



Trends in Wisconsin households' ownership and disposal of electronics

Results from the DNR's 2018 statewide household survey

March 2019

Executive summary

Wisconsin's electronics recycling law requires the Department of Natural Resources to promote public participation in E-Cycle Wisconsin and to assess compliance with Wisconsin's electronics disposal ban. To fulfill these mandates effectively and inform program administration and policy, the DNR has conducted five statewide household surveys since 2010, asking residents what they have done with unwanted electronics, how many electronics are in their homes, what makes it difficult to recycle electronics and other related questions. The DNR conducted its most recent survey in fall 2018.

Key takeaways from the 2018 survey include:

- The number of unused electronics in Wisconsin households has continued to grow, and a large share of respondents report storing devices they no longer use. This points to a need for more public education about electronics recycling and a need to address barriers such as lack of convenient collection sites and high recycling costs.
- Wisconsin residents that did not store unwanted electronics are largely complying with the electronics disposal ban, with only a handful of survey respondents reporting they had put a cellphone, computer or TV in the trash during the previous 12 months.
- Continuing outreach efforts are still needed and important. Receiving information about electronics recycling was the biggest factor in determining whether someone was aware of where to recycle electronics, and not knowing where or how to recycle electronics was the most common reason respondents were unable to recycle their devices. Analysis of awareness levels across different demographic groups points to options for targeting outreach to those least aware of where to recycle electronics.
- A combination of outreach efforts and policy changes is needed to address barriers to electronics recycling. The DNR and stakeholders need to continue and expand efforts to educate the public on where to recycle electronics and to address concerns about data security. The key barriers of higher costs for recycling electronics and lack of convenient collection sites identified in the survey mirror challenges identified through policy recommendations in the DNR's annual E-Cycle Wisconsin reports. Acting on these recommendations, as well as raising awareness about free manufacturer mail-back programs for electronics, could address these barriers and reduce the high storage rates for unwanted electronics.

Survey background

Wisconsin’s electronics recycling law took effect in January 2010 and included a ban on landfilling and incinerating many consumer electronics, effective Sept. 1, 2010. The law (s. 287.17, Wis. Stats.) established a statewide program, called E-Cycle Wisconsin, to collect and recycle certain electronics. It is based on a product stewardship approach, in which electronics manufacturers fund collection and recycling programs for their products. The law requires the DNR to promote public participation in the manufacturer-funded E-Cycle Wisconsin program through education and outreach.

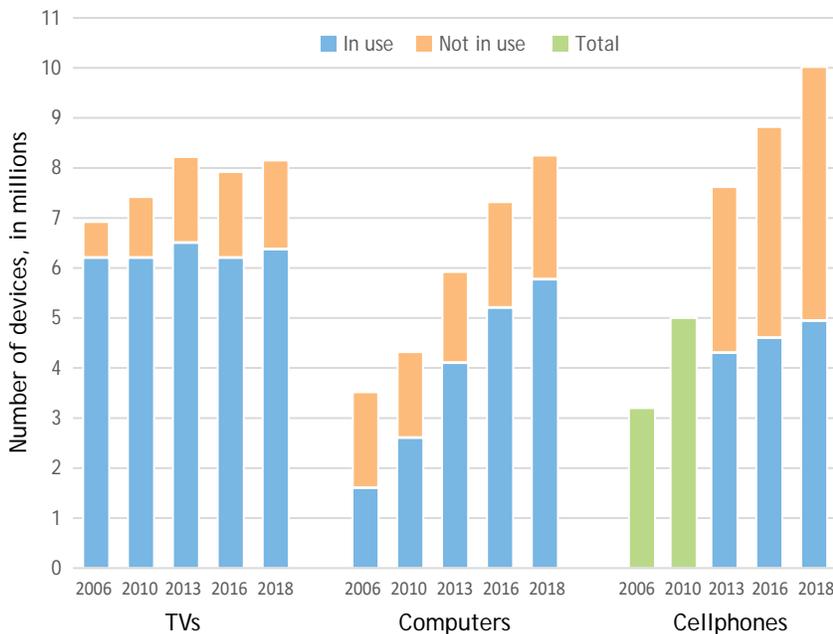
To gauge success in fulfilling this requirement and to provide required information on electronics recycling and disposal to the Legislature and governor, the DNR’s Waste and Materials Management Program has conducted a series of statewide household surveys via mail. The sample was random and statistically valid for all surveys, allowing the DNR to project responses to the statewide population.

The 2018 survey was conducted from September through November 2018 and had a response rate of 56 percent. DNR staff analyzed the data using a variety of statistical techniques. For more details on survey methodology, see Appendix A.

Table 1: Estimated number of electronics in Wisconsin households, 2018

| Device | Average # per household | Total in households | Total unused |
|--------------|-------------------------|---------------------|--------------------------|
| TVs | 3.41 | 8.1 million | 1.8 million (22%) |
| Computers | 3.45 | 8.2 million | 2.4 million (30%) |
| Cellphones | 4.19 | 10 million | 5.1 million (51%) |
| Total | -- | 26.3 million | 9.3 million (35%) |

Figure 1: Estimated number of electronics in Wisconsin households, over time



The “not in use” question was not asked for cellphones in 2006 and 2010.

Number of electronics in Wisconsin households

As in previous years, the 2018 survey asked respondents how many computers, TVs and cellphones they had in their homes. Based on their answers, the DNR estimates Wisconsin households had a total of 8.1 million TVs, 8.2 million computers (including desktops, laptops and tablets) and 10 million cellphones in 2018. These estimates show an increase in all three categories since 2016 and mark the first time the number of computers and number of cellphones have each exceeded the number of TVs.

Survey responses indicated 22 percent of TVs, 30 percent of computers and 50 percent of cellphones in homes were not being used (see Table 1). This translates into approximately 1.8 million TVs, 2.4 million computers and

5.1 million cellphones ready for disposal. The number of cellphones ready for disposal increased 53 percent and the number of computers ready for disposal increased 37 percent between 2013 and 2018, while the number of unused TVs remained stable (see Figure 1).

The 9.3 million devices sitting unused in homes reinforces the importance of informing residents how to find responsible reuse or recycling options. In total, 636 of the 856 survey respondents (74 percent) reported having at least one unused TV, computer or cellphone in their homes. Among these, the average number of unused devices was 3.5 and the highest number was 21.

In the 12 months preceding the survey, 59 percent of respondents had purchased a new device. Of those, about three-fourths (76 percent) had purchased new devices in brick-and-mortar stores, and 43 percent had purchased a device online, either for home delivery or in-store pickup.

The DNR asked a new question on the 2018 survey about respondents' motivations for replacing electronics, to help better understand consumer behavior regarding electronics acquisition and disposal. Eighty-two percent indicated they tended to replace a device when it had stopped working well, and 12 percent said they liked to keep up with new technology, but not buy the latest device immediately. Fewer than 3 percent said they frequently replaced devices to keep up with new technology. A handful of respondents said they replaced devices for specific events or that none of the listed reasons applied to them.

The most significant factors influencing the number of unused devices in a household were inability to recycle electronics and purchase of new devices. Respondents who said they were unable to recycle electronics in the previous 12 months despite wanting to do so had an average of 4.8 unused devices in their households, compared with 2.8 in households that did not report a barrier to recycling. Respondents who had recently purchased new electronics had an average of 4.2 unused devices in their households, compared with 2.5 in households that had not made a recent purchase.

Homeowners averaged slightly more unused devices per household than renters, and larger households had a higher average number of unused devices. Respondents age 65 and older had fewer unused devices in their homes, on average, than younger respondents. Hearing where to recycle in the past 12 months or the presence of collection sites within a respondent's ZIP code did not have any significant influence.

Public awareness of the law and where to recycle electronics

Each survey since 2010 has asked whether respondents have heard of Wisconsin's landfill and incinerator ban on electronics and E-Cycle Wisconsin. After an increase from 2010 to 2011, the percent of respondents answering "Yes" to these questions has declined (see Figure 2). This is not completely surprising, given the large amount of news coverage in late 2010 (when the disposal ban took effect) and the fact that outreach efforts since have not always focused on the ban, and have emphasized where to find electronics recycling options rather than the E-Cycle Wisconsin "brand."

Since 2013, DNR surveys have asked a more general question: "Do you know where you can recycle electronics?" The percent of respondents answering "Yes, I am certain" increased dramatically from 28 percent (2013) to 45 percent (2016), then declined to 39 percent in 2018. However, the percent of respondents who answered "No, I don't know" remained essentially flat from 2016 to 2018. The percent of respondents answering "I think so, but am not certain" increased from 22 to 27 percent between 2016 and 2018 (see Figure 3).

Among all respondents in 2018, 34 percent were unaware of where to recycle electronics. Respondents aged

Figure 2: Percent of respondents aware of electronics disposal ban or E-Cycle Wisconsin, over time

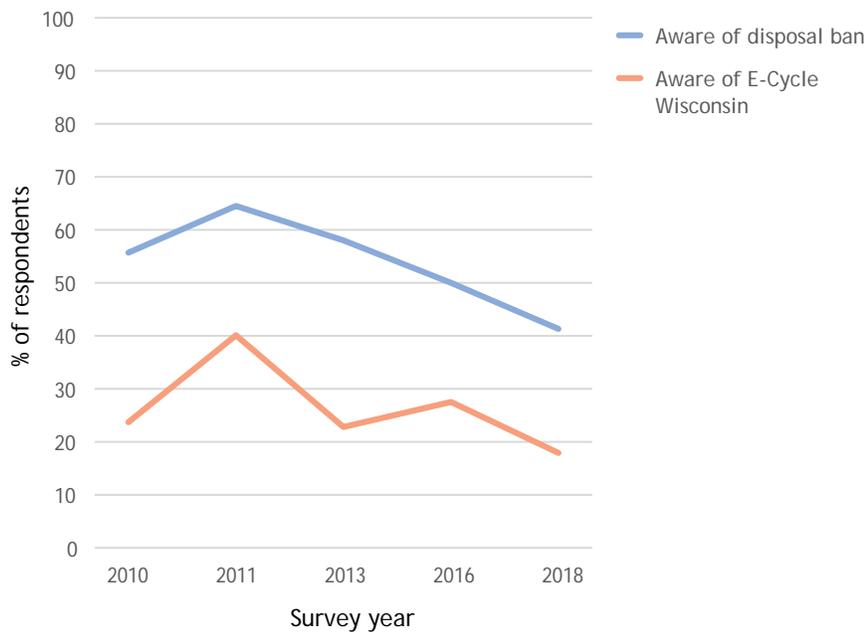
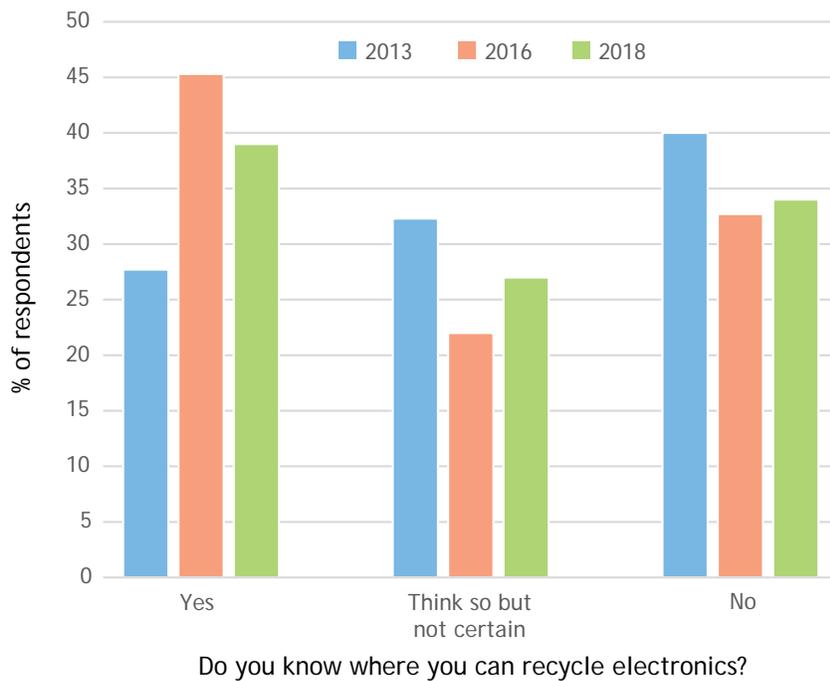


Figure 3: Wisconsin residents' knowledge of where to recycle electronics, over time



with 71 percent of respondents who had not received electronics recycling information during that time.

18-49, renters, residents of the southeastern and northern parts of the state, and women were less likely to know where to recycle electronics (see Figure 4).

Separate from the questions about awareness and knowledge of where to recycle, the survey asked where respondents had heard where to recycle electronics during the previous 12 months, if at all. About 72 percent said they had heard about where to recycle electronics during that time.

Knowledge of the disposal ban, awareness of E-Cycle Wisconsin and hearing about where to recycle electronics in the previous 12 months each meant respondents were more likely to know where to recycle electronics, indicating the importance of effective outreach. About two-thirds of respondents who had heard of E-Cycle Wisconsin were certain they knew where to recycle electronics, compared with one-third of respondents who had not heard of E-Cycle Wisconsin. Half of respondents who had heard of the disposal ban were certain they knew where to recycle electronics, compared with 30 percent of those who had not heard of the ban. Among those who had heard where to recycle electronics in the previous 12 months, only 19 percent said they did not know where to recycle electronics, compared

Electronics disposal choices and factors influencing choices

All DNR household recycling surveys have asked respondents what they did with cellphones, computers and TVs they no longer wanted, to measure compliance with Wisconsin's electronics disposal ban and track changes in households' electronics disposal choices. The question wording has changed slightly over the years, most

significantly with the addition of a “stored” option on the 2016 and 2018 surveys, but the questions have been similar enough to allow comparison over time.

On the 2018 survey, the question was worded, “In the last 12 months, what did you do with each of the following electronic items that you no longer wanted?” About 59 percent of respondents answered this question for a cellphone, 45 percent answered for a computer (including desktops, laptops and tablets) and 44 percent answered for a TV.

Among respondents who had a device they no longer wanted, the most common action was to put it in storage. About two-thirds of households had stored unwanted cellphones and computers and about half had stored unwanted TVs during the previous 12 months. The percent of households that had stored unwanted devices increased more than 10 percentage points for all three device types from 2016 to 2018. This helps explain the increase number of unused devices in households discussed above.

Nearly all households that did not store an unwanted device opted to recycle or reuse it. Table 3 shows the detailed breakdown of disposal choices, and Figure 5 shows all the recycling/reuse options combined. Only a small percentage of households reported putting a cellphone (2 percent), computer (3 percent) or TV (4 percent) in the trash.

A comparison of results across survey years, with “stored” and “other” responses removed, shows the percentage of respondents recycling their devices increased overall between 2010 and 2018. The percentage of respondents who put TVs in the trash declined between 2010 and 2013, then increased slightly (see Figure 6). Figures from a 2006 DNR survey are not included here because of a large “other” category that makes accurate comparison

Figure 4: Respondent groups least aware of where to recycle electronics, 2018

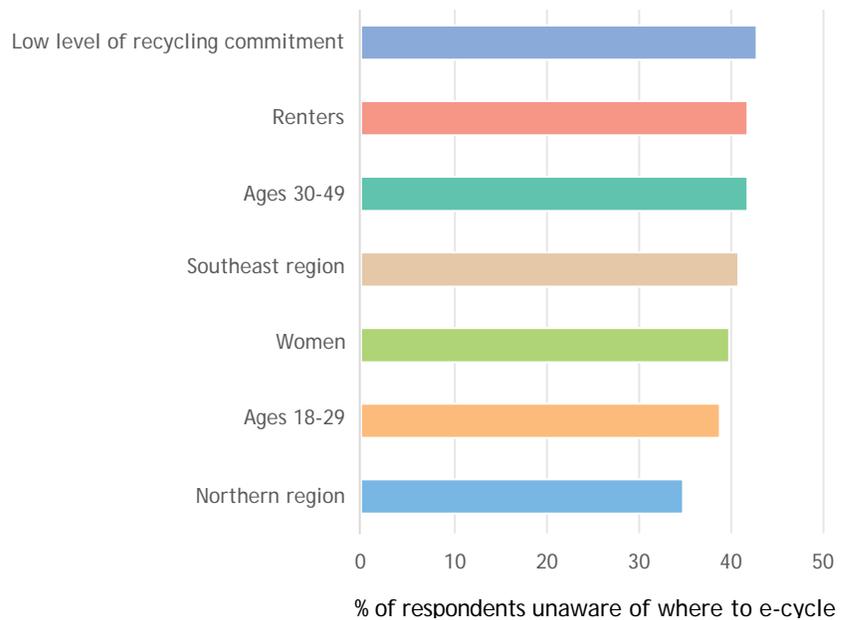


Figure 5: What respondents did with unwanted devices during previous 12 months, 2018

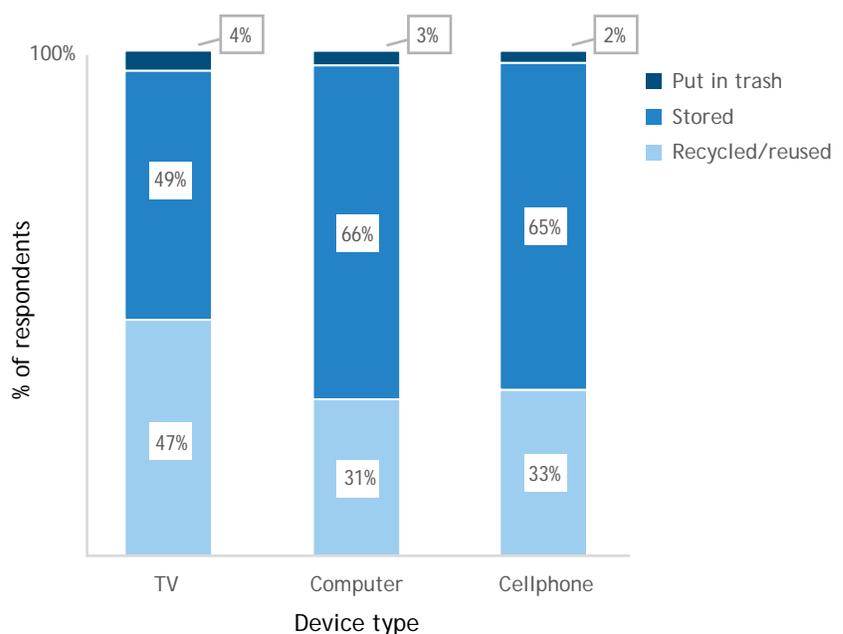
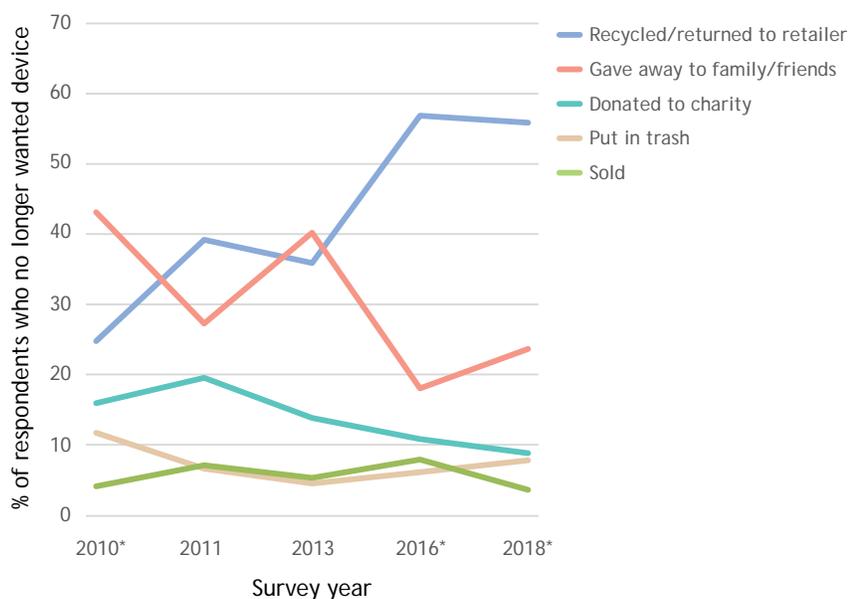


Table 2: What respondents did with unwanted electronics during previous 12 months, 2018

| Disposal choice | TV | Computer | Cellphone |
|--------------------------------|-----|----------|-----------|
| Stored | 49% | 66% | 65% |
| Recycled | 27% | 18% | 7% |
| Exchanged/returned to retailer | 2% | 3% | 12% |
| Gave away to family/friends | 12% | 5% | 7% |
| Donated to charity | 4% | 3% | 3% |
| Sold | 2% | 2% | 4% |
| Put in trash | 4% | 3% | 2% |

Figure 6: Wisconsin households' TV disposal choices, over time



* "Stored" category removed. An "other" category was excluded for all survey years.

heard of E-Cycle Wisconsin were more likely to recycle unwanted cellphones, computers and TVs, and less likely to store the devices or put them in the trash. No respondents who were aware of E-Cycle Wisconsin reported putting cellphones or computers in the trash.

Similarly, respondents with knowledge of where to recycle electronics were more likely to recycle unwanted TVs and computers and less likely to put the devices in storage or the trash. This was true for both the "certain" and "think so" categories, with higher recycling rates and lower storage and trashing rates among those who were certain they knew where to recycle electronics compared to those who thought so but were uncertain (see Figure 9).

Receiving information about where to recycle electronics during the previous 12 months appeared to make respondents slightly less likely to put computers and TVs in the trash, and much more likely to recycle computers and TVs instead of storing them. A higher level of commitment to recycling in general also meant respondents were less likely to put computers and TVs in the trash and more likely to recycle them. In general, factors such as demographic group, presence of a collection site in the respondent's ZIP code, the

difficult, but it is worth noting that nearly 30 percent of respondents to that survey reported putting TVs in the trash. The percent of respondents putting computers in the trash increased overall between 2010 and 2016, then declined slightly in 2018 (see Figure 7). The percentage of respondents who put cellphones trash declined overall from 2010 to 2018, but the numbers fluctuated up and down from 2011 to 2018 (see Figure 8).

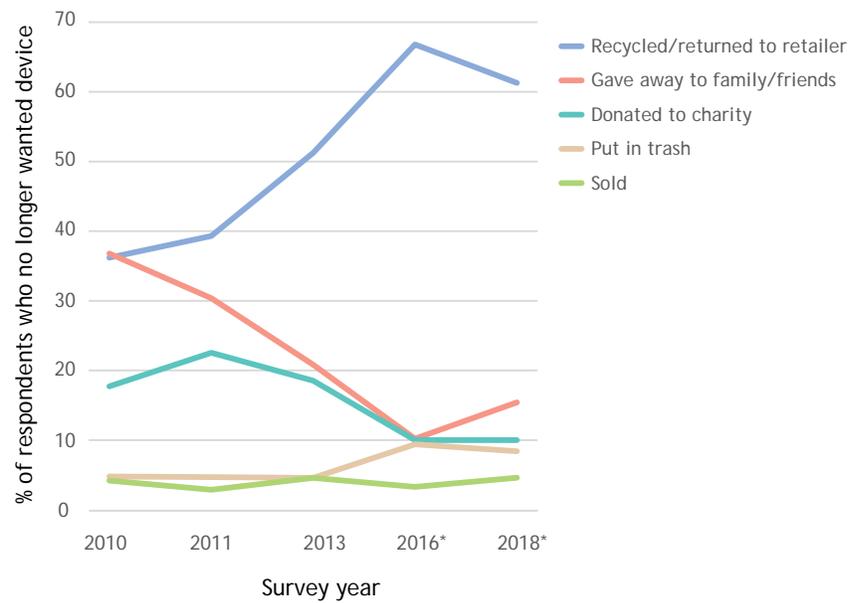
Factors influencing electronics disposal choices

The 2018 survey indicated awareness of the electronics recycling law and knowledge of where to recycle electronics had some influence on electronics disposal choices. Awareness of the disposal ban did not seem to influence what respondents did with unwanted cellphones and computers, but did mean respondents were less likely to put TVs in the trash. Six percent of respondents who were not aware of the ban put TVs in the trash, compared with 1 percent of respondents who did know about the ban. Respondents who had

recent purchase of new electronics and amount willing to pay to recycle did not seem to have a significant influence on electronics disposal choices. However, residents in the northern part of the state appeared slightly more likely than residents in other parts of the state to put TVs and computers in the trash or storage instead of recycling them (only 13 percent recycled computers, compared with 29 to 34 percent of respondent in the other four DNR regions). Younger residents were more likely than older residents to put TVs in the trash, with 14 percent of 18- to 29-year-olds putting TVs in the trash, compared with 6 percent of respondents ages 30 to 49 and less than 2 percent of respondents 50 and over.

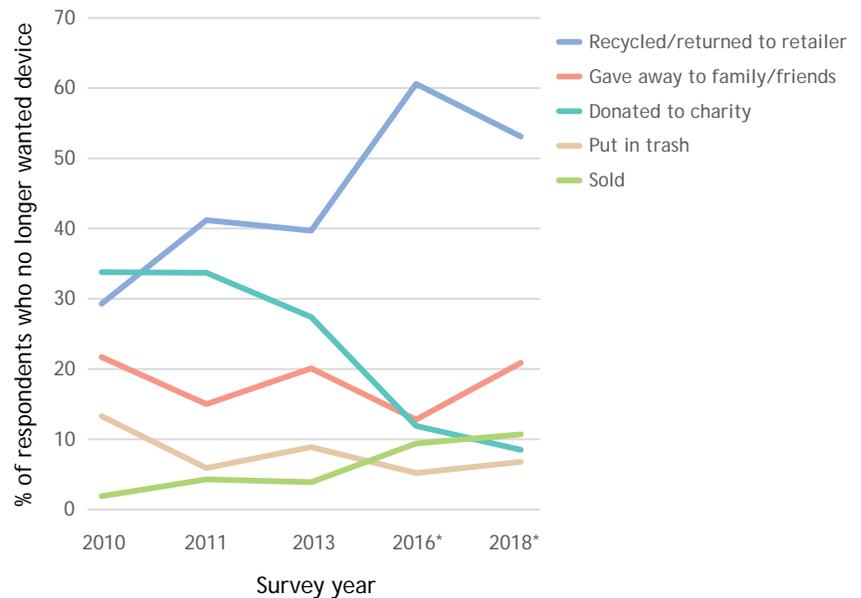
Among the factors examined, only awareness of E-Cycle Wisconsin seemed to influence cellphone disposal choices. This may reflect the fact that cellphones are easier to store and to recycle than larger devices, and also easier to hide in the trash. Both the survey results and DNR interactions with the public indicate the vast majority of households store unwanted cellphones, and it is unclear what may motivate residents to take old phones in for recycling, especially if the phones are old or damaged enough to eliminate any trade-in or resale value.

Figure 7: Wisconsin households' computer disposal choices, over time



* "Stored" category removed. An "other" category was excluded for all survey years.

Figure 8: Wisconsin households' cellphone disposal choices, over time



* "Stored" category removed. An "other" category was excluded for all survey years.

Barriers to electronics recycling

On each survey since 2010, the DNR has asked about reasons respondents had been unable to recycle electronics. The 2018 survey asked, "In the last 12 months, was there ever a time when you wanted to recycle electronics but were unable to do so?" Those that answered "Yes" (about 36 percent of all respondents) were asked, "Which of the following best describes why you were unable to recycle the electronics?" As shown in Figure 10, the top reasons were "Didn't know where or how" (35 percent) and "It was too expensive" (22 percent).

Figure 9: Electronics disposal choices based on knowledge of where to recycle electronics, 2018

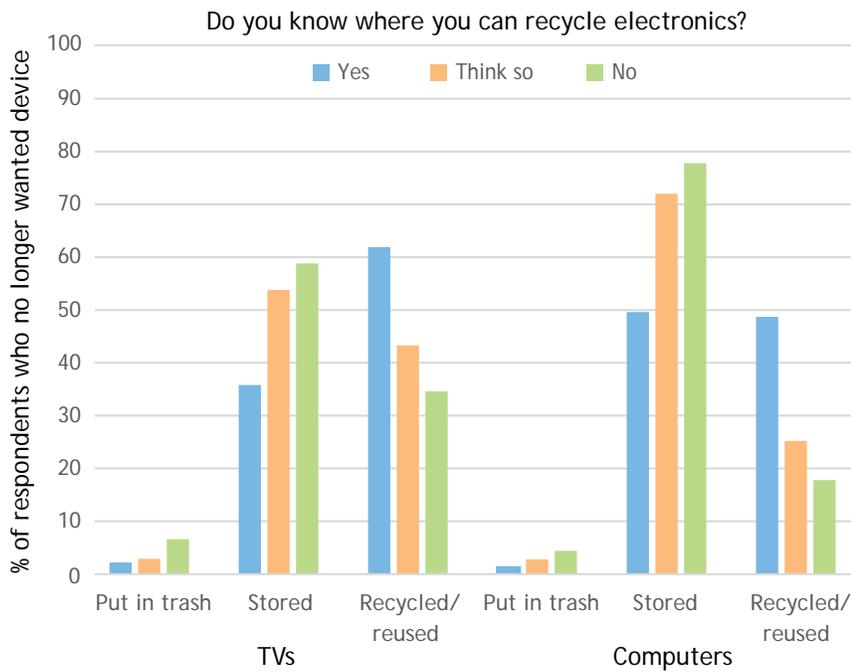
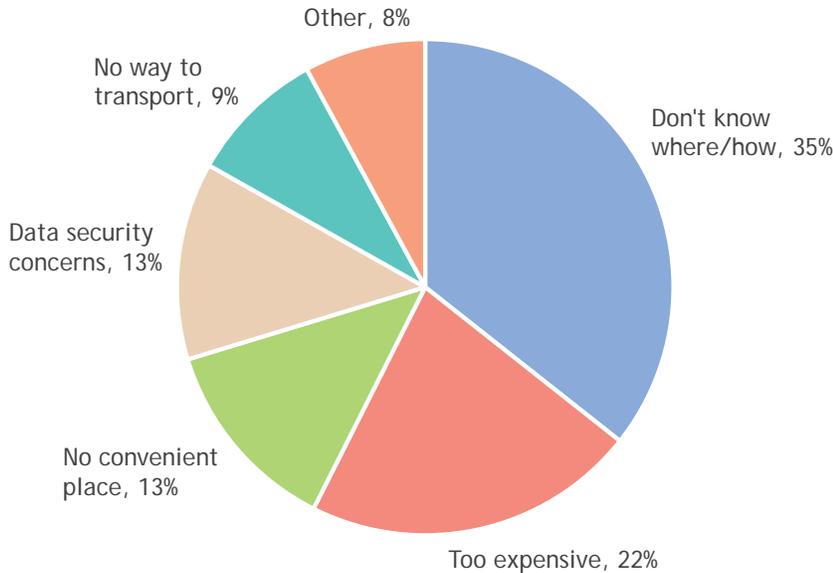


Figure 10: Reason unable to recycle electronics during last 12 months, 2018



its outreach on promoting the list. The fact that this remains the most common barrier suggests it is an important focus for continued outreach. “Too expensive” has been trending upward as a barrier to e-cycling, which is not surprising given that many collectors began increasing consumer fees in late 2015/early 2016. While larger policy changes are needed to reduce the amount consumers pay to recycle electronics, the DNR is attempting to address the cost and “no convenient place” barriers with the addition of manufacturer mail-back program information to its online collection sites list in January 2019. (Most of the mail-back programs are free.)

“I didn’t have a convenient place to recycle” and “I was concerned about my data security” were tied for the third most common reason at 13 percent.

The relatively small number of respondents who had difficulty recycling electronics meant few statistically significant comparisons across demographic groups were possible. However, analysis indicated a strong relationship between the reasons respondents were unable to recycle and both knowledge of where to recycle electronics and receiving information about electronics recycling during the previous 12 months. Table 3 shows the top three barriers based on knowledge and receiving information. The DNR and others can consider these differences when developing outreach and policy proposals.

Addressing barriers

By asking a similar question on multiple surveys the DNR hopes to understand changes in the reasons people are unable to recycle electronics, and identify ways to address these barriers through outreach or policy changes.

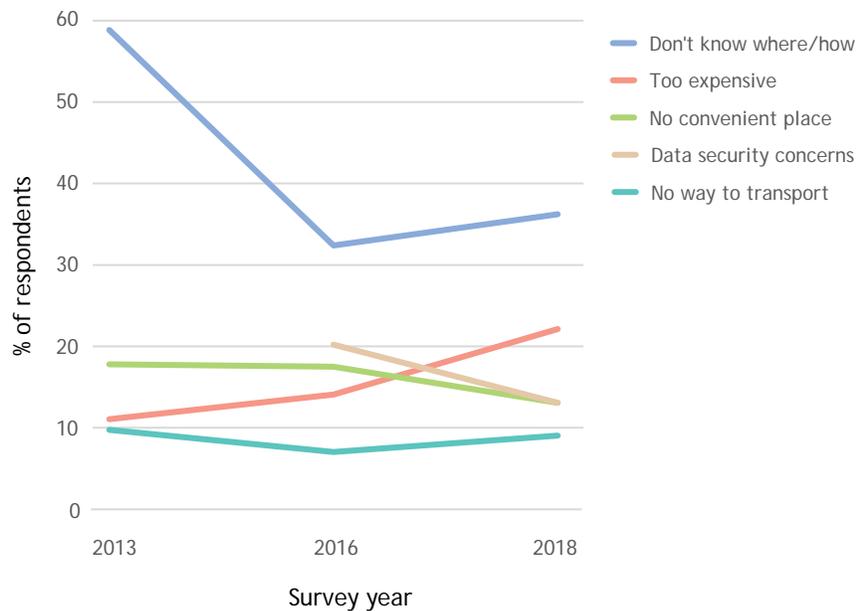
As Figure 11 shows, “didn’t know where/how” has been the top “barrier” in each of the last three surveys, which has led the DNR to improve its public list of electronics collection sites and focus

Table 3: Most common barriers based on knowledge of where to recycle and receiving electronics recycling information, 2018

| Barrier rank | Do you know where you can recycle electronics? | | | Heard where to recycle electronics in the last 12 months? | |
|--------------|--|--|------------------------|---|------------------------|
| | Yes | Think so | No | Yes | No |
| 1 | Too expensive | Too expensive | Don't know where/how | Too expensive | Don't know where/how |
| 2 | No convenient place | Don't know where/how | Too expensive | Don't know where/how | Data security concerns |
| 3 | No way to transport | No convenient place/ Data security concerns | Data security concerns | No convenient place | Too expensive |

Finally, the DNR first included “concerned about my data security” as a response option on the 2016 survey, and many respondents have selected this as their main reason for not recycling. The DNR and others can help address this through outreach about how to wipe data and the data security precautions taken by responsible recyclers, and by encouraging collection sites to improve and communicate their security practices. The DNR added data security information to its website in late 2017 and has included it in other outreach to the public and stakeholders.

Figure 11: Reason unable to recycle electronics during last 12 months, over time



Amount willing to pay to recycle electronics

Several DNR surveys asked respondents how much they would be willing to pay to recycle electronics. On the 2018 survey, the question was worded, “What is the most you would be willing to pay to recycle electronic items such as old TVs, monitors, and computers?” As Figure 12 shows, 29 percent of respondents said they were not willing to pay anything to recycle electronics, 35 percent were willing to pay up to \$5 per item and 21 percent were willing to pay \$6 to \$10 per item. The remaining 15 percent were willing to pay more than \$10 per item.

While this was a hypothetical and somewhat generic question (e.g., it didn’t ask “how much are you willing to pay to recycle a 36” tube TV?”), It highlights a disconnect between what consumers say they are willing to pay and what electronics collection sites are charging. During the July 2017-June 2018 program year, 87 percent of registered E-Cycle Wisconsin collectors charged for at least some items, most commonly for TVs—and the typical recycling cost for TVs was in the \$15-\$25 range. Analysis of electronics disposal choices based on the amount respondents were willing to pay yielded few statistically significant results due to the relatively small sample size, but did show that respondents who were not willing to pay anything were slightly more likely to put TVs in the

Figure 12: Maximum amount willing to pay to recycle an electronic device, 2018

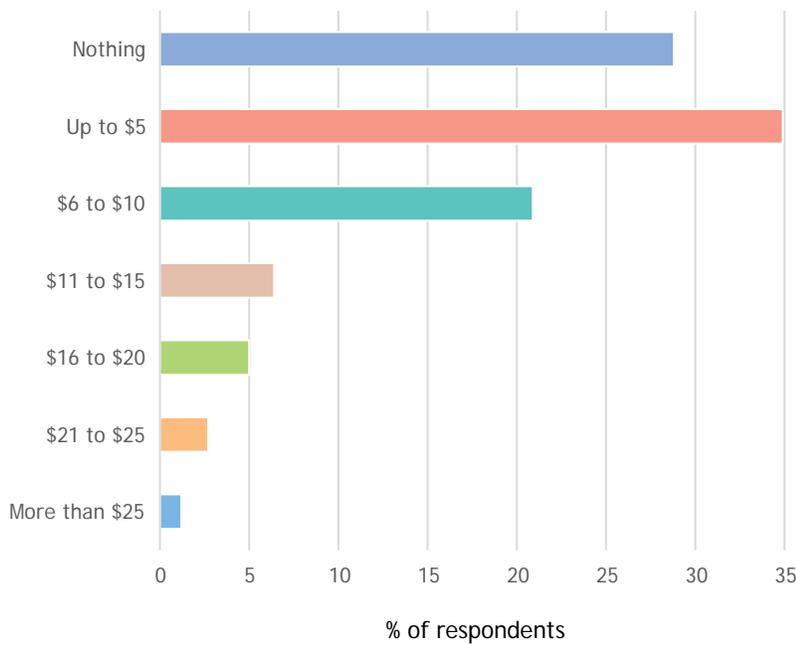
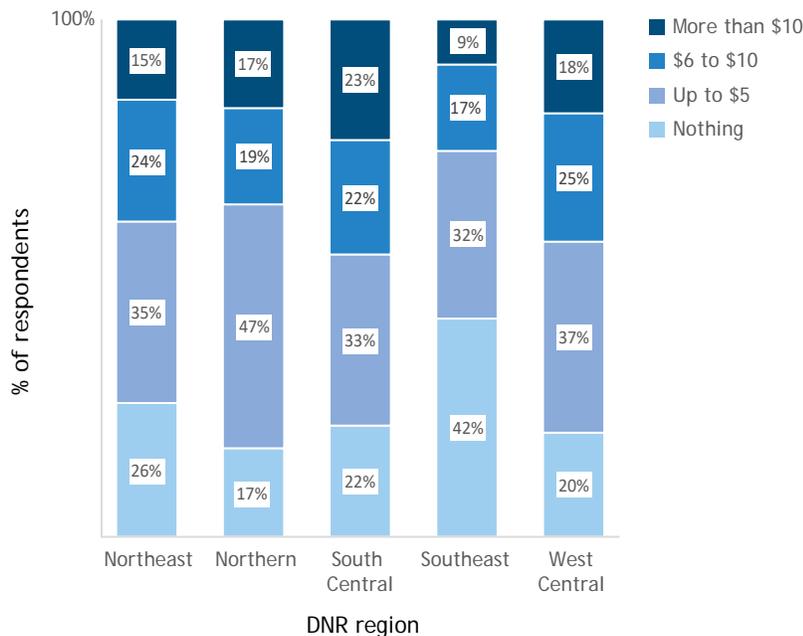


Figure 13: Maximum amount willing to pay to recycle an electronic device, by DNR region, 2018



trash (8 percent compared with 3 percent among respondents who were willing to pay something). Analysis of difference in amount willing to pay across demographic groups did not produce statistically significant results for gender, age, or level of commitment to recycling in general. There was a statistically significant difference in the amount willing to pay across DNR regions (see Appendix C for region map). Forty-two percent of southeastern Wisconsin residents were unwilling to pay to recycle electronics compared to 17 to 26 percent of residents in other parts of the state (see Figure 13).

The 2010, 2011 and 2013 surveys asked a similar question: “How much would you be willing to pay to recycle items such as televisions, computers and printers?” As shown in Figure 14, it appears more consumers are now willing to pay something to recycle electronics, and some are willing to pay higher amounts. The slight difference in how the question was worded may be responsible for some of the shift, but it may also reflect increasing fees collectors began charging consumers for electronics recycling after 2015.

As in some previous years, the 2018 survey asked a follow-up question about whether a respon-

dent would be willing to pay more per item under certain circumstances. Figure 15 illustrates the percentages of respondents who were willing to pay more under each circumstance About 4 percent of respondents were not willing to pay anything to recycle electronics under any of the listed circumstances.

thing collection sites might be able to provide through partnerships with local businesses, especially for special collection events. While it does not appear to be an effective incentive for as many people, emphasizing responsible recycling and data security is something collectors and recyclers registered with E-Cycle Wisconsin could do for little additional cost. Finally, home pickup of electronics may not be practical or cost-effective in many parts of the state, but could be offered in more densely populated areas.

Distance willing to travel to recycle electronics

Whether a resident feels there is a convenient electronics recycling location may depend on how far he or she is willing to drive to recycle electronics. The 2018 survey asked respondents, “What is the farthest you would be willing to travel, one way, to recycle your electronics?” Overall responses ranged from 0 to 100 miles, with an average distance of 14.54 miles and a median of 10 miles. Table 4 shows the average and median distances by DNR region (see Appendix C for region map).

Elements of successful outreach

As mentioned above, the 2018 survey confirmed the importance of ongoing outreach. Respondents who had heard about where to recycle electronics in the previous 12 months were much more certain of where they could recycle electronics than those who had not. The DNR uses survey data to help

Figure 14: Maximum amount willing to pay to recycle an electronic device, over time

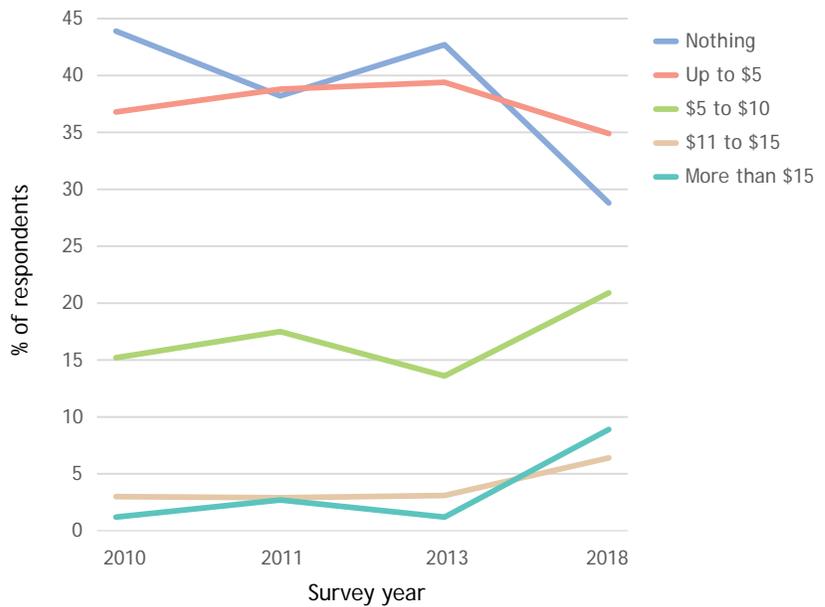


Figure 15: Percent of respondents willing to pay more per item for recycling under certain conditions, 2018

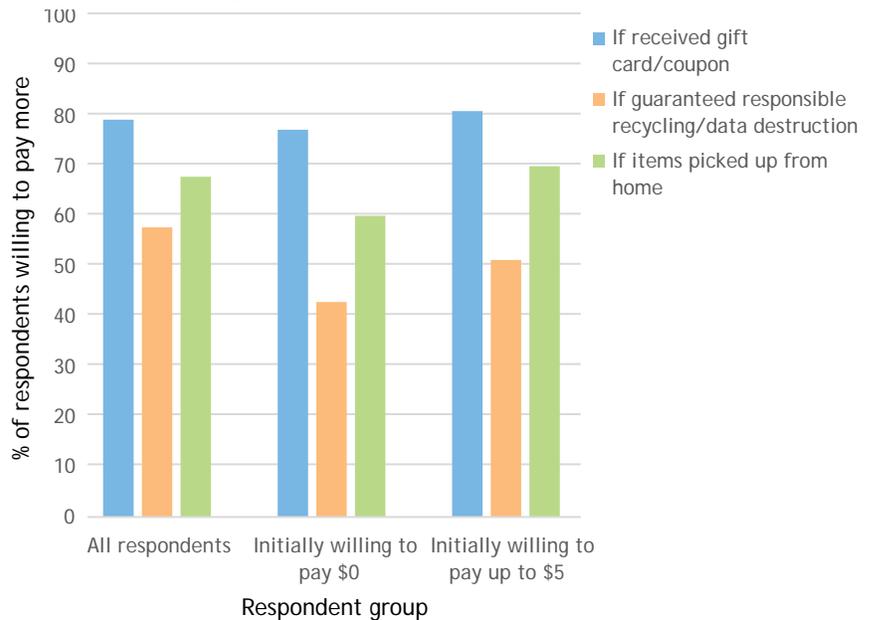


Table 4: Distance willing to drive to recycle electronics, by DNR region, 2018

| DNR region | Average | Median |
|---------------|----------|----------|
| Northeast | 13 miles | 10 miles |
| Northern | 20 miles | 15 miles |
| South Central | 16 miles | 15 miles |
| Southeast | 12 miles | 10 miles |
| West Central | 17 miles | 15 miles |

Figure 16: Where respondents heard about electronics recycling, 2018

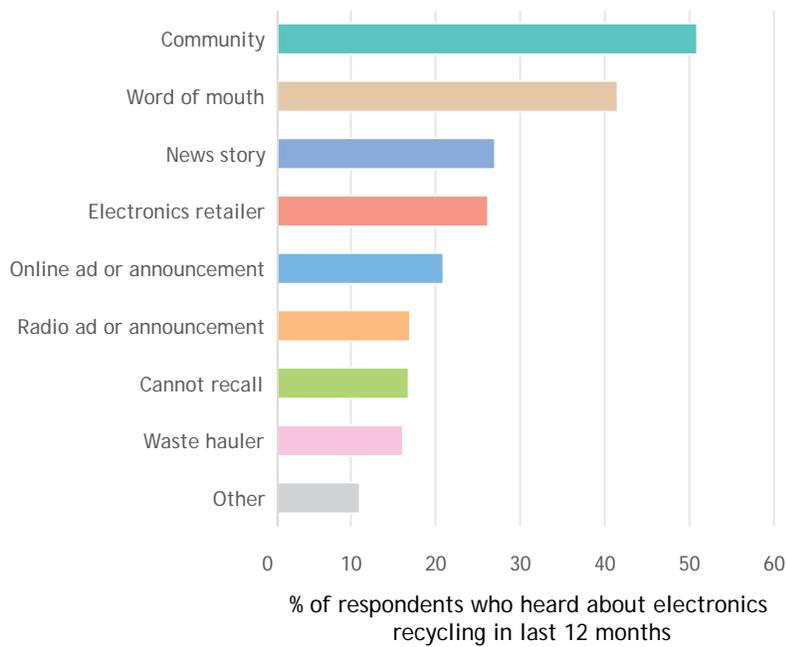
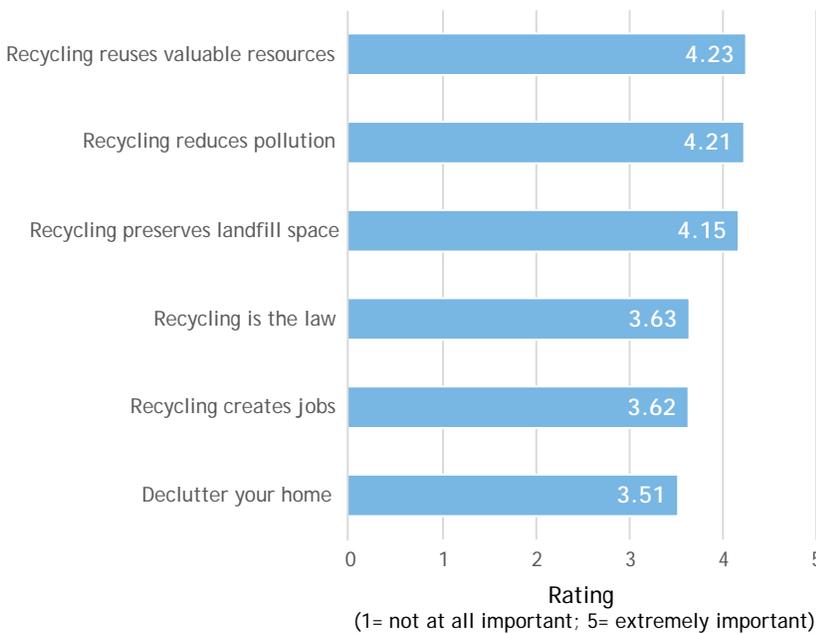


Figure 17: Respondents' relative importance of reasons to recycle electronics, 2018



messages that will resonate with the public.

Respondents were asked to rate the importance of six reasons to recycle on a 5-point scale, ranging from “not at all important” to “extremely important.” Figure 17 shows the average ratings for each reason. The three more “environmental” messages were, on average, more important than the non-environmental reasons. While all six reasons will resonate with some people, emphasizing that recycling electronics preserves valuable resources, prevents pollution and saves landfill space will likely be the most effective messages.

identify the most effective methods of reaching state residents and demographic groups that may need additional information.

Where people heard about electronics recycling

On the 2018 survey, the top five places respondents had heard about electronics recycling were from their communities, by word of mouth, in a news story, from an electronics retailer, and in an online ad or announcement (see Figure 16). This was similar to the 2016 survey, with the exception of the “online” category, which jumped in popularity as an information source, perhaps due to the DNR’s increased focus on digital advertising and social media. All five of these sources are outreach channels the DNR can influence, whether through more news releases and social media/digital advertising (which may also feed into “word of mouth”) or by continuing to work with local governments and electronics retailers to ensure these groups meet their outreach requirements under the electronics recycling law.

Effective messaging

The 2018 survey asked respondents, “How important to you are each of the following reasons to recycle your electronics?” The relative importance of the listed reasons can help tailor outreach

Among demographic groups the DNR would like to target because of their lower awareness of where to recycle electronics, the relative importance of reasons to recycle largely matched those of the overall survey. The exceptions were:

- “recycling preserves landfill space” was slightly more important than “recycling reduces pollution” for women, residents of southeastern Wisconsin and people with a low level of commitment to recycling in general;
- “recycling reduces pollution” was the most important reason for people with a high level of commitment to recycling in general;
- “recycling is the law” was the least important reason for residents aged 18 to 49 and people with a low level of commitment to recycling in general;
- “recycling creates jobs” was more important to renters than “recycling is the law”; and
- “declutter your home” was slightly more important than “recycling is the law” or “recycling creates jobs” for residents of southeastern Wisconsin.

Conclusions

The 2018 survey results point to potential outreach and policy actions the DNR and electronics recycling stakeholders can take to reduce the number of unwanted devices stored in homes and ensure electronics are not put in the trash. The survey confirmed the importance of outreach. Receiving information about electronics recycling was the biggest factor in determining whether someone was aware of where to recycle electronics, and not knowing where or how to recycle electronics was, in turn, the most common reason respondents were unable to recycle electronics. Analysis of differences among demographic groups points to some options for targeting outreach to those least aware of where to recycle electronics.

The DNR will use the survey results to adjust and improve its public outreach efforts, including updating its communications plan to reflect most effective messages (reusing valuable materials, preventing pollution, preserving landfill space) and focus on addressing barriers (not knowing where to recycle, lack of convenient/affordable recycling options, data security concerns). The DNR will also work to better reach demographic groups less aware of electronics recycling and to make sure local governments, electronics retailers and other stakeholders are aware of free outreach materials offered by the DNR.

The increased cost of electronics recycling and lack of convenient collection sites that the survey identified as other key barriers mirror challenges the DNR’s annual E-Cycle Wisconsin reports have identified and addressed through policy recommendations. Acting on these recommendations could address these barriers and reduce the high storage rates for unwanted electronics.

Appendix A: Survey background, demographics and methodology

The DNR's 2018 electronics recycling household survey asked respondents to describe how they have disposed of electronics in the recent past, what they know about electronics recycling in the state, what prevents them from recycling electronics and how they have heard about recycling opportunities (see Appendix B for a copy of the questionnaire).

The 2018 survey was administered by the UW-Madison Survey Center. In September 2018, the UWSC mailed a four-page questionnaire to 1,600 randomly sampled Wisconsin residential addresses in September 2018. Respondents received up to four mailings: an initial questionnaire with \$2 incentive, a reminder postcard and two additional questionnaire mailings (no incentive) to non-respondents. Collection of completed surveys ended Nov. 30, 2018.

UWSC received a total of 856 questionnaires with the majority of questions answered. A total of 65 of the originally mailed questionnaires were returned, marked undeliverable or vacant address by the U.S. Postal Service. With these removed from the sample, the survey response rate was 56 percent. UWSC reported that the survey had a fairly high response rate for this type of random sample, mailed survey.

Previous surveys used for comparison

To understand how knowledge of electronics recycling has changed since Wisconsin's electronics recycling law took effect in January 2010; the DNR compared the 2018 survey results with similar surveys conducted for the DNR by the UWSC in summer 2013, fall 2011 and fall 2010, along with a 2016 survey conducted by DNR's Science Services Bureau.

The 2016 survey was a general household recycling survey that included a subset of questions specifically dealing with electronics recycling. The eight-page survey was mailed to 1,600 randomly drawn Wisconsin residential addresses in February 2016, followed by a reminder postcard and reminder letter to non-respondents. The DNR purchased the list of names and addresses from Survey Sampling, Inc. The list was stratified by region (north/south) to create adequate representation of the less-populated northern part of the state. This over-sampling was corrected for during survey analysis. In total, the DNR received 692 completed surveys during the two-month field period, for a response rate of 49 percent after removing 187 undeliverable addresses.

The UWSC mailed the four-page 2013 household electronics recycling survey to 1,600 randomly drawn Wisconsin residential addresses in July 2013. A reminder postcard and two subsequent survey mailings over the course of two and a half months yielded 816 completed surveys, a response rate of 51 percent. After removing ineligible or vacant addresses the response rate was 53 percent.

The 2011 survey was an eight-page survey concerning Wisconsin residents' opinions, behaviors and knowledge of household recycling with a subset of questions specifically related to electronics recycling. The UWSC mailed the survey to 1,200 randomly drawn Wisconsin residential addresses in November 2011. Three full mailings and reminder postcards over two months yielded 638 completed surveys, a response rate of 53 percent. After removing ineligible or vacant addresses, the 2011 response rate was 56 percent.

The 2010 household electronics recycling survey was a four-page survey dealing entirely with electronics recycling. The survey was mailed to 1,600 randomly drawn Wisconsin residential addresses in October 2010. Three full waves of mailings and reminder postcards over two and a half months yielded 922 completed surveys, a response rate of 58 percent. After removing ineligible or vacant addresses, the 2010 response rate was 59 percent.

The DNR also compared the 2018 survey results with a phone survey on household recycling the Bureau of Waste and Materials Management contracted the UWSC to conduct in spring 2006. The UWSC completed 555 telephone interviews of adult Wisconsin residents, a 44 percent response rate when adjusted for refusals and ineligible households. The 2006 survey contained 11 questions about the number of electronics in residents' homes and how unused electronics were disposed of.

Survey respondent demographics

The demographics of the survey respondents for all five mail surveys are well matched for comparisons. The percentage of respondents living in rural settings, average household size, home ownership rate and the distribution across DNR regions are very similar. There has been a trend over time toward more older and fewer younger respondents. The DNR does not have detailed demographic information for the 2006 survey.

Respondent demographics from all five surveys have differed in some areas from Wisconsin's overall demographics, according to U.S. Census and state data. For the 2018 survey, 78 percent of respondents owned their homes (similar to the figures for earlier surveys), while the 2015 U.S. Census estimates put Wisconsin home ownership at 67 percent. About 35 percent of survey respondents, on average, have reported living in a rural area, compared with the Wisconsin Department of Administration's 2015 estimate that 30 percent of state residents lived in rural areas. The respondents to the surveys have tended to be older than the overall Wisconsin population. For example, in 2018, 37 percent of survey respondents were 65 or older, compared with 19 percent in this category in the 2010 U.S. Census. However, 2018 survey demographics were close to those of the state population in terms of gender breakdown and geographic distribution (using DNR region as a measure).

Methodology of 2018 survey analysis

The DNR analyzed 2018 survey results and compared them to previous surveys using SPSS and R software packages. Analysis tools used to examine statistically significant differences between variables included cross-tabulations with Chi-square, column proportion and Cromer's V tests, comparison of means with ANOVA, binary logistic regression and multiple linear regression. All comparisons included in this report have a significant level of at least $p=.05$, and nearly all are significant at the $p=.01$ level.

Appendix B: 2018 survey questionnaire



2018 Household Electronics Recycling Survey

Please complete this survey to the best of your ability and return in the provided envelope at your earliest convenience. The survey will ask you questions about your use and disposal of household electronics. Your responses will also help us to better meet Wisconsin residents' electronics recycling needs. Thank you for participating in this survey.

1. In the last 12 months, did you purchase any consumer electronics, such as a TV, computer, tablet, cell phone or printer, for your home?

- Yes
 No → Go to question 2
 Unsure → Go to question 2

1a. Which of the following describes how you purchased the home consumer electronics in the last 12 months?

| | Yes | No | If yes, please tell us the store name(s): |
|-------------------------------|-----------------------|-----------------------|---|
| a. Online for in-store pickup | <input type="radio"/> | <input type="radio"/> | <input type="text"/> |
| b. Online for delivery | <input type="radio"/> | <input type="radio"/> | <input type="text"/> |
| c. In person at a store | <input type="radio"/> | <input type="radio"/> | <input type="text"/> |
| d. Somewhere else | <input type="radio"/> | <input type="radio"/> | <input type="text"/> |

2. Do you know where you can recycle electronics?

- Yes, I am certain
 I think so but am not certain
 No, I don't know

3. What is the farthest you would be willing to travel, one way, to recycle your electronics?

Number of miles

4. Please think about all the cell phones, computers, and TVs in your home that are working and not working, in use and not in use. This includes those in your basement, attic or garage. In the boxes below, please indicate the number of these electronics in your home. Enter the number that are currently in use in the first column and the number that are currently never used, including broken items, in the second column. If you do not have an item in your home, please enter 0. Do not include electronics owned by an employer.

| | Number in use | Number not in use |
|--|----------------------|----------------------|
| a. Cell phones | <input type="text"/> | <input type="text"/> |
| b. Computers, including desktops, laptops, netbooks, and tablets | <input type="text"/> | <input type="text"/> |
| c. Televisions | <input type="text"/> | <input type="text"/> |

5. In the last 12 months, what did you do with each of the following electronic items that you no longer wanted? If you did not have or did not stop using a particular type of electronics, please check NA for Not Applicable.

| | NA | Put in trash | Recycled | Sold | Gave away to family or friends | Donated to charity | Exchanged / returned to retailer | Stored |
|---|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------------|-----------------------|----------------------------------|-----------------------|
| a. Cell phone(s) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| b. Computer(s) including desktops, laptops, and tablets | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| c. Television(s) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

If you did something not listed above please tell us.

6. In the last 12 months, was there ever a time when you wanted to recycle electronics but were unable to do so?

Yes

No → Go to question 7

6a. Which of the following best describes why you were unable to recycle the electronics?

- It was too expensive to recycle the electronics
- I didn't know where or how to recycle the electronics
- I didn't have a convenient place to recycle the electronics
- I was concerned about my data security
- I didn't have the time, it takes too long
- It was easier to throw things in the trash
- I was unable to transport items to the recycling location
- Other reason → Please tell us:

7. Some collection sites charge a fee to recycle electronics. What is the most you would be willing to pay to recycle electronic items such as old TVs, monitors, and computers?

- Nothing
- Up to \$5 per item
- \$6 to \$10 per item
- \$11 to \$15 per item
- \$16 to \$20 per item
- \$21 to \$25 per item
- More than \$25 per item

8. Would you be willing to pay more than you indicated in question 7 above to recycle electronics if...

| | Yes | No |
|--|-----------------------|-----------------------|
| a. ...you received a gift card or coupon equal to some or all of the recycling cost? | <input type="radio"/> | <input type="radio"/> |
| b. ...you had a guarantee of responsible recycling and safe data destruction? | <input type="radio"/> | <input type="radio"/> |
| c. ...a recycler would pick up electronics from your home? | <input type="radio"/> | <input type="radio"/> |

9. In October 2009, Wisconsin passed a state electronics recycling law. The law bans many electronics from being put in the trash. The law also created a manufacturer-funded program called E-Cycle Wisconsin, to make it easier and more affordable to recycle certain electronics. Before reading the above statement, had you heard about...

| | Yes | No |
|---|-----------------------|-----------------------|
| a. ...Wisconsin's landfill and incinerator ban on electronics? | <input type="radio"/> | <input type="radio"/> |
| b. ...E-Cycle Wisconsin, the statewide electronics recycling program? | <input type="radio"/> | <input type="radio"/> |

10. In the last 12 months, have you heard about where to recycle electronics from each of the following sources?

| | Yes | No |
|--|-----------------------|-----------------------|
| a. A news story | <input type="radio"/> | <input type="radio"/> |
| b. My community | <input type="radio"/> | <input type="radio"/> |
| c. An electronics retailer | <input type="radio"/> | <input type="radio"/> |
| d. My waste hauler | <input type="radio"/> | <input type="radio"/> |
| e. A radio advertisement or announcement | <input type="radio"/> | <input type="radio"/> |
| f. An online advertisement or announcement | <input type="radio"/> | <input type="radio"/> |
| g. By word of mouth | <input type="radio"/> | <input type="radio"/> |
| h. I heard about it, but I cannot recall where | <input type="radio"/> | <input type="radio"/> |
| i. Some other source. Please tell us: | <input type="radio"/> | <input type="radio"/> |

11. How important to you are each of the following reasons to recycle your electronics?

| | Not at all important | Not too important | Somewhat important | Very important | Extremely important | Not sure |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| a. Recycling reduces pollution | <input type="radio"/> |
| b. Recycling creates jobs | <input type="radio"/> |
| c. Recycling preserves landfill space | <input type="radio"/> |
| d. Recycling reuses valuable resources | <input type="radio"/> |
| e. Recycling is the law | <input type="radio"/> |
| f. Need to declutter my home | <input type="radio"/> |
| g. Some other reason not listed above | <input type="radio"/> |

Please tell us:

12. These last few questions will help us compare your answers with those of other respondents. All responses are confidential and will not be connected with your name.

How would you rate your commitment to recycling?

- Not at all committed
- Not too committed
- Somewhat committed
- Very committed
- Extremely committed
- Not sure

13. Which of the following statements best describes how you replace electronics such as TVs, computers, tablets and cell phones?

- I tend to only replace a device when it has stopped working well.
- I tend to frequently replace my devices to take advantage of new technology
- I like to keep up with new technology, but not buy the latest device immediately.
- I tend to replace my devices with newer ones for specific events, such as purchasing a new TV to watch a big sporting event or a new laptop for school.
- None of the above describe me.

14. Do you own or rent the home you currently live in?

- Own, includes having a mortgage
- Rent
- Some other arrangement

15. In which Wisconsin county is your primary residence located?

County

16. How would you describe the place where you live?

- Rural Urban Suburban
-

17. In the last 12 months, how many people usually lived in your household, including yourself?

Number of people

18. What is your current age?

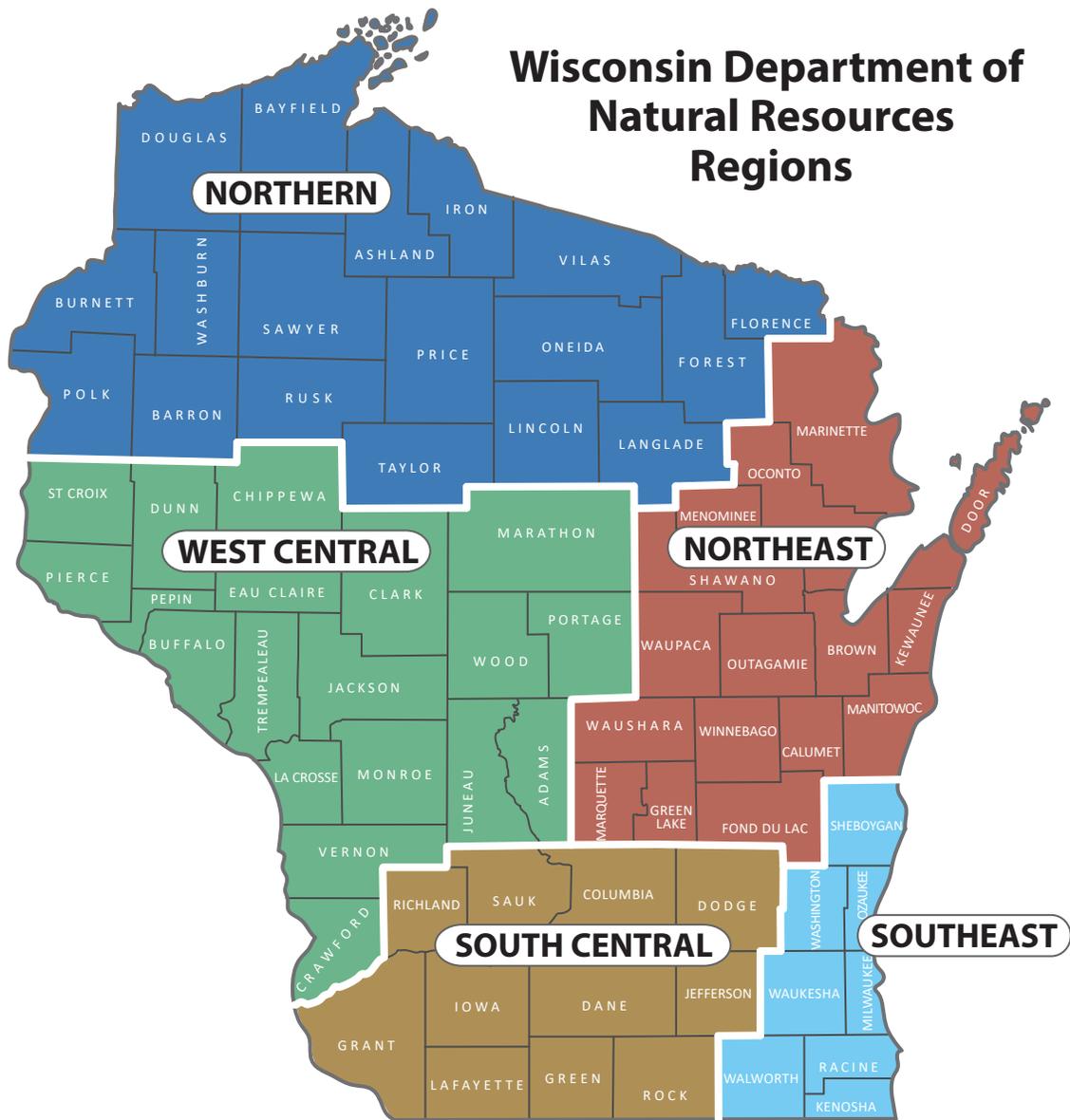
Years

19. Do you identify as male or female?

- Male
- Female

Thank you for completing this questionnaire! Please return it in the postage paid self-addressed envelope provided to: UW Survey Center; 475 N Charter Street, Room B607; Madison, WI 53706-1507.

Appendix C: DNR regions map



Wisconsin Department of Natural Resources
 Bureau of Waste and Materials Management
 P.O. Box 7921, Madison, WI 53707 | DNRWle-cycling@wisconsin.gov

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