some used a combination of fee types. Just over half of the collectors charging fees did take some items for free. Nearly all of the 80 percent of sites that charged a fee did so for TVs, and some also restricted the size or type of TVs they accepted.

Per pound fees ranged from 10 to 60 cents, with most in the range of 20 to 30 cents. Per item fees ranged from $1 to $100. 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 to $100. Most charged different prices based on size and display type, most commonly ranging from $10 to around $35, with some charging more for items like console or rear projection TVs. 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.

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, increase existing charges or to limit the types of items they accept, because manufacturer payments often do not currently cover the full cost of collecting and recycling the electronics.

Electronics going outside the program

Besides illegal dumping or disposal, one potential consequence of having fewer registered collection sites and more fees—both for registered collectors and for consumers—in the E-Cycle Wisconsin program is that individuals or collectors will look for cheaper, local alternatives. Evidence from the last two years suggests this is indeed happening in some cases.

The amount of material collected by registered collectors but going to non-registered recyclers has increased significantly, from about 231,000 pounds in program year 3 (less than 1 percent of the collection total that year) to nearly 1.4 million pounds in program year 7 (4.2 percent of the collection total). Much of this can be attributed to registered collectors that divert some portion of what they collect—usually the more valuable IT equipment—to their own dismantling operations. In most cases, the material is still being managed properly, but because the law does not require collectors to meet the same standards as registered recyclers—most notably, having a closure plan and owner financial responsibility in place—there is greater potential for problems down the road if the collectors stockpile material or go out of business.

There have also been documented problems with this material when it is diverted from the program. The DNR is aware of at least one case where a registered collector was sending CRTs to a non-registered recycler in Michigan's Upper Peninsula, which is now the subject of a state and federal cleanup effort. In another case discussed earlier, a registered collection site decided to start sending its material, including a significant number of CRTs, to a local backyard scrapper who was taking the material for free. The DNR is pursuing options for cleaning up the property after the scrapper was evicted.

These examples point to the need to improve the economics of the E-Cycle Wisconsin program, potentially involving higher manufacturer payments, to ensure that responsible, registered recyclers are the first choice for registered collectors and consumers, along with more uniform regulations for all facilities that are dismantling electronics.

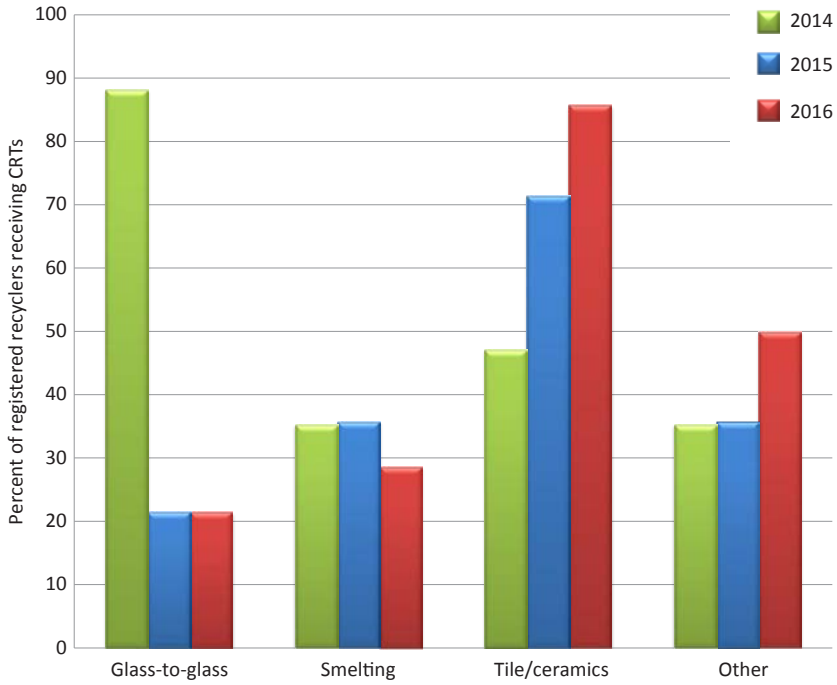
Problem materials and program economics

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. Finally, there have been complaints from collectors and recyclers in Wisconsin and other states that manufacturers' per pound payments are not keeping pace with the cost changes.

Cathode ray tubes

CRT-containing devices (TVs and monitors) make up the majority of weight collected under E-Cycle Wisconsin (see Figure 4). They are also the most difficult and expensive devices to recycle. Historically, 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 smelters in North America. These existing end markets have raised prices and/or reduced the amount of glass they take. In 2015, the remaining glass-to-glass furnace shut down for several months for maintenance, leading recyclers to seek other outlets. Many began sending glass for use in tile and other ceramics in Spain and Brazil. Others have been pursuing construction of furnaces to extract lead from the glass.

Figure 16: End-market destinations for E-Cycle Wisconsin CRT glass, 2014-2016



Most recyclers have multiple outlets for 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 2015, and recyclers did not return to this outlet in 2016 (see Figure 16). In 2016, all but two of the 14 recyclers receiving CRTS under E-Cycle Wisconsin were sending at least a portion of their glass to tile manufacturing. Just under one-third are sending some glass to smelters, and half are sending at least a portion of the glass to other downstream options, such as an Ohio firm that incorporates glass into materials used in a variety of applications, a lead-extraction furnace in New York, and a firm in the Netherlands that incorporates glass into construction materials.

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 has spent considerable time during the past few years 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
As mentioned in the E-Cycle Wisconsin 2015 report, flat-panel displays present 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. 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, and one recycler in Wisconsin is now using this technology.

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 declined sharply after 2014 and have largely remained low, further challenging recyclers' bottom lines.

Manufacturer share of recycling costs
By design, contracts and pricing among collectors, recyclers and manufacturers under E-Cycle Wisconsin are privately negotiated, and the law doesn't require parties to report pricing details to the DNR. This is based on the idea that a free-market approach will reward the most efficient and cost-effective collection and recycling, and that the government would have a difficult time setting a fair price that could be adjusted as market conditions change.

In practice, recyclers have said the consistent oversupply of eligible pounds, rising manufacturer compliance costs across all state programs and strong competition among recyclers has led many manufacturers to push for lower per pound payments in Wisconsin and other states with similar programs. This means more of the cost of recycling is passed on to collectors and, ultimately, consumers.

Declining manufacturer targets and collection gap

As mentioned above, additional economic pressure has come from collection significantly outpacing the overall manufacturer recycling target in four of the last five program years (see Figure 6). 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. Overall sales of some electronics have also declined in

recent years, according to the Consumer Technology Association.

As a result of these downward trends in new device weights, the estimated overall manufacturer target for program year 8 is 21.9 million pounds, down more than 10 million pounds (a 32 percent drop) 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 CRTs in the recycling stream. The Consumer Technology Association's 2016 estimate, based on a consumer survey, is that 28 percent of U.S. households still have a CRT TV (down from 41 percent in 2014) and 16 percent have a CRT monitor (down from 21 percent in 2014). The DNR's 2016 household survey estimated that Wisconsin households have about 1.7 million unused TVs, the bulk of which are likely CRTs.

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

Based on the first seven 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 ideas for the Legislation's consideration are based on extensive conversations with stakeholders over the last several years, including at face-to-face meetings the DNR hosted in May 2015 and June 2016 that were 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 21.9 million pounds in program year 8. 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 9 run from July 1, 2017, through Dec. 31, 2018, 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 that paying these registration fees across many states can be difficult. 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 can be 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:

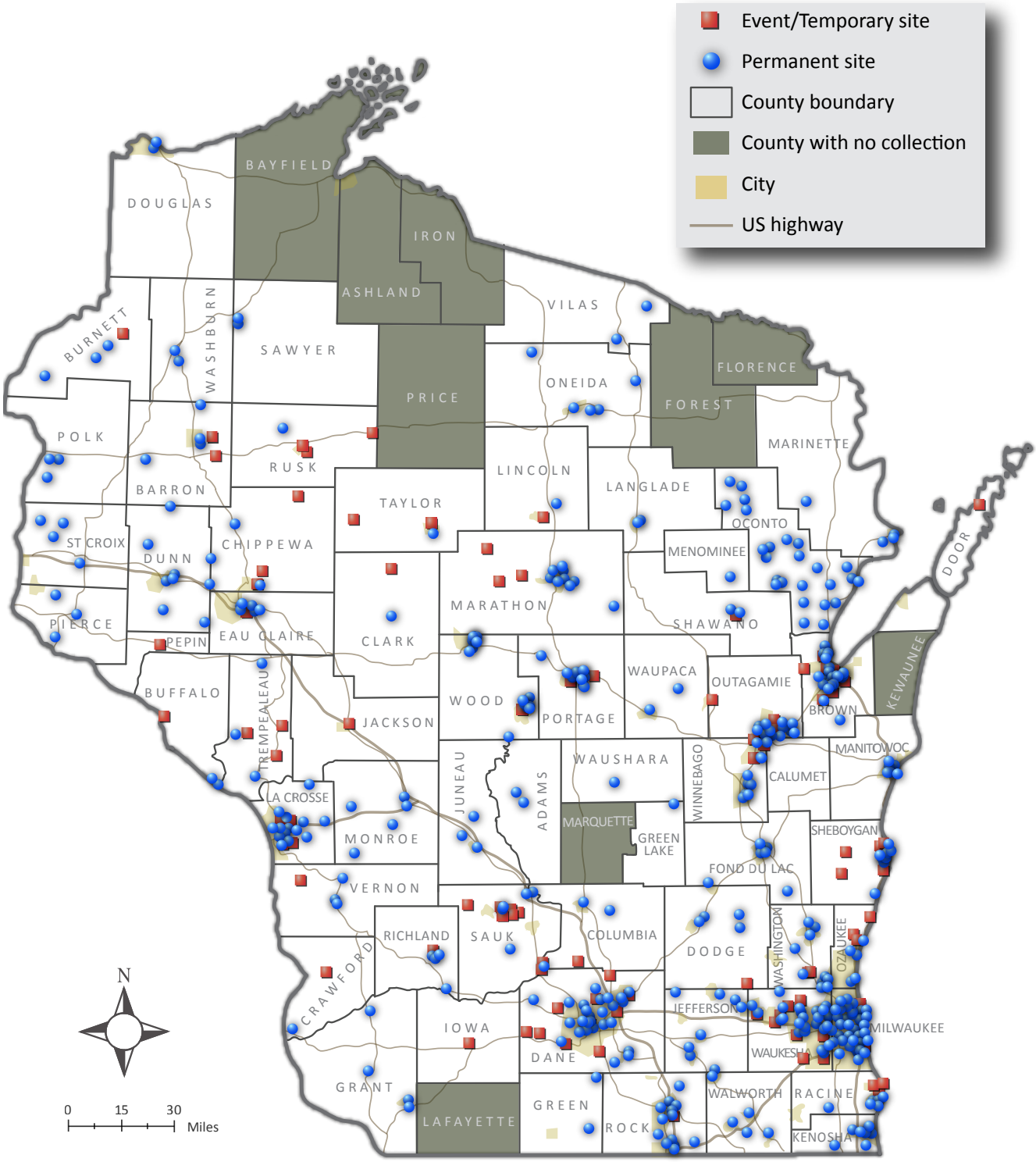
- Update the definition of consumer computer so that it is easier to determine whether new or updated products with video displays smaller than 7 inches, such as smartphones, are included, and add video game consoles to the list of covered electronics.
- Update the definition of consumer printer to explicitly 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, making the recycling program clearer for consumers and requiring less sorting by recyclers.

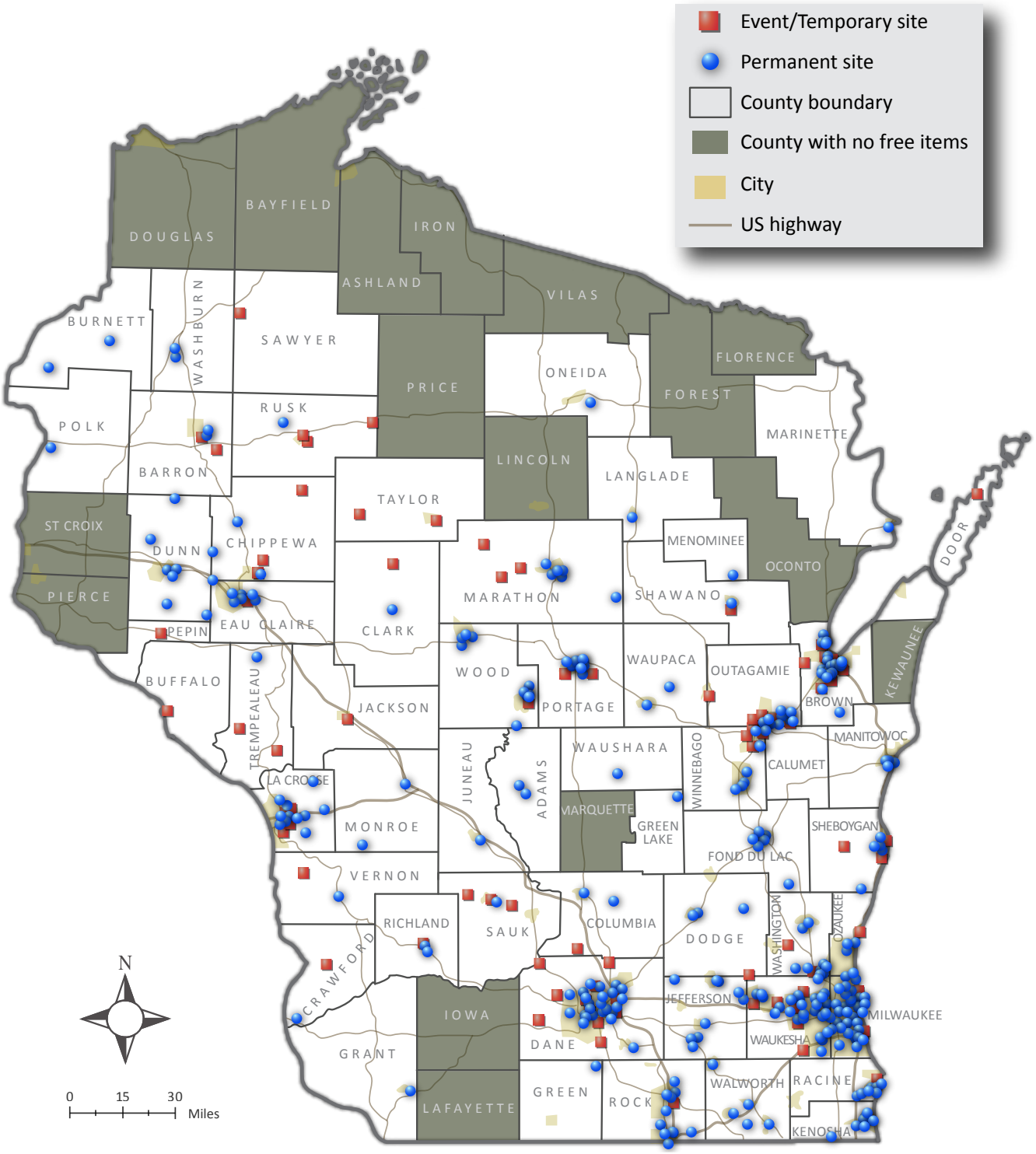
Consider adding covered schools

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

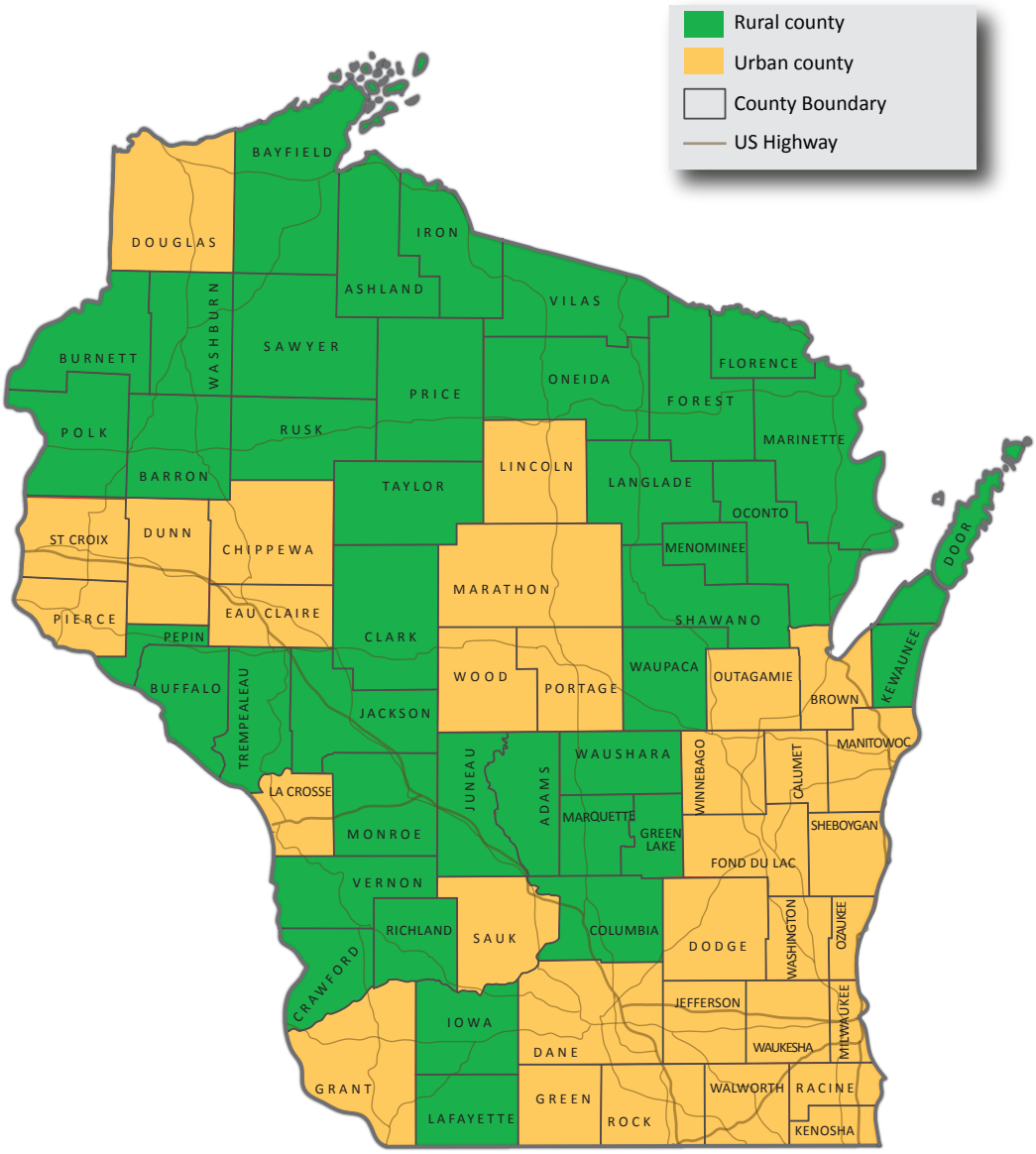
Appendix A: Map of collection sites registered under E-Cycle Wisconsin during program year 7



Appendix B: Map of registered E-Cycle Wisconsin collection sites accepting some items for free during program year 7



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



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