



Trends in Wisconsin households' ownership and disposal of electronics

Results from the DNR's 2021 statewide household survey

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 bans. To fulfill these mandates effectively and inform program administration and policy, the DNR has conducted six 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 spring 2021.

Electronics ownership and disposal choices

Based on the 2021 survey, the DNR estimates Wisconsin households had **7.6 million TVs, 8.3 million computers (including desktops, laptops and tablets) and 9.3 million cellphones**. These estimates show a slight increase in the number of computers and small decreases in the number of TVs and cellphones since the 2018 survey. Survey responses indicated **17% of TVs, 26% of computers and 44% of cellphones in Wisconsin households were not being used**. The estimated number of unused devices declined for all three categories between 2018 and 2021, indicating some households made progress in cleaning out old gadgets.

Among households that had computers or cellphones they no longer wanted during the previous 12 months, the most common action was to put them in storage. About half had stored unwanted cellphones and 56% had stored unwanted computers. For TVs, the most common action was to recycle or reuse them (60% of respondents), compared with 37% who stored unwanted TVs. The percent of households that had stored unwanted devices decreased substantially for all three device types from 2018 to 2021. **Only a small percentage of respondents reported putting a cellphone (2%), computer (1%) or TV (3%) in the trash**. Awareness of the electronics recycling law, knowledge of where to recycle electronics and receiving electronics recycling information were the biggest factors affecting whether respondents recycled, stored or trashed their devices.

Electronics recycling awareness

The 2021 survey showed an **increased awareness of Wisconsin's electronics disposal ban and E-Cycle Wisconsin**, perhaps due to increased outreach efforts. The percentage of respondents who said they knew where to recycle electronics remained relatively steady between 2018 and 2021.

Receiving information about electronics recycling during the previous 12 months was the biggest factor influencing whether someone was aware of where to recycle electronics. The top five places respondents had heard about electronics recycling were from their communities, by word of mouth, social media, from an electronics retailer and in a news story. Respondents least likely to know where to recycle electronics included renters, respondents age 18-49, residents of southeastern Wisconsin and women.

Key takeaways from the 2021 survey

- The number of unused electronics in Wisconsin households and share of respondents who reported storing devices they no longer used declined between 2018 and 2021, though there remains a large number of unused devices in Wisconsin households that could be recycled.
- State residents are largely complying with the electronics disposal ban, with only a handful of survey respondents reporting they put a cellphone, computer or TV in the trash during the previous 12 months.
- Recycling outreach is 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 electronics recycling barriers. 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 recycling costs and lack of convenient collection sites identified in the survey mirror challenges addressed in 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 high storage rates for unwanted electronics.

To help inform outreach messages, the survey asked respondents to rate the importance of six reasons to recycle. Respondents ranked environmentally focused reasons—reusing valuable materials, reducing pollution and preserving landfill space—along with “recycling is the right thing to do” as the most important overall.

Electronics recycling barriers

About 29% of 2021 survey respondents said they had been unable to recycle electronics during the previous 12 months despite wanting to do so. **The most common reasons respondents were unable to recycle electronics were “Didn’t know where or how” (38%), “It was too expensive” (20%), “I didn’t have a convenient place to recycle” (18%) and “I was concerned about my data security” (14%).**

The share of respondents not willing to pay anything to recycle electronics has declined over time—perhaps reflecting the reality that recycling charges are more common—but in 2021, 57% of respondents were only willing to pay \$5 or less to recycle an item such as a TV or computer. The majority of respondents were willing to pay more under certain conditions, such as receiving a gift card or coupon, but about 4% of respondents were not willing to pay anything to recycle electronics under any of the listed circumstances.

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 to collect and recycle certain electronics from households and K-12 schools. It is based on a product stewardship approach, in which electronics manufacturers fund collection and recycling programs for their products. The law requires the Department of Natural Resources 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. Samples were random and statistically valid for all surveys, allowing the DNR to project responses to the statewide population.

The 2021 survey was conducted from April through July and had a response rate of 48%. DNR staff analyzed the data using a variety of statistical techniques. For more details on survey methodology, see Appendix A.

Number of electronics in Wisconsin households

As in previous years, the 2021 survey asked respondents how many computers, TVs and cellphones they had in their homes. Based on their answers, the DNR estimates Wisconsin households had 7.6 million TVs, 8.3 million computers (including desktops, laptops and tablets) and 9.3 million cellphones in 2021. These estimates show a slight increase from 2018 in the number of computers and small decreases in the number of TVs and cellphones (see Figure 1)

Responses indicated 17% of TVs, 26% of computers and 44% of cellphones in homes were not in use. This translates into about 1.3 million TVs, 2.2 million computers and 4.1 million cellphones ready for disposal (see Table 1). The estimated number of unused devices declined for all three categories between 2018 and 2021, indicating some households made progress cleaning out old gadgets.

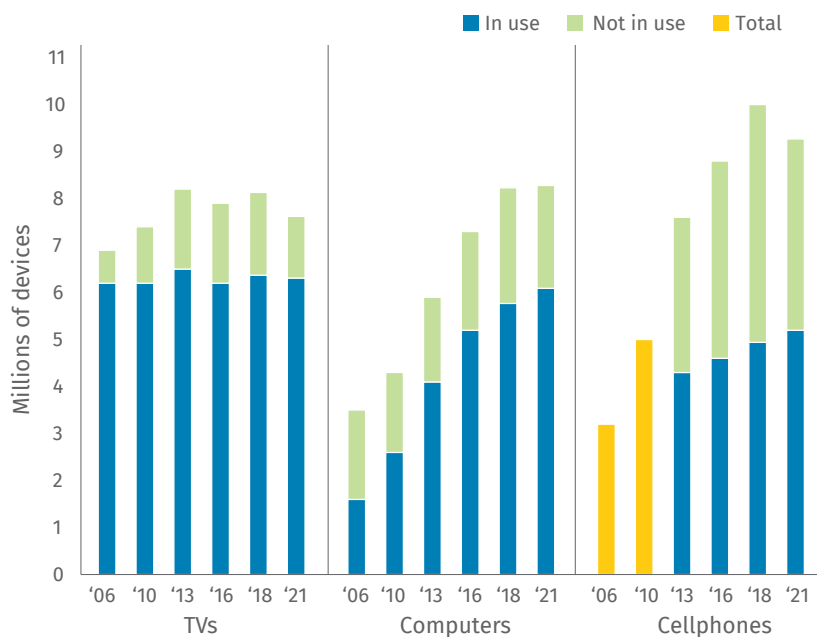
The 7.6 million devices sitting unused in homes reinforces the importance of helping residents find responsible reuse or recycling options. In total, 63% of respondents had at least one unused TV, computer or cellphone in their homes. Among these, the average number of unused devices was 3.5 and the highest was 20.

For the first time, the DNR asked respondents to report the numbers of cathode-ray tube (CRT) and non-CRT TVs separately, to gauge how many of the heavy, costly-to-recycle CRTs remain in Wisconsin homes. The results showed that, while flat-panel TVs (6.7 million) now outnumber CRTs (960,000) by nearly 7 to 1, CRTs still account for two-thirds of the estimated weight of unused

Table 1: Estimated number of electronics in Wisconsin households, 2021

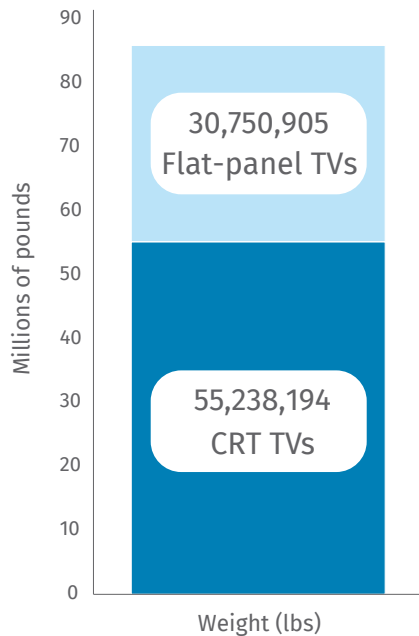
Device	Average # per household	Total in households	Total unused
TVs	3.09	7.6 million	1.3 million (17%)
Computers	3.36	8.3 million	2.2 million (26%)
Cellphones	3.76	9.3 million	4.1 million (44%)
Total	--	25.2 million	7.6 million

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



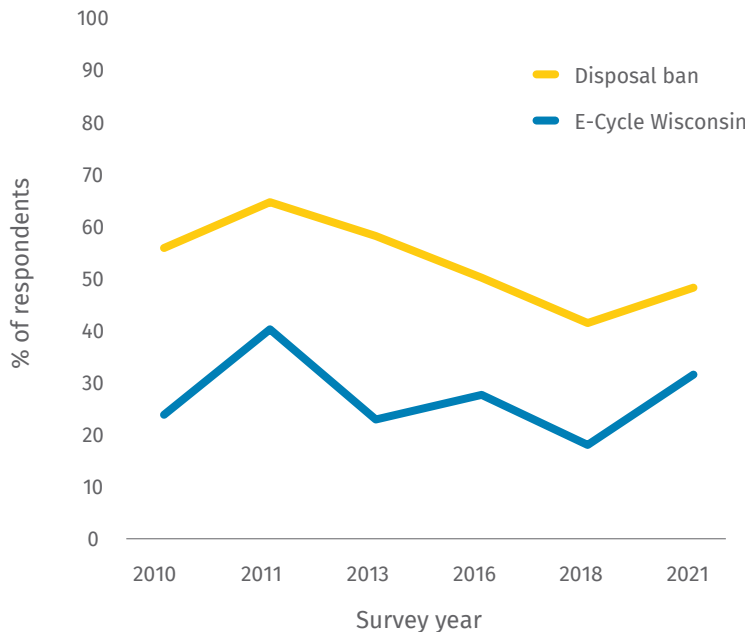
The “not in use” question was not asked for cellphones in 2006 and 2010.

Figure 2: Estimated weight of unused TVs in Wisconsin households, 2021



Estimate based on 2021 DNR household survey and average unit weights provided by the Electronics Recycling Coordination Clearinghouse.

Figure 3: Percent of respondents aware of electronics disposal ban or E-Cycle Wisconsin, over time



renters, and larger households had a higher average number of unused devices. Respondents age 18 to 29 and 65 and older had fewer unused devices, on average, than respondents age 30 to 64.

TVs in Wisconsin households. As shown in Figure 2, the DNR estimates there were a total of 86 million pounds of unused TVs in state households, with CRTs accounting for 55 million pounds.

In the 12 months before the survey, 55% of respondents had purchased a new device. Of those, 70% had purchased devices in brick-and-mortar stores, 46% had purchased online for home delivery and 27% had purchased online for in-store pickup.

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 3.1 unused devices in their households, compared with 1.8 in households that did not report a barrier to recycling. Respondents who had recently purchased new electronics had an average of 2.7 unused devices in their households, compared with 1.6 in households that had not made a recent purchase.

Respondents who knew where to recycle electronics averaged fewer unused devices than those who did not know or were not certain. Homeowners averaged more unused devices per household than

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

Table 2: Knowledge of where to recycle electronics based on awareness of law or receiving info

	Heard of E-Cycle WI		Heard of disposal ban		Heard where to e-cycle	
	Yes	No	Yes	No	Yes	No
Know where to recycle electronics						
Yes	68%	23%	51%	23%	48%	12%
Think so	24%	35%	29%	34%	33%	28%
No	8%	42%	20%	43%	19%	60%

ban on electronics and E-Cycle Wisconsin. After an increase from 2010 to 2011, the percent of respondents answering “Yes” to these questions declined. The 2021 survey showed awareness of the disposal ban increased from 42% in 2018 to 48% of respondents. Awareness of E-Cycle Wisconsin increased from 18% in 2018 to 31% of respondents in 2021, the highest level since 2011(see Figure 3).

Since 2013, DNR surveys have asked, “Do you know where you can recycle electronics?” The percent of respondents answering “Yes, I am certain” increased dramatically from 28% (2013) to 45% (2016), then declined to 39% in 2018. In 2021, the percentage of respondents saying they were certain they knew where to recycle electronics was down slightly, as was the percentage who said they didn’t know where to e-cycle, but there was no statistically significant difference with the 2018 numbers (see Figure 4).

Among all respondents in 2021, 32% were unaware of where to recycle electronics. Respondents aged 18-49, renters, residents of southeastern Wisconsin, women and respondents with a low commitment to recycling were less likely to know where to recycle electronics than other groups.

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 69% said they had heard about where to recycle electronics during that time.

As shown in Table 2, knowledge of the disposal ban, awareness of E-Cycle Wisconsin and hearing about where to recycle electronics in the previous 12 months each corresponded to knowledge of where to recycle electronics, indicating the importance of effective outreach.

Figure 4: Wisconsin residents’ knowledge of where to recycle electronics, over time

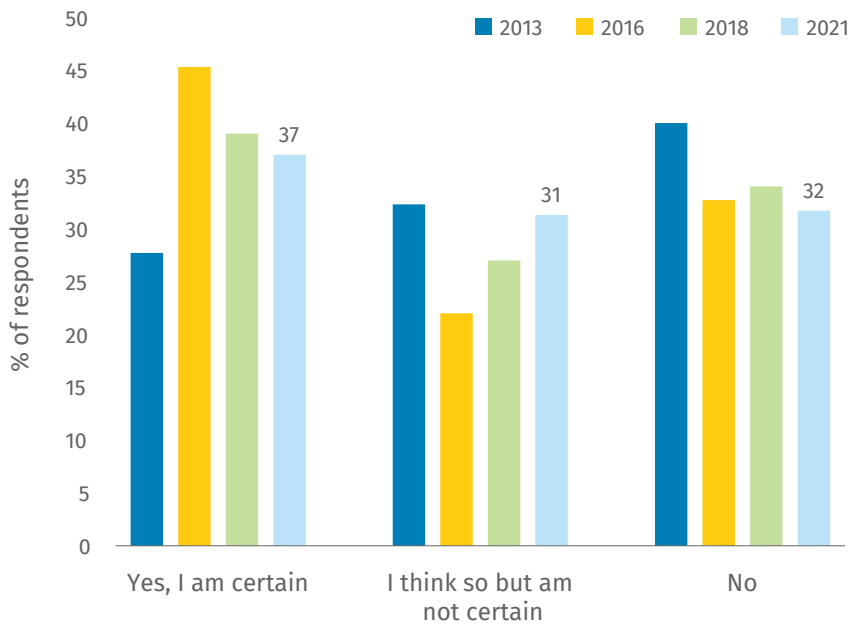


Figure 5: Wisconsin household electronics disposal choices, 2018 and 2021

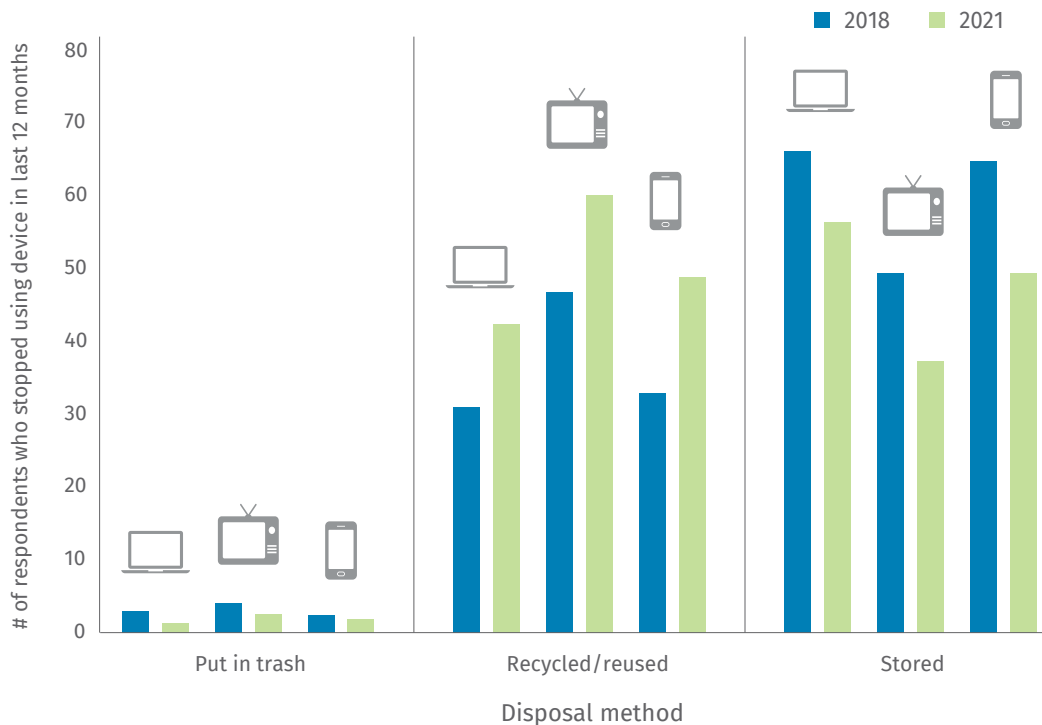


Table 3: What respondents did with unwanted electronics during previous 12 months, 2021

Disposal choice	TV	Computer	Cellphone
Stored	37%	56%	49%
Recycled	31%	21%	11%
Exchanged/returned to retailer	3%	5%	20%
Gave away to family/friends	16%	10%	9%
Donated to charity	5%	3%	5%
Sold	5%	3%	4%

Electronics disposal choices

All DNR household recycling surveys have asked what respondents 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, most significantly with the addition of a “stored” option beginning in 2016, but the questions have been similar enough to allow comparison over time.

On the 2021 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 62% of respondents answered this question for a cellphone, 48% answered for a computer (including desktops, laptops and tablets) and 44% answered for a TV.

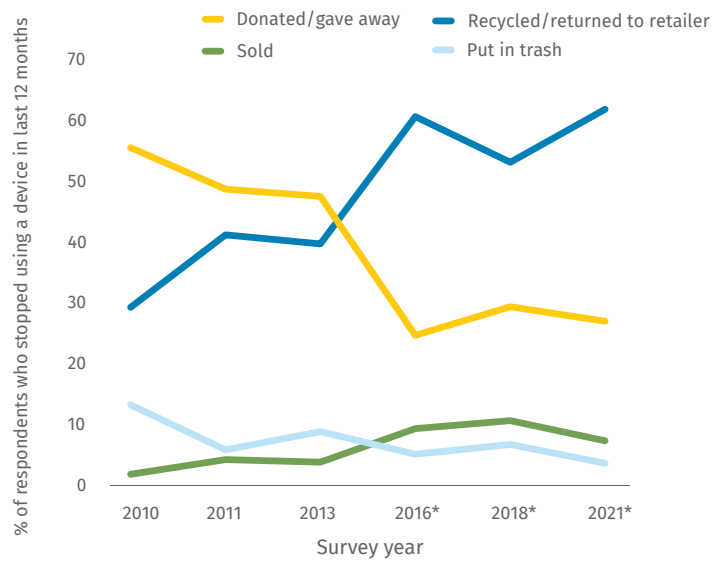
Among respondents who had a device they no longer wanted, about half had stored unwanted cellphones and computers and 37% had stored unwanted TVs during the previous 12 months. The percent of households that had stored unwanted devices decreased substantially for all three device types from 2018 to 2021, while the percent of households that recycled or reused devices increased, as shown in Figure 5. Only a small percentage of respondents reported putting a cellphone (2%), computer (1%) or TV (3%) in the trash. Table 3 shows the detailed breakdown of disposal choices.

A comparison of disposal choices across survey years, with “stored” and “other” responses removed, shows the percentage of respondents recycling their devices increased overall between 2010 and 2021. The percentage of respondents who put cellphones in the trash declined overall from 2010 to 2021, but the numbers fluctuated up and down (see Figure 6). The percent of respondents putting computers in the trash declined in 2021 (see Figure 7). The percentage of respondents who put TVs in the trash declined between 2010 and 2013, then increased slightly before declining again in 2021 (see Figure 8). Numbers from a 2006 DNR survey are not included here because of a large “other” category that makes accurate comparison difficult, but it is worth noting that nearly 30% of respondents to that survey reported putting TVs in the trash.

The most significant factors influencing respondents’ electronics disposal choices, based on survey questions, were receiving information about electronics recycling, being aware of Wisconsin’s electronics recycling law and knowing where to recycle electronics. Differences among respondents who were aware or not aware was most pronounced for TV disposal choices. For computers and cellphones, more of the “aware” respondents still chose to store unwanted devices, rather than recycle or reuse them, than was the case for “aware” respondents with unwanted TVs. This may reflect both that computers and cellphones are easier to store and that these devices contain more personal data. It suggests awareness and outreach alone may not be enough to motivate some people to recycle smaller devices instead of storing them.

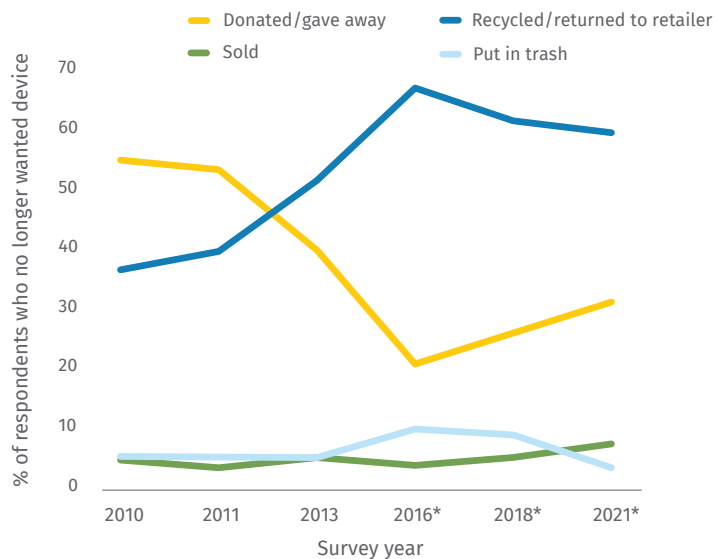
On the 2021 survey, respondents who were certain they knew where to recycle electronics were more likely

Figure 6: Wisconsin households’ cellphone disposal choices, over time



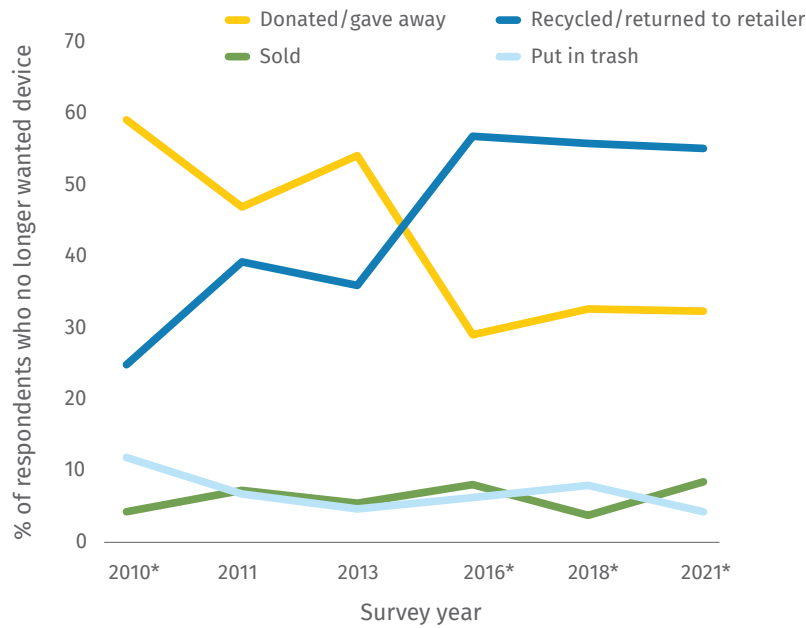
* “Stored” category removed. An “other” category was excluded for all survey years.

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



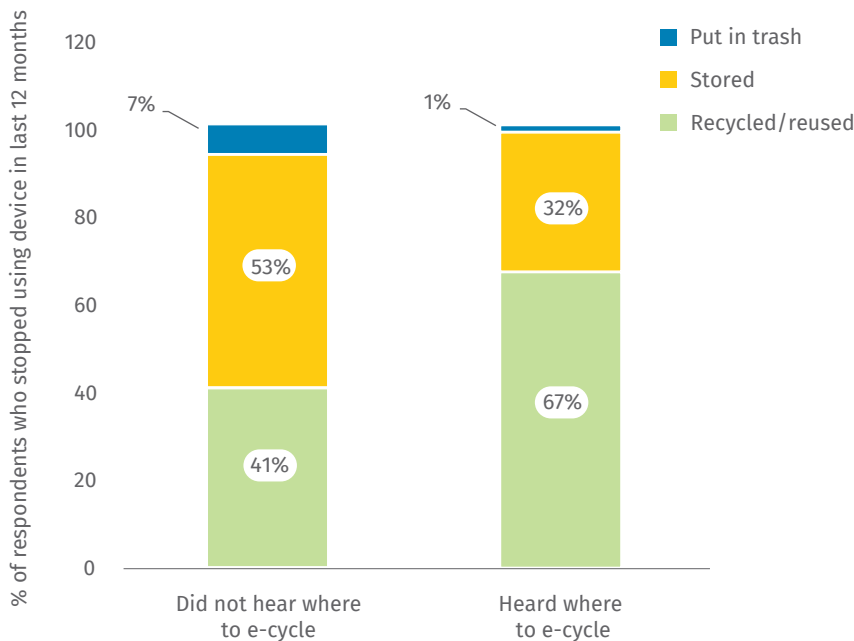
* “Stored” category removed. An “other” category was excluded for all survey years.

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



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

Figure 9: TV disposal choice based on hearing about recycling electronics



because nearly all E-Cycle Wisconsin collectors charge for TVs, and many charge more than \$20. It suggests collectors, recyclers and manufacturers may have difficulty motivating many residents to recycle TVs if fees remain high.

Comparisons among demographic groups such as age, DNR region, gender identity, home ownership status and level of commitment to recycling did not show statistically significant differences in electronics disposal changes.

to recycle or reuse TVs, computers and cellphones they no longer wanted, and less likely to put the devices in storage or the trash. This was also true of respondents who had received information about where to recycle electronics during the previous 12 months. Figure 9 shows the difference in TV disposal choices among respondents who had heard about where to recycle electronics in the previous 12 months compared with those who had not.

Being aware of E-Cycle Wisconsin also meant respondents were more likely to recycle and less likely to store or trash their electronics, with the biggest difference again for TVs. Respondents who were aware of the electronics disposal ban were also more likely than respondents not aware of the ban to recycle/reuse TVs and computers than to store or trash them. (There was not a statistically significant difference for cellphone disposal choices.)

One other difference in TV disposal choices was based on the amount respondents were willing to pay to e-cycle. Those who said they were not willing to pay anything were significantly less likely to have recycled or reused a TV they no longer wanted than respondents willing to pay up to \$10 or more than \$10 per item (see Figure 10). This is notable

Electronics recycling barriers

On each survey since 2010, the DNR has asked about reasons respondents had been unable to recycle electronics. The 2021 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 29% of all respondents) were asked, “Which of the following best describes why you were unable to recycle the electronics?” As shown in Figure 11, the top reasons were “Didn’t know where or how” (38%) and “It was too expensive” (20%). “I didn’t have a convenient place to recycle” (18%) and “I was concerned about my data security” (14%).

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 knowledge of where to recycle electronics. Because not knowing where or how to recycle electronics is the most common barrier, it’s interesting to note which barriers might need to be addressed once lack of knowledge is no longer the issue. Table 4 shows the top three barriers based on knowledge level.

While expense was a concern for all three knowledge levels, the lack of a convenient recycling location and concerns about data security were the top barriers among respondents who knew where they could recycle electronics. The DNR and others can consider these differences when developing outreach and policy proposals.

As Figure 12 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 on promoting the list. “Too

Figure 10: TV disposal choice by amount willing to pay to recycle electronics

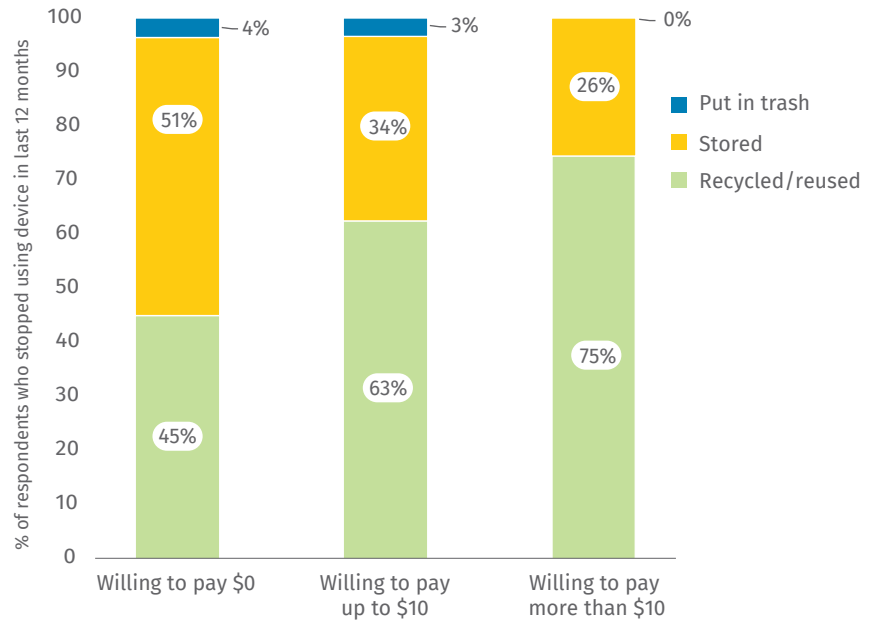


Figure 11: Reason unable to recycle electronics during last 12 months, 2021

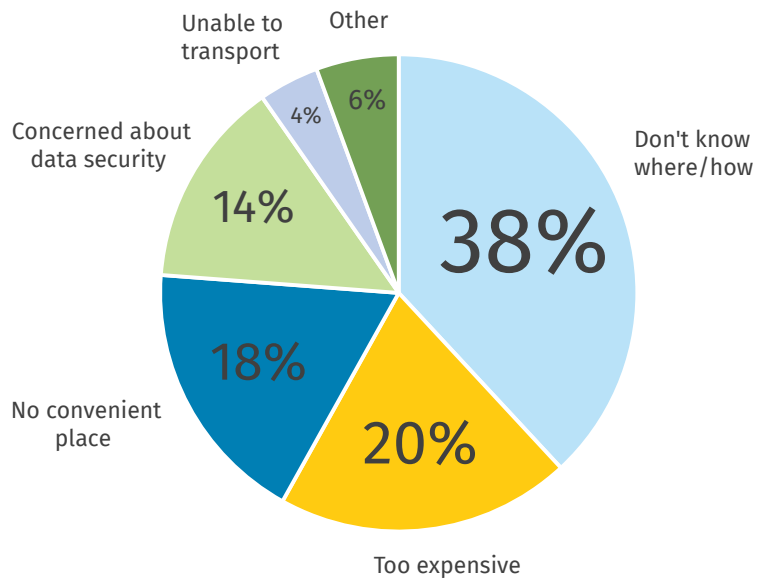
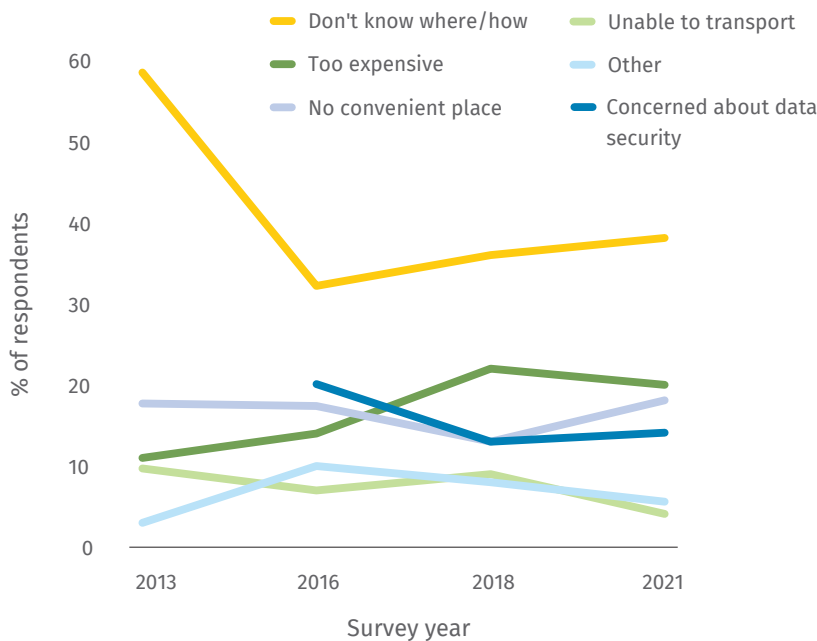


Table 4: Most common barriers based on knowledge of where to recycle and receiving electronics recycling information, 2021

Do you know where you can recycle electronics?			
Barrier rank	Yes	Think so	No
1	No convenient place	Don't know where/how	Don't know where/how+++
2	Data security concerns	Too expensive	Too expensive
3	Too expensive	Data security concerns	No convenient place

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



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 2020-June 2021 program year, 86% 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 \$20-\$30 range. As noted above, respondents who were not willing to pay anything were less likely to recycle/reuse TVs.

There was a statistically significant difference in the amount willing to pay across DNR regions, indicating residents in some parts of the state are less tolerant of higher fees. Thirty-eight percent of southeastern Wisconsin residents were unwilling to pay to recycle electronics, compared to 14% to 23% of residents in other parts of the state. About 65% of respondents in southeastern Wisconsin and 68% in northeastern Wisconsin were not willing to pay more than \$5 to recycle electronics, much higher than in other parts of the state.

The 2010, 2011, 2013 and 2018 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

expensive” has been trending upward as a barrier, which is not surprising given many collectors began increasing consumer fees in late 2015/early 2016. The increase in “no convenient place” from 2018 to 2021 may be due in part to cancellation of collection events and temporary closures of drop-off sites in 2020 due to the pandemic.

Amount willing to pay to recycle electronics

Several DNR surveys asked how much respondents would be willing to pay to recycle electronics. On the 2021 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 13 shows, 25% of respondents were not willing to pay anything to recycle electronics, 32% were willing to pay up to \$5 per item and 21% were willing to pay \$6 to \$10 per item. The remaining 22% were willing to pay more than \$10 per item.

While this was a hypothetical and generic question (e.g., it didn’t

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 to recycle electronics.

As in some previous years, the 2021 survey asked a follow-up question about whether a respondent would be willing to pay more per item under certain circumstances. Table 5 illustrates the percentages of respondents who were willing to pay more under each circumstance. About 4% of respondents were not willing to pay to recycle electronics under any of the listed circumstances.

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 travel. The 2021 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 210 miles, with an average distance of 15.7 miles and a median of 10 miles.

Elements of successful outreach

As mentioned above, the 2021 survey confirmed the importance of ongoing outreach. Respondents who had heard about electronics recycling in the previous 12 months were much more certain of where to recycle electronics than those who had not. The DNR uses sur-

Figure 13: Maximum amount willing to pay to recycle device, 2021

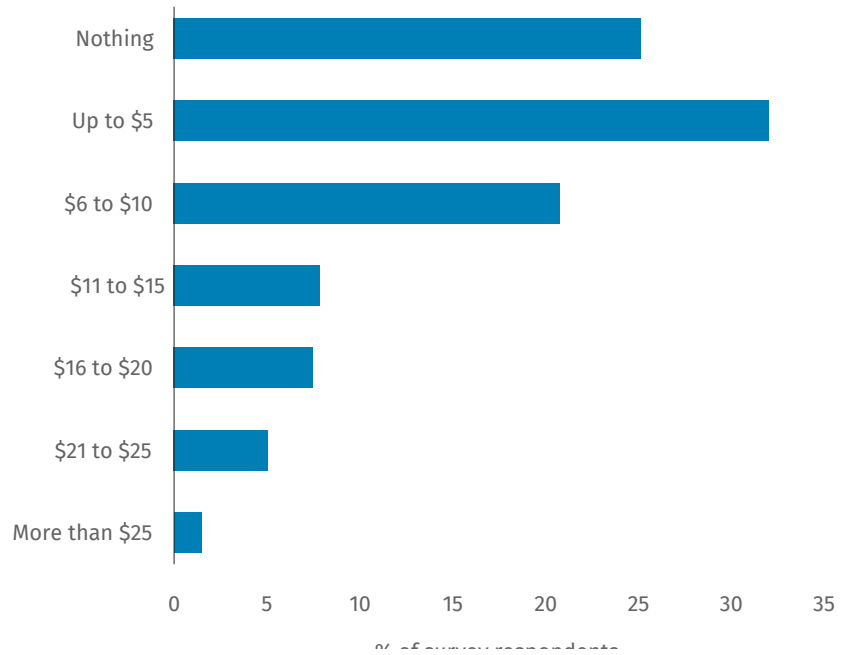


Figure 14: Maximum amount willing to pay to recycle device, over time

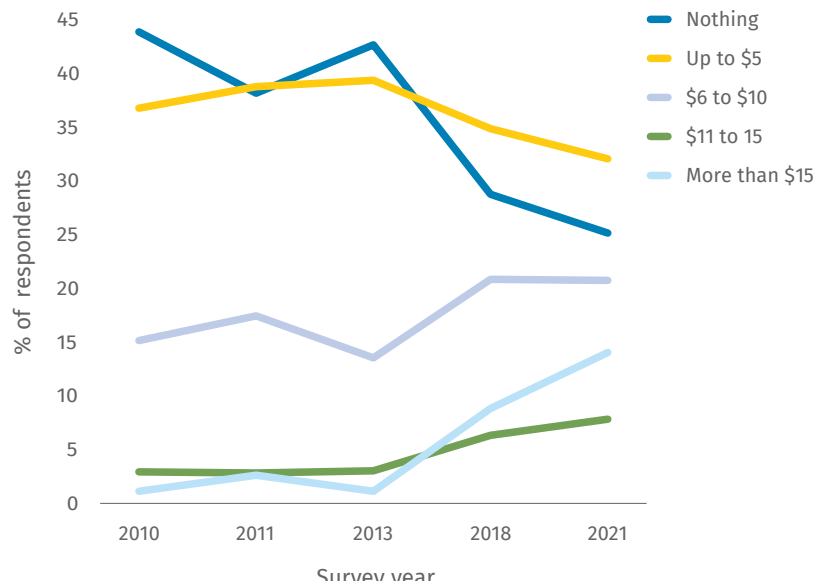


Table 5: Percent of respondents willing to pay more per item under certain conditions

Willing to pay more if...	Response to “most willing to pay” question		
	All amount categories	Initially willing to pay \$0	Initially willing to pay up to \$5
Received gift card or coupon	78%	74%	79%
Guaranteed responsible recycling & data destruction	62%	47%	56%
Electronics picked up from home	72%	62%	72%

Figure 15: Where respondents heard about electronics recycling, 2021

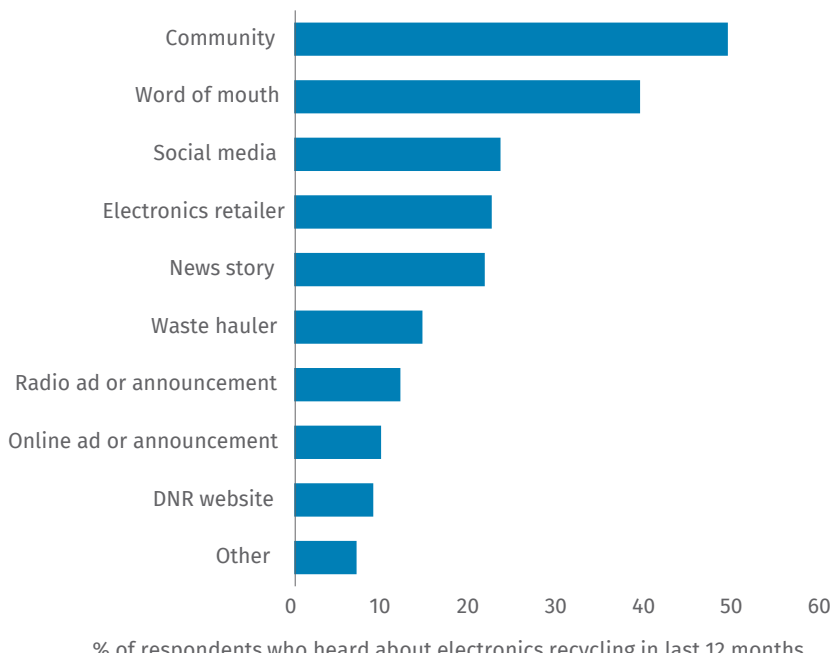
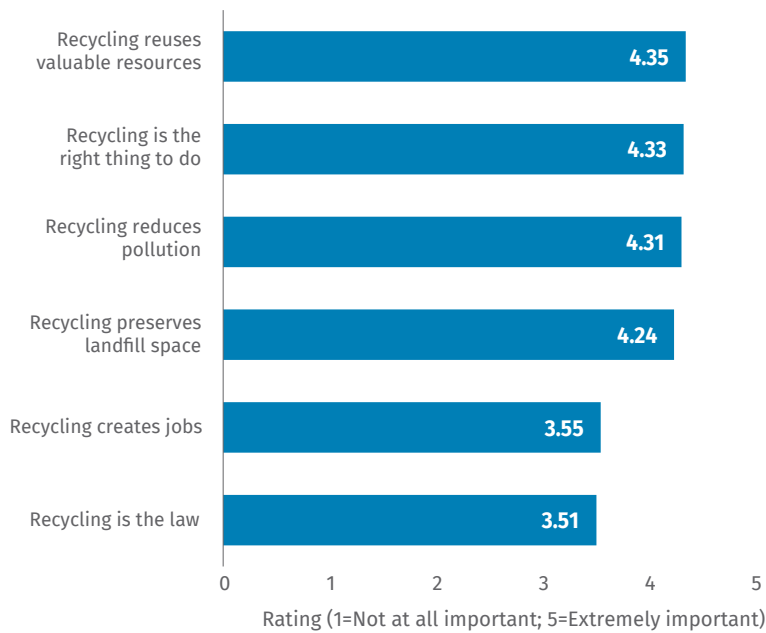


Figure 16: Respondents’ relative importance of reasons to recycle, 2021



messages were, on average, more important than creating jobs or following the law. A new option on the 2021 survey, “Recycling is the right thing to do,” also resonated with respondent.

Among demographic groups the DNR would like to reach because of their lower awareness of where to recycle electronics, the relative importance of reasons to recycle largely matched those of the overall survey, with the exception that “recycling is the right thing to do” was slightly more important than other reasons among respondents who identified as women.

vey data to help identify the most effective methods of reaching residents and demographic groups that may need additional outreach.

On the 2021 survey, the top five places respondents had heard about electronics recycling were from their communities, by word of mouth, social media, from an electronics retailer and in a news story (see Figure 15). This was similar to the 2018 survey. All 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 survey asked respondents, “How important to you are each of the following reasons to recycle?” The relative importance of the listed reasons can help tailor outreach messages.

The survey asked respondents to rate the importance of six reasons to recycle on a 5-point scale, ranging from “not at all important” to “extremely important.” Figure 16 shows the average rating for each reason. As on past surveys, three “environmental”

Conclusions

The 2021 survey indicated progress on reducing the number of unused devices in Wisconsin households through recycling and reuse since the last survey in 2018. This may have been due in part to increased awareness of the electronics recycling law.

The results also 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 (recycling rescues valuable materials, is the right thing to do and prevents pollution) 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. A new grant program created by 2021 Wisconsin Act 79 will help address these barriers, and the DNR will continue to work with stakeholders to identify additional policy changes.

Appendix A: Survey background, demographics and methodology

The DNR's 2021 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. The electronics recycling questions were included as part of an 8-page survey covering a variety of recycling-related topics.

The 2021 survey was administered by the UW-Madison Survey Center. In April 2021, the UWSC mailed the questionnaire to 2,000 randomly sampled Wisconsin residential addresses. Respondents received up to three mailings (initial questionnaire with \$2 incentive, reminder postcard, and one additional questionnaire mailing with no incentive to non-respondents. Collection of completed surveys ended July 2, 2021.

UWSC received a total of 950 questionnaires with the majority of questions answered. A total of 42 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 48 percent. This was slightly lower than previous surveys, likely due to the elimination of a fourth mailing because of costs.

Email DNRWTe-cycling@wisconsin.gov for a copy of the 2021 questionnaire.

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 2021 survey results with similar surveys conducted for the DNR by the UWSC in fall 2018, summer 2013, fall 2011 and fall 2010, along with a 2016 survey conducted by DNR's Science Services Bureau.

The UWSC mailed the four-page 2018 household electronics recycling survey to 1,600 randomly drawn Wisconsin residential addresses in September 2018. A reminder postcard and two subsequent survey mailings over the course of two and a half months yielded 856 surveys with the majority of responses completed. After removing ineligible or vacant addresses the response rate was 56%.

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 list of names and addresses 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% 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. After removing ineligible or vacant addresses the response rate was 53%.

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. After removing ineligible or vacant addresses, the 2011 response rate was 56%.

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. After removing ineligible or vacant addresses, the 2010 response rate was 59%.

The DNR also compared the 2021 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% 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

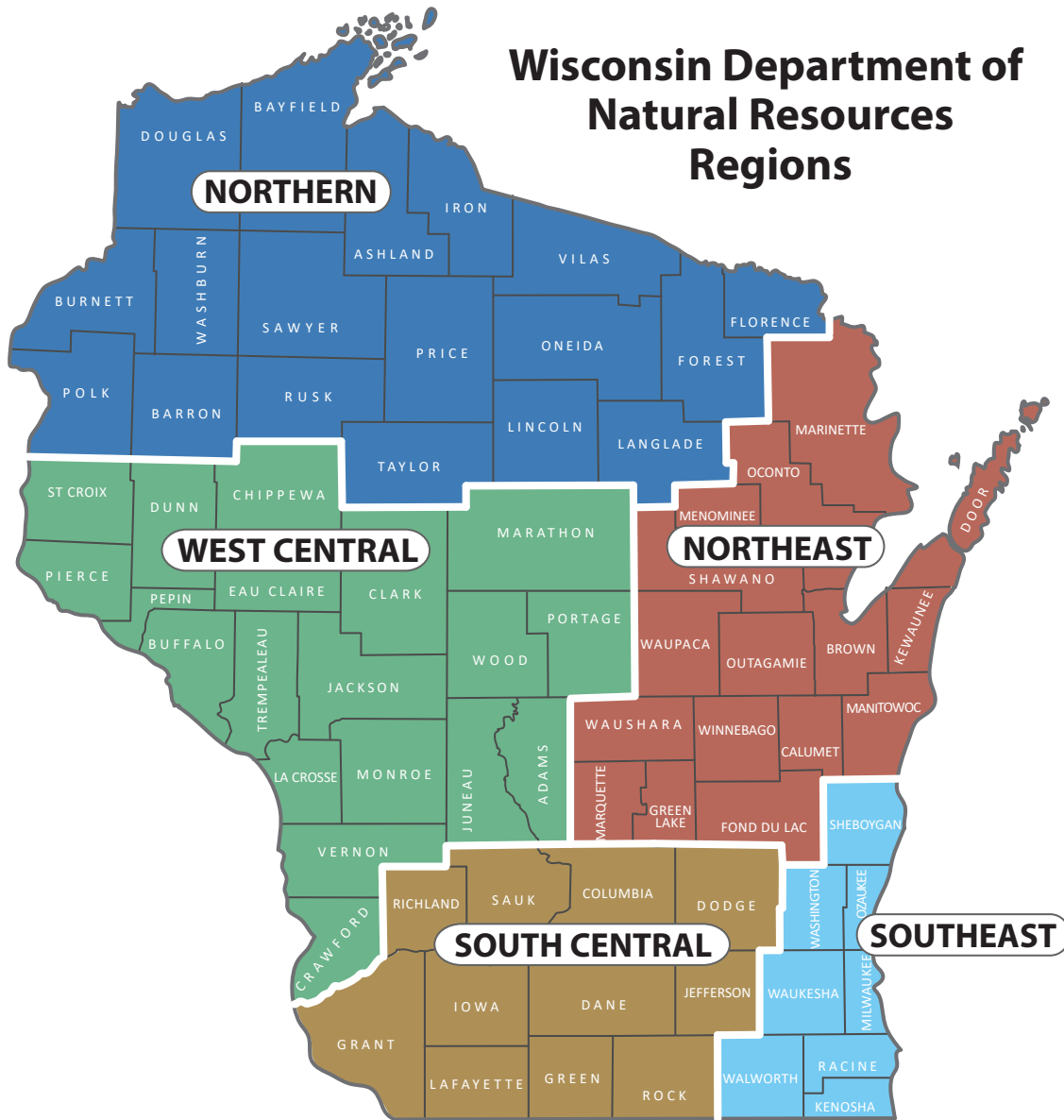
The demographics of the survey respondents for all six mail surveys are well matched for comparisons. The percentage of respondents living in rural settings, average household size, home ownership rate and the distribution across DNR regions are very similar. There has been a trend over time toward more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

Respondent demographics from all six surveys have differed in some areas from Wisconsin's overall demographics, according to U.S. Census and state data. For the 2021 survey, 79% of respondents owned their homes (similar to the figures for earlier surveys), while the 2020 U.S. Census estimates put Wisconsin home ownership at 68%. About 38% of survey respondents, on average, have reported living in a rural area, compared with the Wisconsin Department of Administration's 2015 estimate that 30% 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 2021, 31% of survey respondents were 65 or older, compared with 19% in this category in the 2010 U.S. Census. However, 2021 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 2021 survey analysis

The DNR analyzed 2021 survey results and compared them to previous surveys using the SPSS 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, and comparison of means with ANOVA. All comparisons included in this report have a significance level of at least $p=.05$, and nearly all are significant at the $p=.01$ level.

Appendix B: DNR Regional Map



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