Indoor Waste & Diversion Practices at Colleges & Universities

Trends & Lessons Learned for
Bin Standardization, Centralized Collections
& Other Practices.

Summary Report
October 2024

A collaboration between:

BUSCH SYSTEMS

aashe

NATIONAL WILDLIFE FEDERATION

CAMPUS RACE TO ZERO WASTE 2024

CURC

ZERO WASTE CAMPUS COUNCIL

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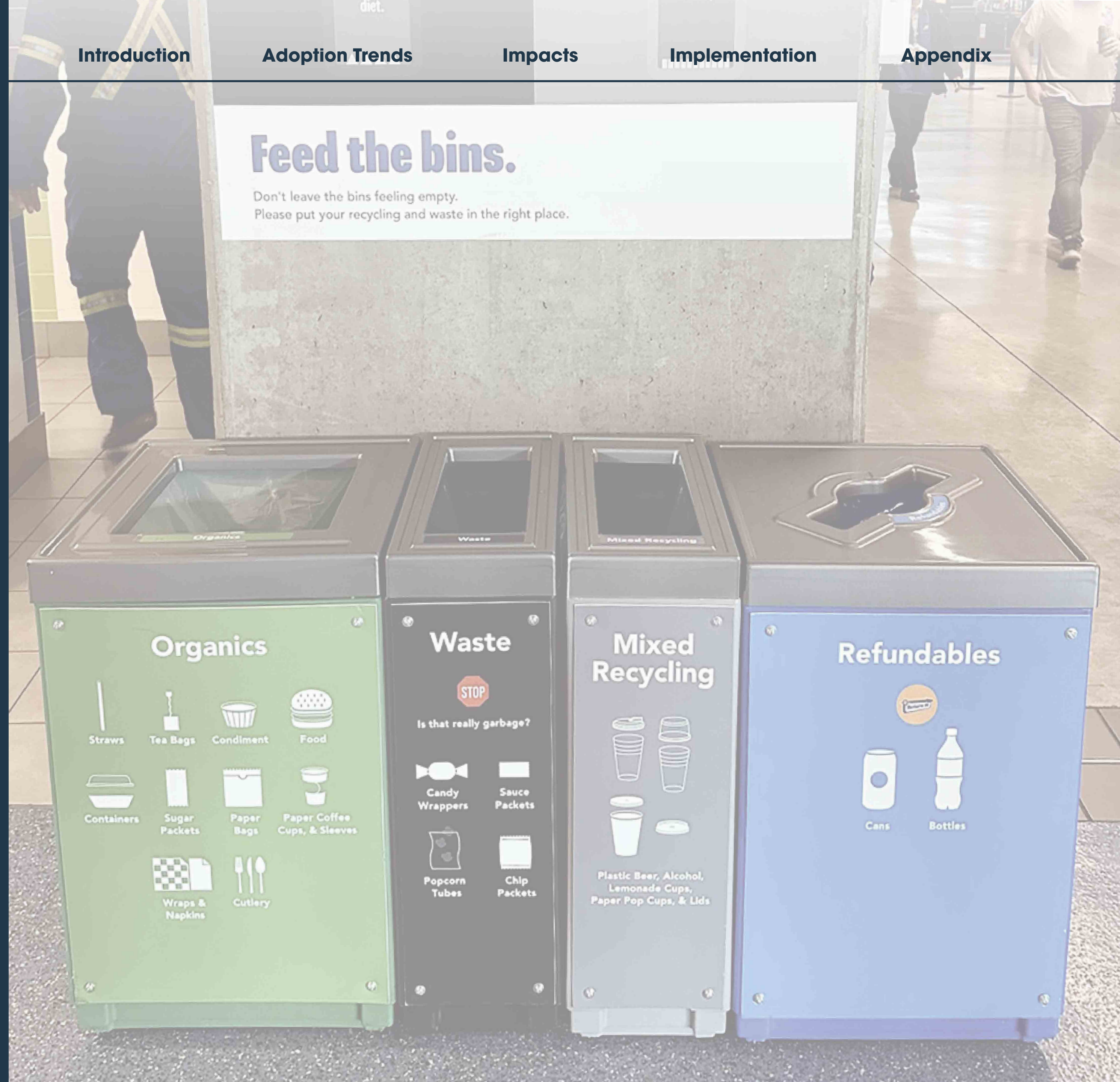
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This project was a collaboration between Zero Waste Campus Council, CURC, Association for the Advancement of Sustainability in Higher Education (AASHE), Campus Race to Zero Waste, National Wildlife Federation and Busch Systems. Project management and preparation of this report was done by Busch Systems.

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Special thank you to Phil Lombardo of Endicott College for data analysis of the survey results, and to the program representatives who provided additional information for the campus spotlights.

In addition to the credits listed with photos throughout the report, images were provided by the City of Lethbridge and Indiana University, Purdue University-Indianapolis.

Glossary

Bin Stations or Waste Stations: Terms used interchangeably to refer to trash, recycling and in some cases compost bins or multi-stream cabinets co-located together in public or common areas for general use. Typically involves 20 to 50-gallon bins.

Basket: Refers to smaller bins under 10 gallons typically provided to office deskside locations.

Centralized Collections: Collection model encompassing both placement and service arrangements that de-emphasize or avoid custodial service from office deskside and / or classrooms in favor of individuals bringing their personal waste to bin stations in common areas.

Composting/Compostable: Refers to food waste and other organic materials including compostable food packaging that is recovered with a dedicated collection stream. Term is used interchangeably in this report with "organics" or "food waste".

Deskside: Refers to personal office workspaces for staff and faculty.

Diversion: Refers to efforts to keep recyclable, compostable or reusable waste from being disposed of as trash.

Streams or Collection Streams: Umbrella terms used interchangeably to refer to different types of waste collected using separate collection bins or bin chambers. Depending on the school, this may include one stream for mixed recyclables or separate streams for different types of recyclables, in addition to a trash stream. Where food waste / compostables are recovered they constitute their own collection stream.

Recovery: Refers to efforts to collect and direct recyclable, food waste/ compostable or reusable items away from the landfill toward another use.

Trash: Non-recyclable or compostable material that cannot be diverted or otherwise recovered.

Waste: For the purposes of this report, waste refers broadly to all discarded items, including recyclables, organics and reusable items as well as trash or garbage destined for landfills or incineration. By extension, waste stream refers to all the materials being discarded on a campus.

About the Survey

Establishing a successful diversion program that recovers a high percentage of the waste stream requires more than simply setting out a few bins labeled for "recycling". Despite best intentions and educational outreach, the average person typically discards waste without giving it their focused attention. Too often, the result is waste items ending up in the wrong bin. Just as speed bumps and other traffic calming measures can modify driver behavior and reduce accidents, public-facing waste collection arrangements (both bins and how they're serviced) can be designed to guide user behavior and improve the system's overall performance.

Though a growing number of colleges and universities have adopted a range of best practices toward this end, little effort has been made to document these trends or quantify their impacts. This project was designed to help fill in these gaps, using an online survey of higher education institutions to detail aspects of their waste and diversion collection arrangements from indoor administrative and academic areas of campus. The survey focused on the participating school's efforts, if any, to adopt two categories of best practices, uniform bin standards and centralized collection arrangements, along with related practices with food waste collections and educational outreach.

Recognizing the value these best practices can have to improve waste diversion and the challenges many schools face in implementing them, the goal of the project has been to support campus project managers with resources to help adopt them locally. To do this it has three objectives: 1) document adoption trends at other colleges and universities to demonstrate the growing consensus around their value; 2) provide qualitative evidence of their impactfulness to help build stakeholder support for their implementation; and 3) gather lessons learned and practical advice from campus staff who've previously implemented them to aid the planning of those looking to do so.

Explanation of Key Best Practices

Uniform Bin Standards

The concept of uniform standards is to set up waste and diversion bins with as close to a uniform appearance as possible in all areas of a campus. Using the same logic as product branding on consumer packaging, the predictable appearance of bins from one location to another allows distracted users to tap their recognition and past experience with the bins to quickly understand how to sort items in the moment. Uniform standards are important to coordinate purchasing decisions that are otherwise determined by the aesthetic or other incidental preferences of different administrators across campus and over time. Without standards and a process to enforce them, campuses accumulate a hodgepodge of a dozen or more mismatched bin styles, haphazardly placed.

The survey asked participating schools about four basic types of bin standards:

Uniform Color Branding
Each distinct waste stream is assigned its own color that is used in all locations. The color may be applied to the entire bin, just the top of it or just on signage.

Designated Bin Model(s)
Whether the exact same bin product or just bins of similar materials and style, the physical appearance of the bins, the shape of the openings and positioning of signage are used to reinforce expectations. In practice, schools typically designate several different bin styles based on the requirements of the setting.
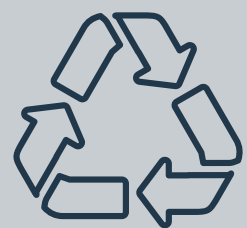
Labels and Signage
Consistent terminology, list / images of acceptable items and overall branding and appearance are used on bins.

Placement
Written guidelines detailing how to position bins in predictable patterns in relation to the layout of a building and the surrounding architectural features. These may include guidance on placing bins in relation to sight lines in a hallway, ensuring bins are within a specified distance from classrooms and offices or placed consistently next to building entrances. These may go further to define exactly which waste streams will be included in certain settings or even the exact order of streams from left to right.

Centralized Collections

This is an umbrella term for an operational model that can be applied to several situations in different ways. The general concept is to deploy a relatively small number of mid-size waste collection bins (15 to 50 gallons) to strategic "centralized" locations, where individuals are expected to carry and discard their personal waste. The four main examples where this is applied are waste generated in 1) offices and staff workstations, 2) classrooms and meeting rooms, 3) outdoor areas of the main campus (excluding venues and stadiums), and 4) multi-family housing. In the first two instances that are the focus of this project, custodial staff who might previously have emptied the small waste baskets placed by an office desk or inside a classroom are now assigned to only service the larger centralized bins located in common areas such as hallways, break rooms or lobby areas. Bins are removed entirely from classrooms, and depending on a school's particular arrangement, deskside locations as well. Students, staff and faculty are instructed in each instance to discard their waste in the centralized bins placed nearby.

Prior to the introduction of recycling programs, the historic pattern for collecting waste on most college campuses was to disperse a large number of trash bins, serviced by facilities staff, wherever people might be expected to discard waste. The underlying logic was to maximize convenience for people discarding waste on the assumption it would reduce litter and the need for labor to remove it. This model creates several challenges to diverting waste. Given most people will not walk past the "wrong" bin to find the correct one for the item they're discarding (regardless if it is recycling or trash), an effective material recovery program requires placing one or more additional bins next to existing trash bins in most situations. Doing this comes with a price tag, both the capital cost to purchase new bins and the additional labor to service them.

Multiplied across a campus with hundreds if not thousands of decentralized trash bins, these costs create administrative headwinds slowing or even preventing the expansion of diversion programs. Even where costs are not a factor, space limitations may prevent adding a second or more centralized bins for the additional streams. Behavior is another theoretical problem. In a sense, the greater convenience of instantly accessible, custodial-serviced waste bins enables people to minimize their level of focus when aiming their waste item toward one bin opening versus another.

Centralized collection arrangements flip this script. Asking people to carry their waste to centralized bins gives them an opportunity to reflect on how sorting rules apply to the item(s) they're discarding. Unlike the small waste baskets in a classroom or office, the centralized bins they're directed to are likelier to have restrictive openings and signage that further improve sorting accuracy. Operationally, the labor previously dedicated to emptying a large network of bins can be repurposed to other cleaning tasks, or in many cases, to servicing expanded collection options for compostable food waste. Eliminating unnecessary bins also means reducing the number and cost of plastic bags needed to line them.

As the survey findings show, the assumption behind the historic pattern of redundant bins placed everywhere simply isn't accurate. With careful planning, shifting to a centralized model does not automatically result in more litter in most cases, and is even shown to reduce it in some cases.

Methodology

This project involved an online survey of primarily sustainability staff at colleges and universities in the United States and Canada in March and April of 2024. The survey was distributed to campus representatives at over 1,000 institutions via contact lists of the partner organizations and professional sustainability listservs. Approximately 200 responses were received, 170 of which were validated for the project. The basic form consisted of fifteen multiple choice and open comment questions, with as many as six follow up questions presented to certain participants based on their responses.

All US-based schools were cross-referenced against Carnegie Classification's Size and Settings groupings to categorize the response sample by geographic zone, size and type of institution. Additional direct outreach was made to recruit participation from large (over 10,000 FTE), US-based 4-year schools. Recognizing the total sample would represent less than one percent of all 4,375 US and Canadian colleges and universities, this sub-group was targeted because of the potential to include a significant percentage of the 285 such institutions. 97 schools from this sub-group (33%) are included in the final sample (59% of total participation). Though this sample did not produce statistically significant findings in most instances, we've chosen to display results about adoption trends of the various practices based on this sub-group of large, US-based 4-year schools because their larger sample size is inherently more representative and by our judgement, meaningful. Results for the overall group of schools are largely similar, and notes have been included where they diverge significantly. Charts tallying responses to the separate questions about the impact of these practices or advising about challenges and strategies to implement them are drawn from any participating institutions from the larger group that have adopted them.

The report's findings come with several qualifications. First, the sample of 170 participants has an inherent selection bias, disproportionally representing schools that have a dedicated sustainability office and staff. Given these are often the people on campus spearheading the adoption of best practices, the trends described may appear more widespread than in practice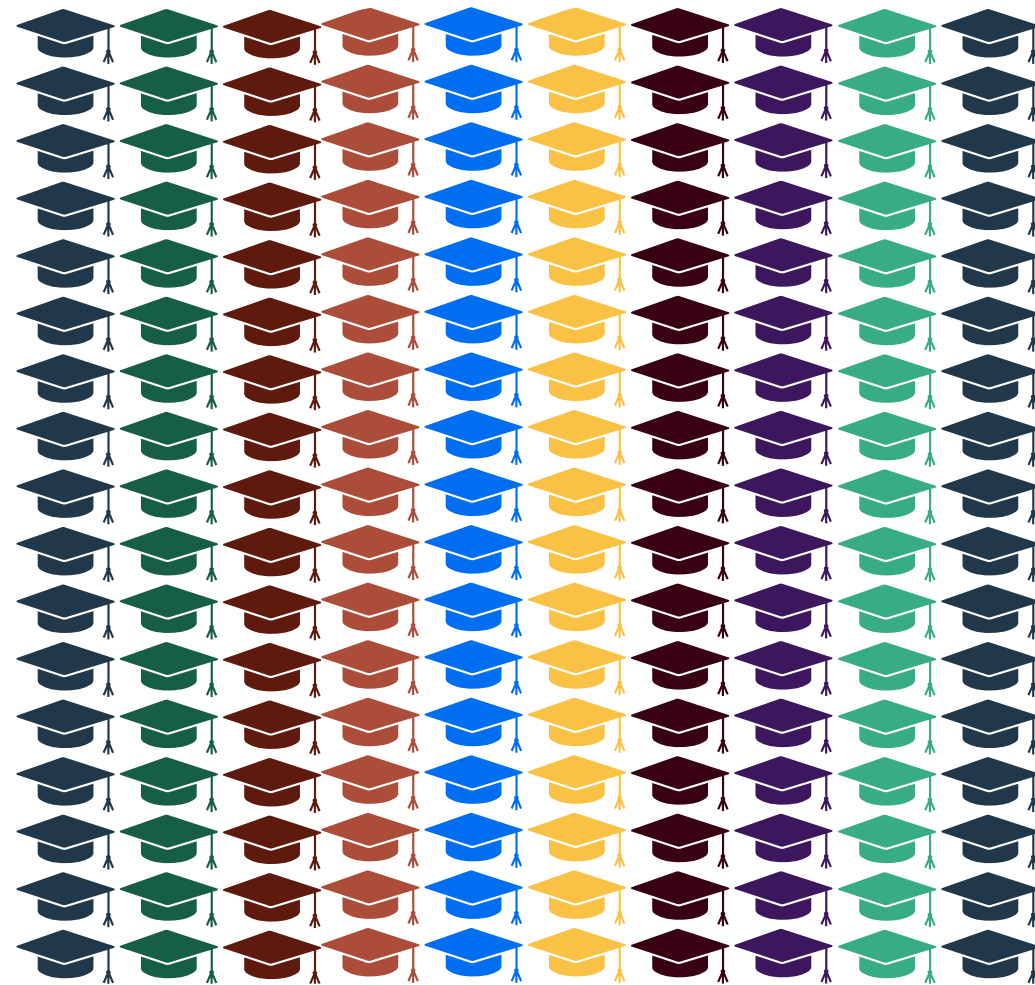. Second, to counter "survey fatigue" and boost participation, the survey form minimized the number of questions and presented respondents with broader, less defined response options. This in turn left room for participants to interpret certain answers with greater subjectivity. Notes are included with individual figures describing where this may factor in the results.

Boston University

Profile of Participating Institutions

170 Colleges & Universities

Institution Type

4 YEAR, MEDIUM
18%

4 YEAR, SMALL
14

2 YEAR
7%

2%
GRADUATE ONLY

59%

4 YEAR, LARGE*
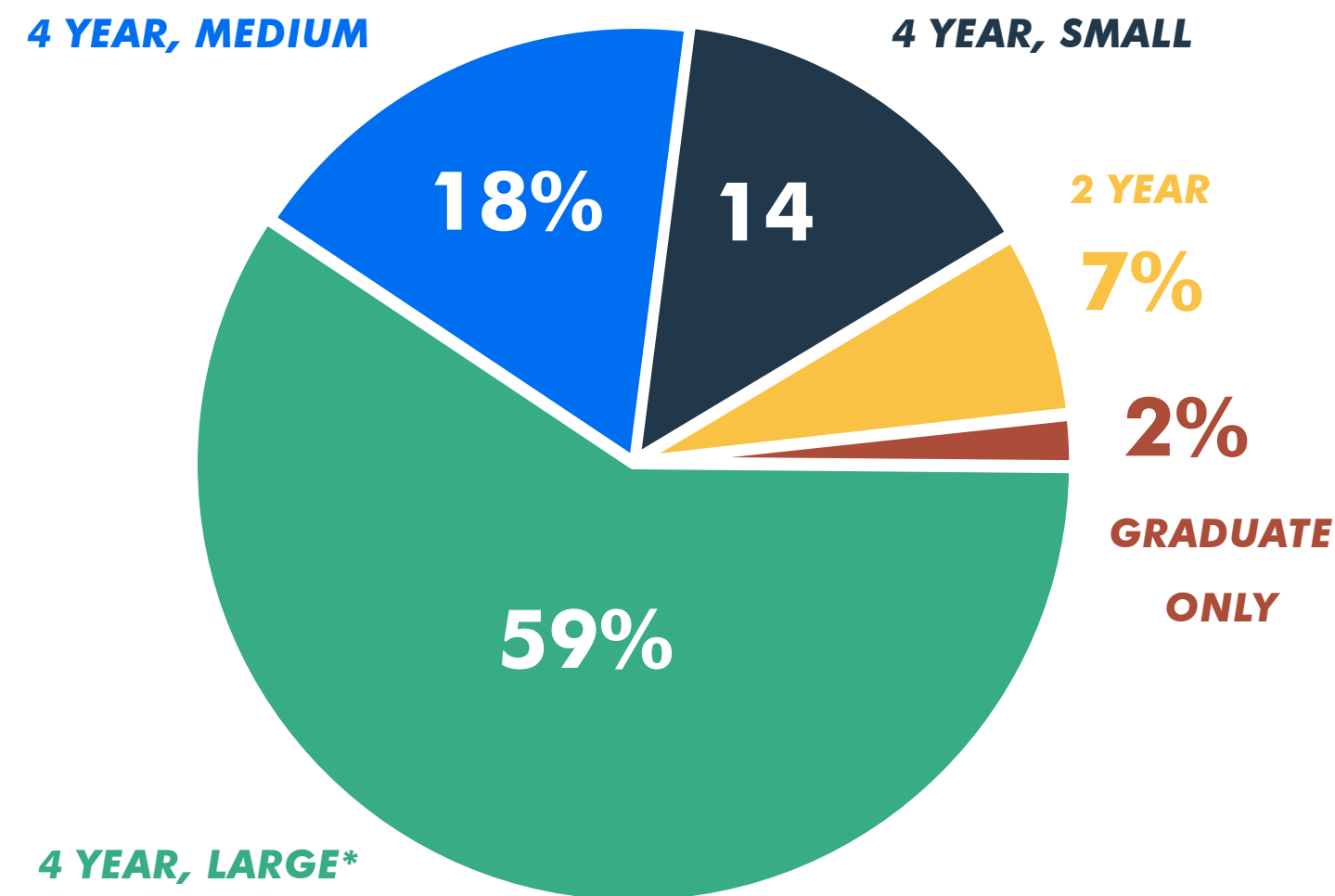
Figure 1.1*

Geographic Distribution

5% 4% 14%
17% 14%
16%
23%
2% 6%

Figure 1.2

*Figure 1.1 based on Carnegie Classifications definitions. "Large" defined as 10,000+ FTE.

Participating Institutions

170 Colleges & Universities

|													
Appalachian State University	California State University, East Bay	Confederation College	Gonzaga University	Massachusetts Maritime Academy	Northampton Community College	Rutgers University-New Brunswick	SUNY Oneonta	University at Albany	University of Florida	University of Nebraska, Lincoln	University of Richmond	University of Wisconsin-Madison	Wells College
Arizona State University	California State University, Northridge	Connecticut College	Gordon College	Medical University of South Carolina	Northern Virgina Community College	Sacramento City College	Swarthmore College	University at Buffalo	University of Georgia	University of Nevada, Las Vegas	University of South Carolina	University of Wisconsin-River Falls	Wesleyan University
Auburn University	California State University, Sacramento	Contra Costa Community College District	Hamilton College	MGH Institute of Health Professions	Northwestern University	Salisbury University	Tennessee State University	University of Calgary	University of Illinois Chicago	University of North Carolina at Asheville	University of South Carolina Upstate	University of Wisconsin-Stevens Point	West Chester University
Binghamton University	Canadore College	Daemen University	Harvard University	Miami University	Ohio University	Salt Lake Community College	The Ohio State University	University of California, Berkeley	University of Kentucky	University of North Carolina at Chapel Hill	University of South Dakota	University of Wyoming	Western Carolina University
Boise State University	Carleton University	East Carolina University	Harverford College	Michigan State University	Oklahoma State University	San Diego State University	The University of Texas at Austin	University of California, Davis	University of Louisville	University of North Carolina at Charlotte	University of South Florida	Utah Valley University	Whitman College
Boston University	Carnegie Mellon University	Emerson College	Illinois State University	Michigan Technological University	Pennsylvania State University	Southern New Hampshire University	Thompson Rivers University	University of California, Irvine	University of Manitoba	University of North Carolina at Greensboro	University of Southern California	Valparaiso University	Winthrop University
Bowdoin College	Case Western Reserve University	Emory University	Johns Hokins University	Mohawk College	Pamona College	Stanford University	Tufts University	University of California, Los Angeles	University of Maryland, College Park	University of North Carolina at Wilmington	University of Toronto	Villanova University	Wofford College
Bowling Green State University	Catawba College	Endicott College	Johnson County Community College	Montclair State University	Portland Community College	SUNY College of Environmental Science and Forestry	UMass Amherst	University of California, San Diego	University of Michigan	University of Oregon	University of Vermont	Virginia Commonwealth University	Xavier University of Louisiana
Brigham Young University	Christopher Newport University	Farmingdale State College	Kennesaw State University	New Jersey Institute of Technology	Portland State University	SUNY Erie Community College	UMass Chan Medical School	University of California, Santa Cruz	University of Michigan-Dearborn	University of Ottawa	University of Virginia	Washington University in St.Louis	York Technical College
California State University, Channel Islands	Clemson University	George Mason University	Kent State University	NorQuest College	Purchase College	SUNY Fredonia	UMass Dartmouth	University of Central Florida	University of Minnesota	University of Pittsburgh	University of Washington	Washtenaw Community College	
California State University, Dominguez Hills	Colorado State University	Georgia State University	Loyola University New Orleans	North Carolina State University	Purdue University	SUNY New Paltz	UMass Lowell	University of Connecticut	University of Montana	University of Puget Sound	University of Wisconsin-Madison	Wayne State University	

Note: Excludes schools that requested to remain anonymous.

Adoption Trends for Best Practices

Bin Standards

_____

Office Deskside Collections

_____

Bins in Classrooms

_____

Food Waste Collections

_____

Outreach to Staff & Faculty

University of Michigan
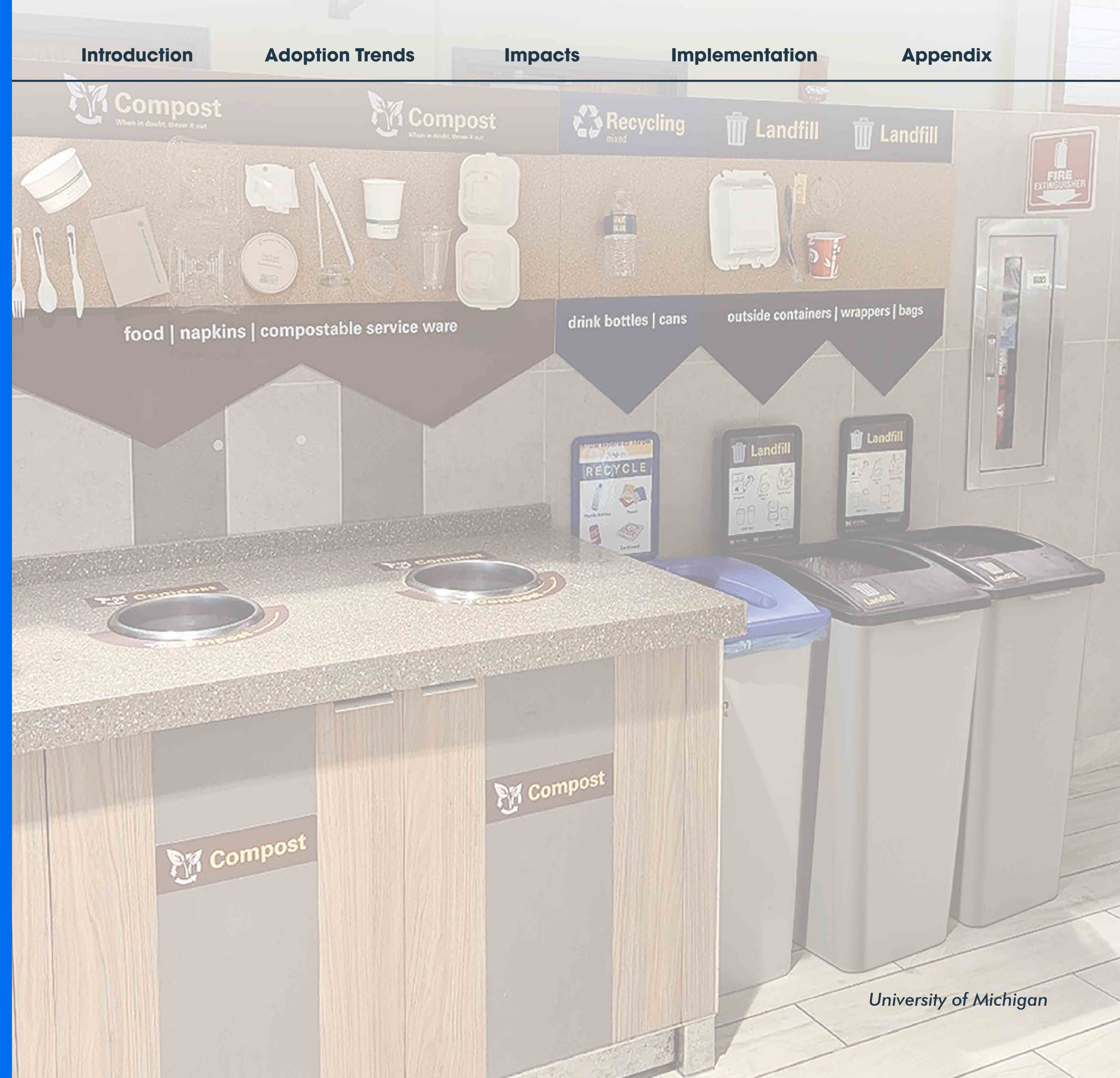
Bin Standards

This chart suggests a strong majority of the targeted sub-group (larger, 4-year, US-based) of schools have designated bin standards for each of the three most common examples (color distinction by stream; uniform signage; designated models), with 54% indicating all three. A separate question showed that of those schools with at least one adopted standard, a similar 54% have fully implemented them across campus while another 40% have partially done so.

SCHOOLS ADOPTING SPECIFIC BIN STANDARDS

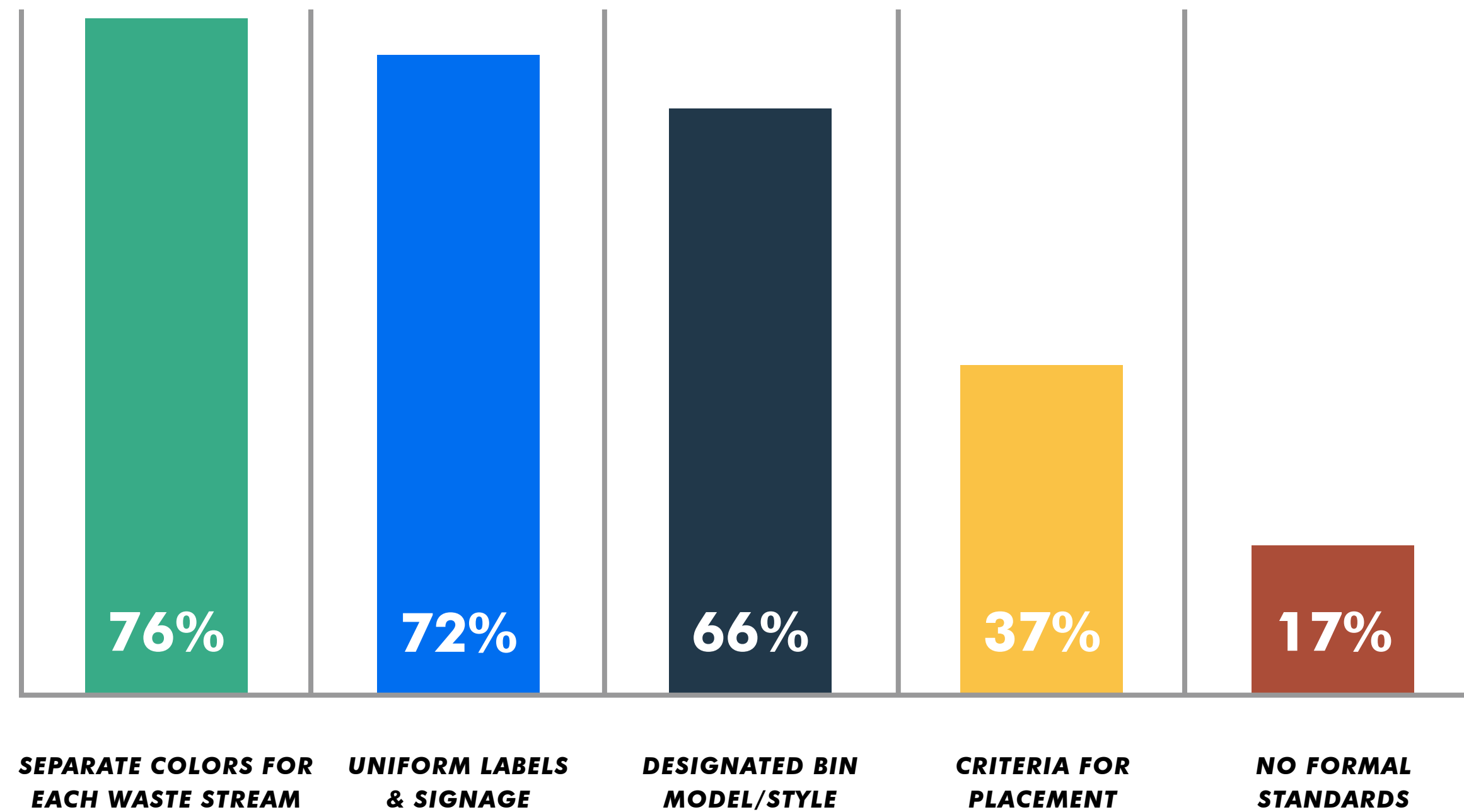| 76%	72%	66%	37%	17%
SEPARATE COLORS FOR EACH WASTE STREAM	UNIFORM LABELS & SIGNAGE	DESIGNATED BIN MODEL/STYLE	CRITERIA FOR PLACEMENT	NO FORMAL STANDARDS

Figure 2.1

In a large, decentralized institution, the ability of bin standard guidelines to control what bins are actually placed on campus can depend on whether they've been endorsed by campus leadership. The survey specifically asked if schools had "formally adopted" the standards, which can be subjectively interpreted depending on a school's internal protocols. The purpose of the question was to distinguish between guidelines that carry some level of official policy and the informal preferences of waste managers that other campus stakeholders may choose to ignore. Even among schools with formal bin standards, the written comments of several make clear their reach is limited by administrative barriers.

Figure 2.1 data based on 4 year, large, US-based schools (93)

Color-to-Stream Assignment

Whether part of a formal standard or simply a dominant pattern, schools were asked what colors are used to identify the respective collection streams they have in place. The survey results suggest schools are in line with a broader national trend toward identifying recycling with the color blue (85% for single stream) and food waste and compost with green (81%) (Figure 2.2). Though no corresponding data exists, anecdotally, 20 years ago green was frequently used for recycling, and in general, schools were more likely to choose random colors without a clear association to recycling. Similarly, brown was more frequently used with compost and food waste fifteen years ago than the 4% reflected here.

As with other bin standards, it's worth noting in a lot of cases these color assignments better reflect written guidelines than the actual bin infrastructure in place. Many schools still have mismatched color arrangements with older legacy bins or have generic-looking bin stations where color standards may only be displayed on a label. Nonetheless, these results suggest schools are falling in line over time with the broader trend to adopt universal color branding consistent across jurisdictions.
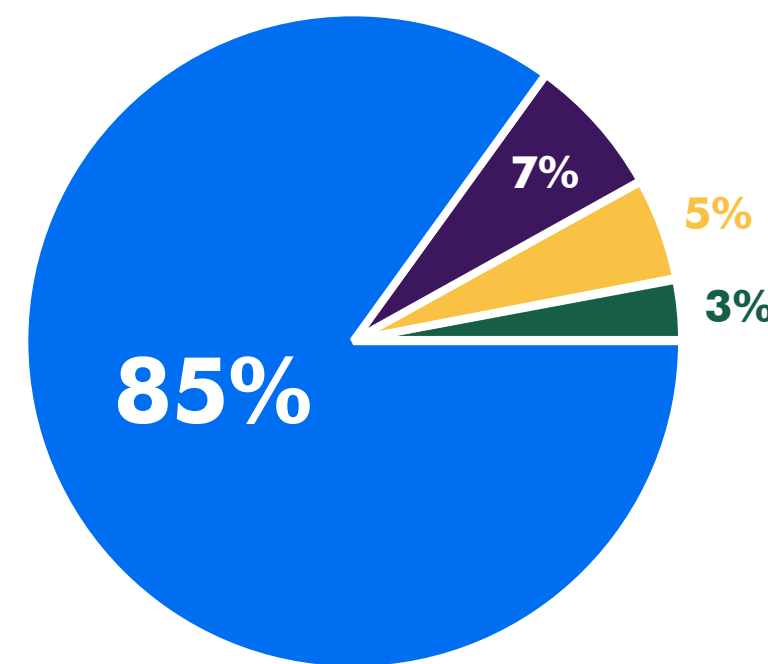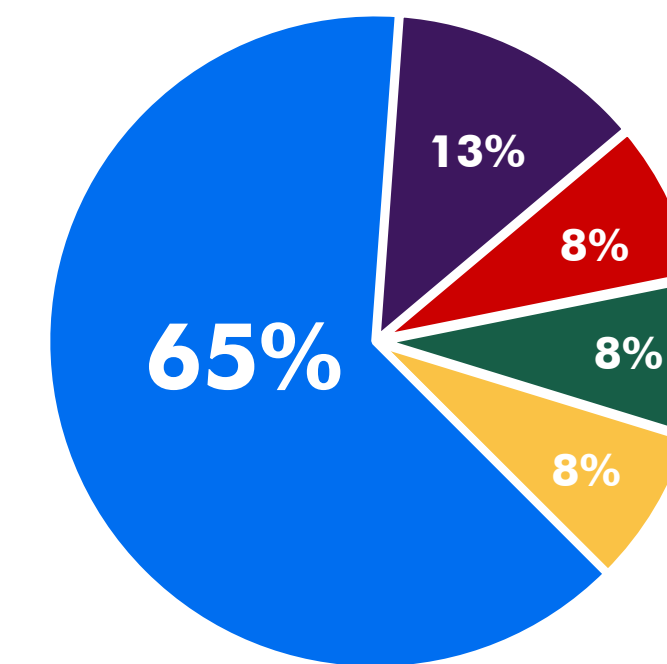
Key Takeaway
Results show a strong trend of adopting a universal standard of blue for recycling and green for compost.
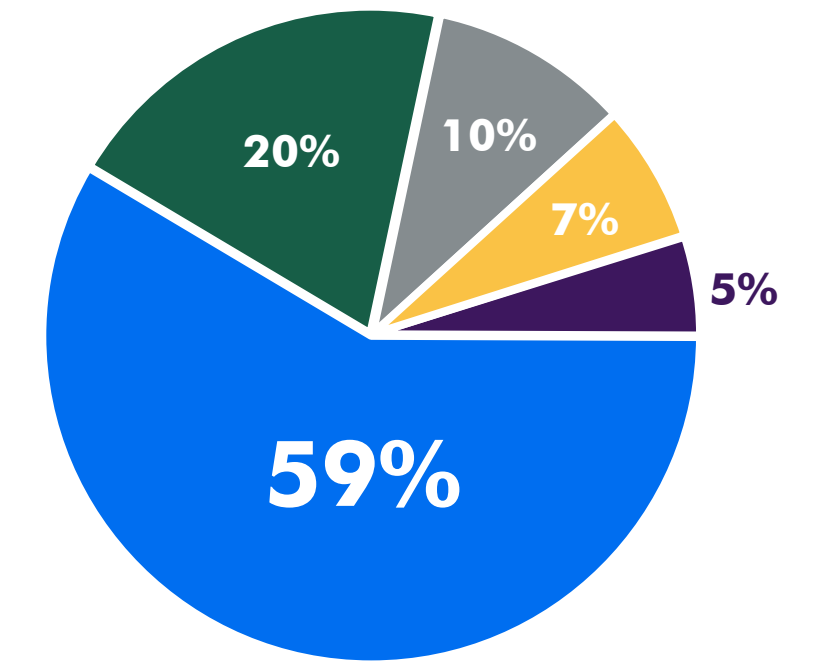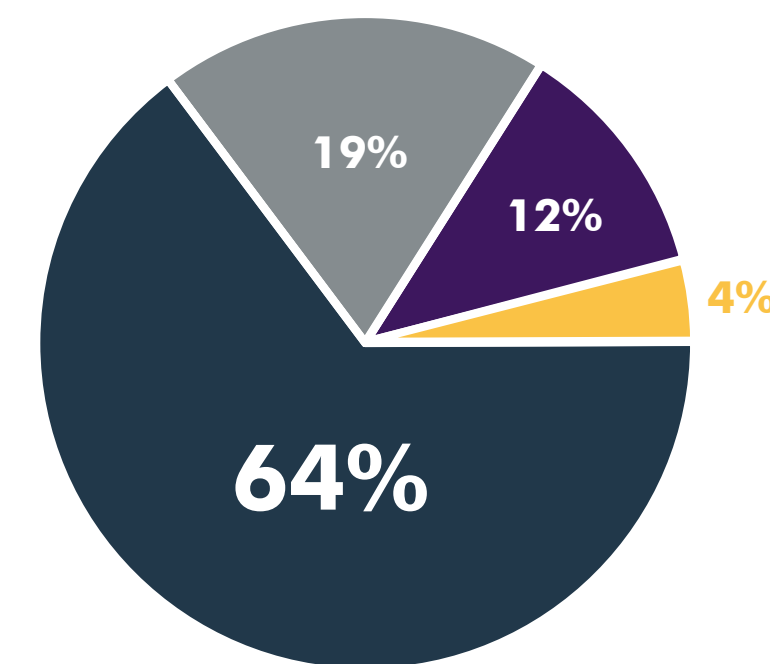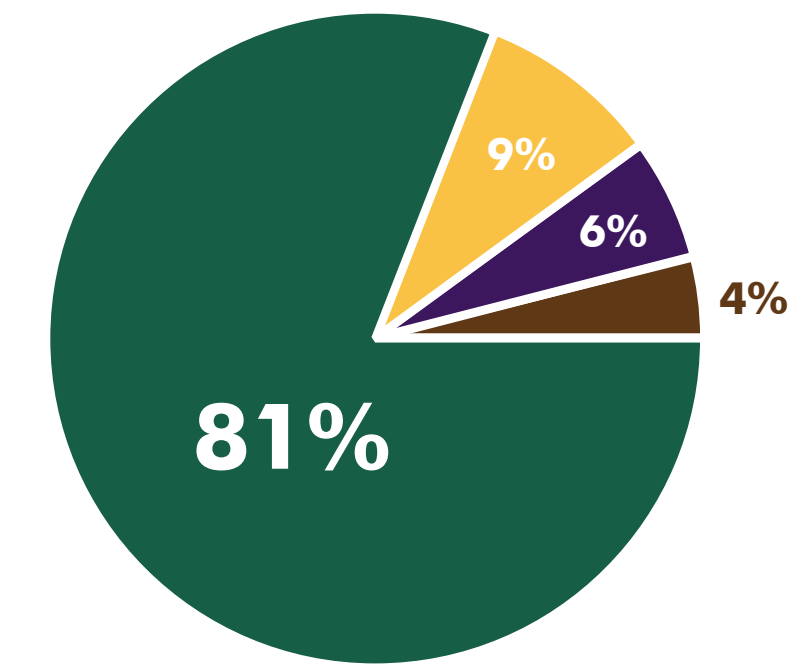
COLORS USED TO IDENTIFY WASTE STREAMS

Figure 2.2

Figure 2.2 data based on 4 year, large, US-based schools (92)

Recycling Bin Stations

Schools historically collected recyclables with separate bins for different materials, but starting in the late 90's many converted to a mixed "single stream" system to reduce costs and stay consistent with local practices. More recently, to address contamination, some schools have explored shifting back to a dual or multiple-stream recycling system. Figure 2.3 refers to the number of separate recycling collection streams currently used alongside trash in common-area bin stations. The number of schools still using an exclusively two-or-more stream system as their standard is only 12%, while another 28% use this in some situations and single stream collections in others. Single-stream recycling remains dominant with 85% of schools relying on the arrangement for some if not all locations.

Medical University of South Carolina

CONFIGURATION OF RECYCLING BIN STATIONS

SINGLE AND MULTI-STREAM ARRANGEMENTS — 28%

TWO OR MORE STREAMS (EXCLUSIVELY) — 12%

NO CONSISTENT ARRANGEMENT — 3%

SINGLE STREAM (EXCLUSIVELY) — 57%

Figure 2.3
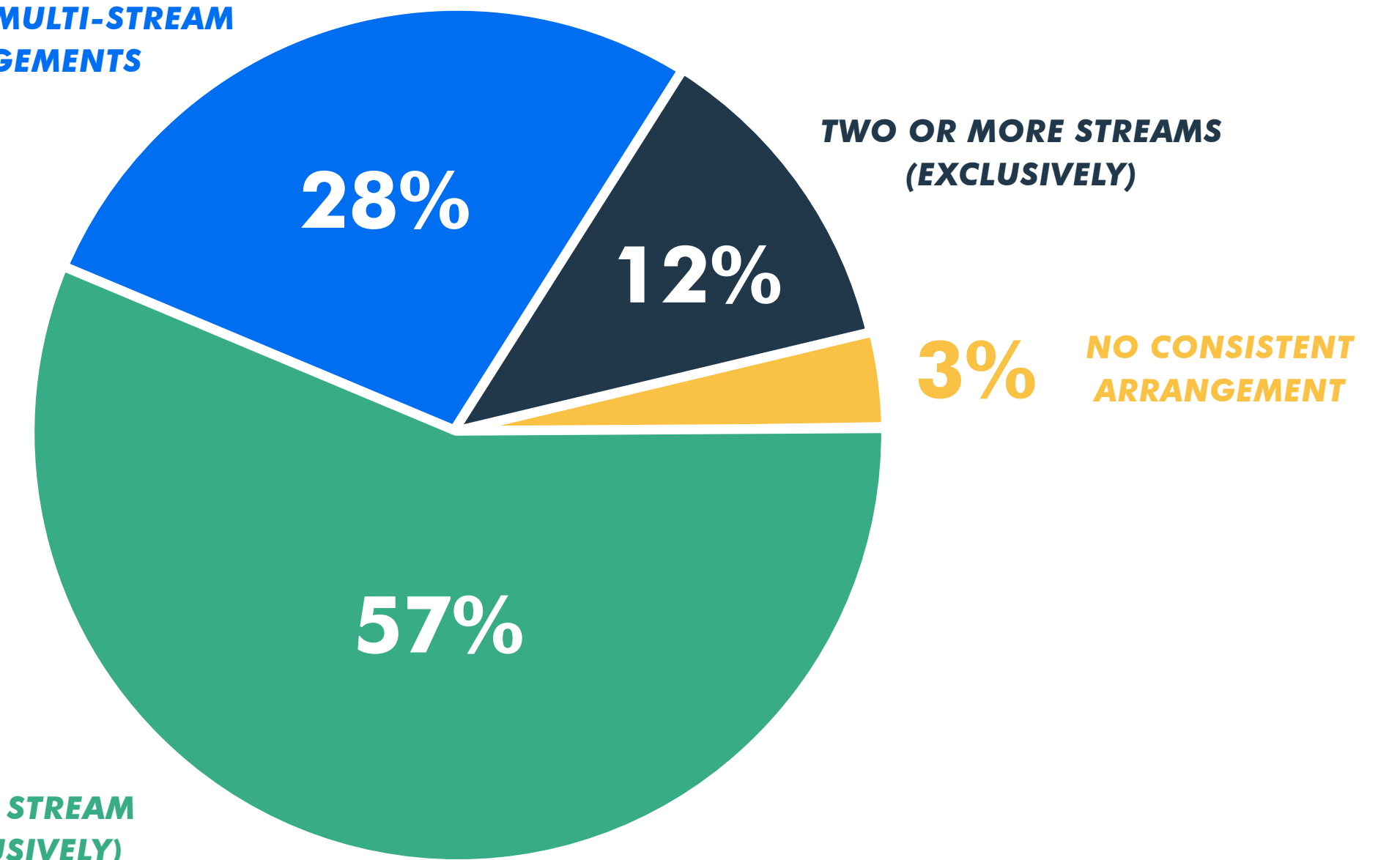
Figure 2.3 data based on 4 year, large, US-based schools (93)

Office Deskside Collections

There are two general ways schools can revamp waste collections from individual office workstations, altering the deskside waste basket configuration and/or the associated service arrangement:

Waste Baskets: The historic pattern has been for schools to provide each workstation with a deskside trash basket. As recycling programs developed in past decades, the standard approach has been to add a second basket for recycling. As Figure 2.5 shows, this earlier trend has been adopted by all but 7% of schools that provide deskside baskets in one form or another. More recently some schools have experimented with other arrangements to encourage diversion. The survey shows that 7% of schools, including the University of Vermont, provide only a basket for recycling but not trash (Figure 2.5) and another 13%, including Stanford University, UMass Lowell and UCLA, no longer provide individual deskside baskets at all in some or all locations (Figure 2.4). Figure 2.6 reveals another trend in recent years with 41% of schools that provide trash baskets opting to hand out small or "mini" baskets that hang on or sit next to regular-size recycling bins. Schools that go with these less than 1-gallon capacity baskets include Tufts University, Case Western Reserve University, Portland State University and the University of Maryland-College Park, among others. Research published by Keep America Beautiful in 2015 shows that these smaller trash baskets can increase recycling and reduce contamination by as much as 20% over traditional size trash baskets. *Note: These results reflect the school's current procedures. Comments left by respondents indicate that in many cases older deskside basket configurations are still in place in certain locations due to grandfathered arrangement or a gradual transition.*

ARE WASTE BASKETS PROVIDED AT DESKSIDE?

NO BINS PROVIDED (SOME IF NOT ALL LOCATIONS)
13%
87%
BINS PROVIDED AS STANDARD ARRANGEMENT
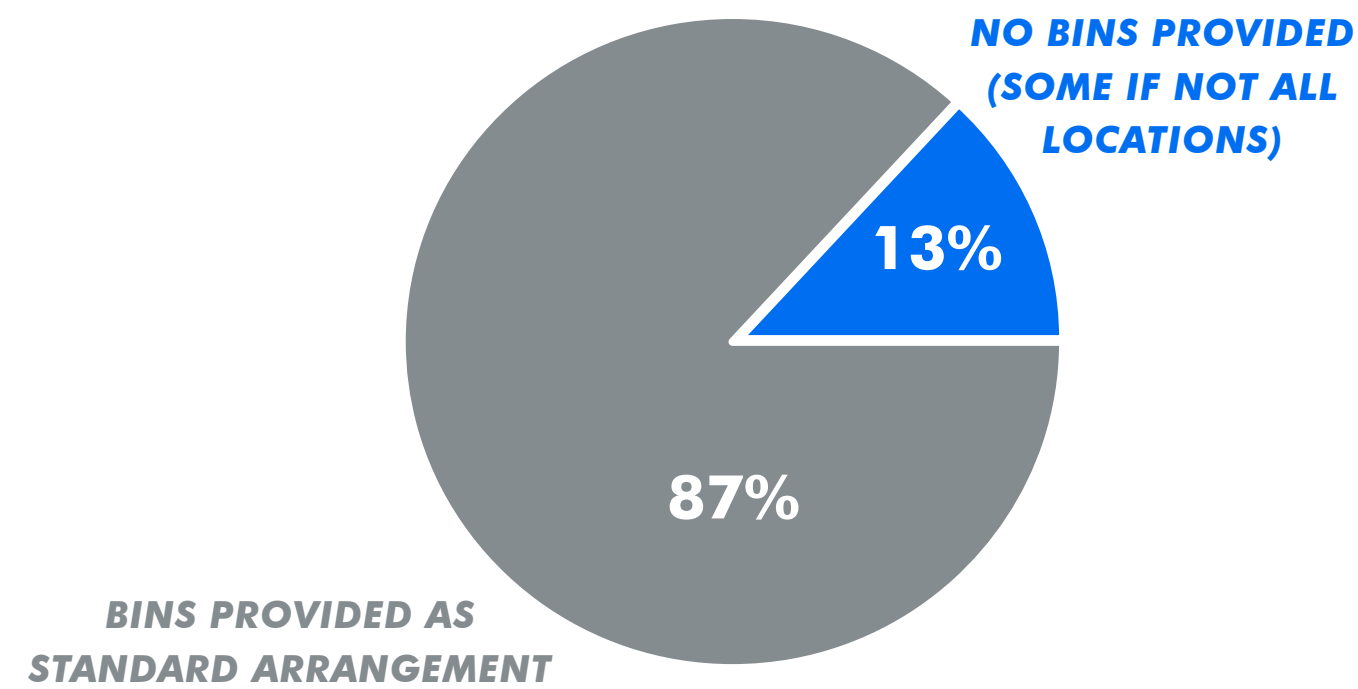
Figure 2.4 (92)*

IF PROVIDED, FOR WHICH STREAMS?

RECYCLING ONLY
7%
7%
TRASH ONLY
86%
TRASH & RECYCLING
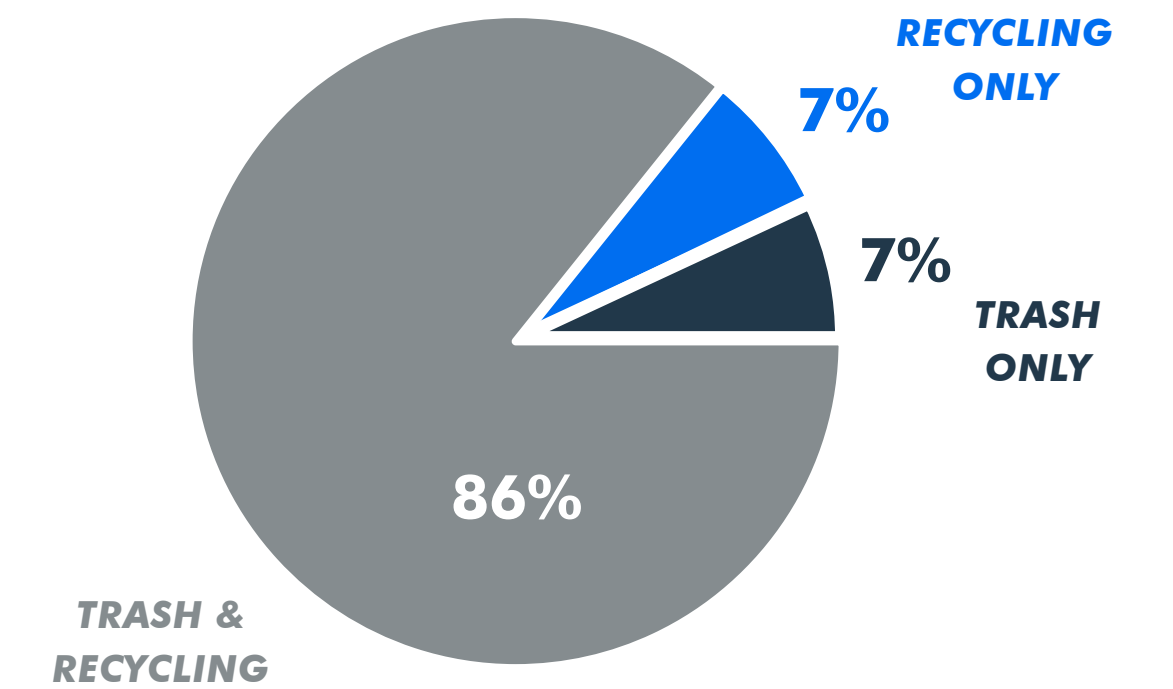
Figure 2.5 (83)*

IF BASKETS PROVIDED FOR TRASH, WHAT TYPE?

BOTH (DEPENDS ON LOCATION)

8%
33% SMALL / "MINI" BIN
59% REGULAR SIZE

Figure 2.6 (76)*
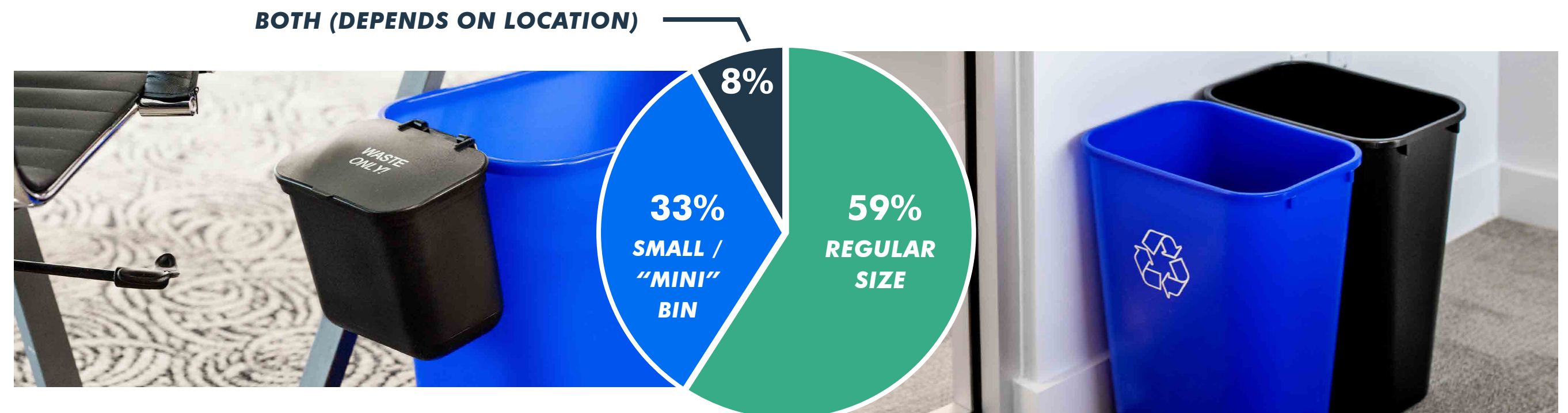
*Data of all figures based on 4 year, large, US-based schools.

Custodial Service: While most colleges and universities have always provided custodial deskside service for trash, individuals were long expected to carry any recyclables to centralized bin stations.

Reflecting a decades-long trend to put recycling on equal or preferential footing, many now extend this service to recycling. But even as custodial routines still favor trash over recycling at 28% of schools that provide deskside service (Figure 2.8), 44% have embraced the centralized collection model and simply eliminated deskside service for all waste streams in some if not all locations. (Figure 2.7).

Of the 23% that provide custodial service in some locations but not others, written comments suggest many such as Boston University, Georgia State and American University are phasing in the no-service arrangement over time. In other cases, the mix of service/no-service arrangements reflect a practical compromise. Custodial waste service is the default at the University of Oregon but individuals can volunteer to empty their own bins. The University of Minnesota-Twin Cities and The Ohio State University both give individual departments a choice to pay for the service.
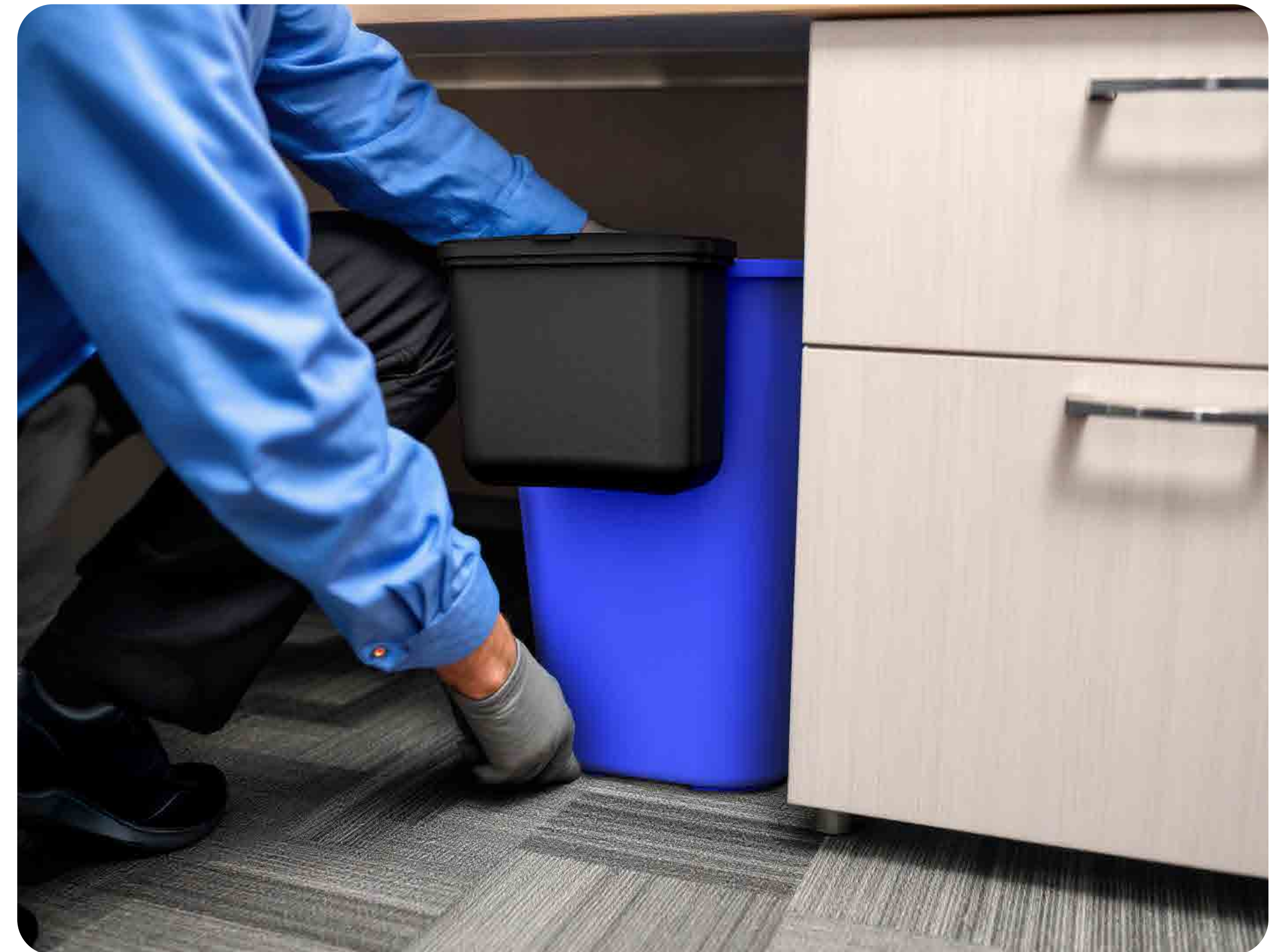
IS CUSTODIAL DESKSIDE SERVICE OFFERED?

SERVICE SOME LOCATIONS, NOT OTHERS

23%

21%

NO SERVICE

56%
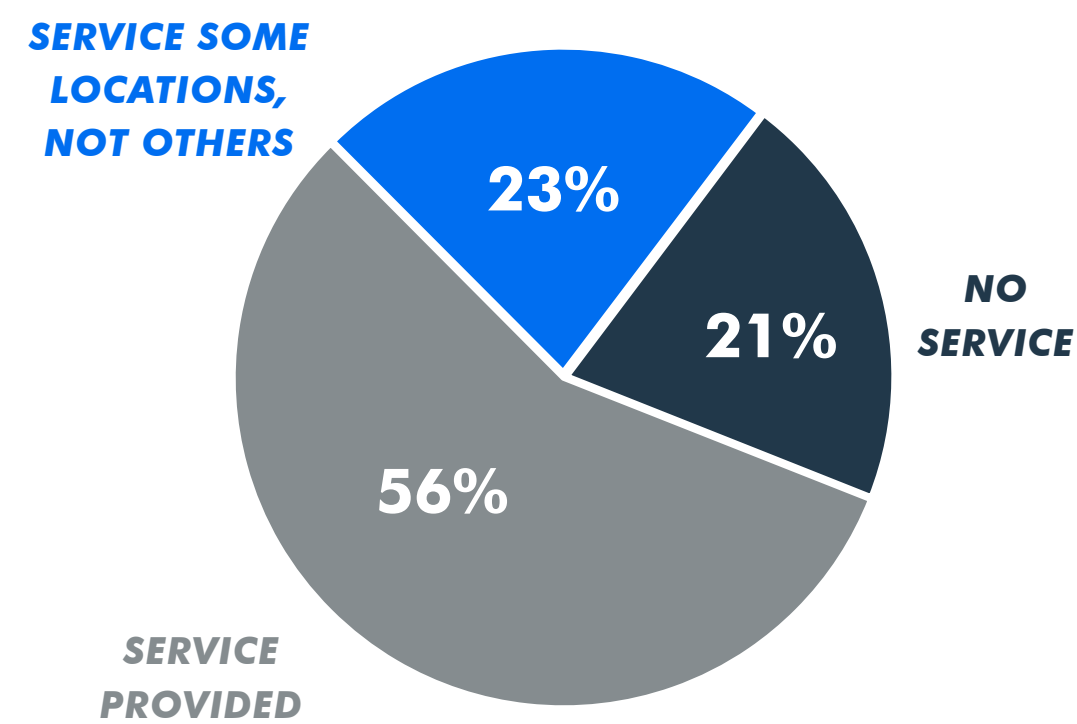
SERVICE PROVIDED

Figure 2.7 (92)*

IF SERVICE PROVIDED, FOR WHICH STREAMS?

RECYCLING ONLY

12%

28%

TRASH ONLY

60%

TRASH & RECYCLING
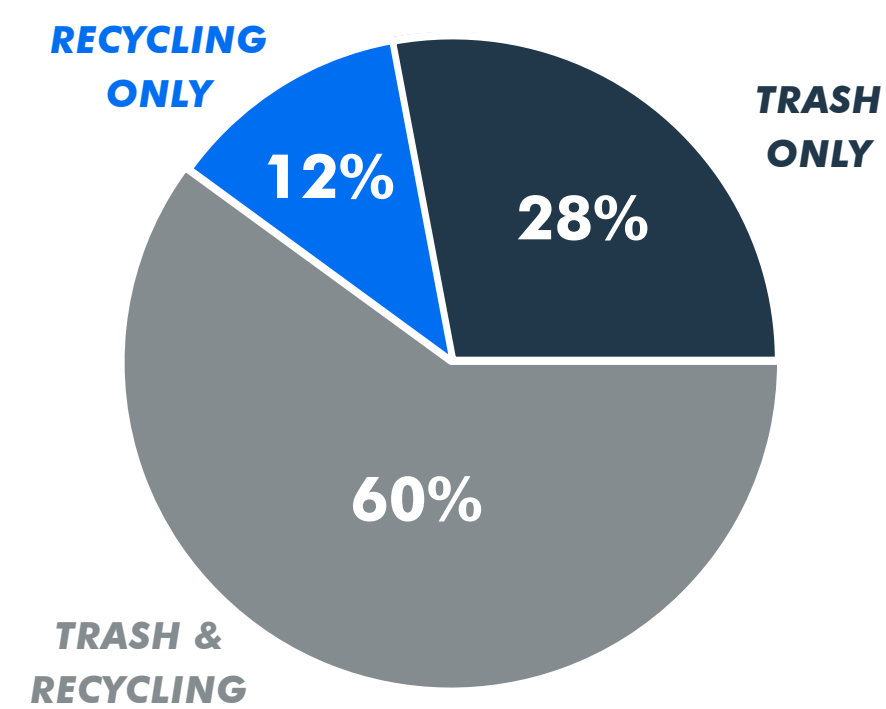
Figure 2.8 (60)*

Key Takeaway
44% rely on staff and faculty to carry personal waste from their desk to centralized bin station in some or all office locations.

*Data of all figures based on 4 year, large, US-based schools.

Bins in Classrooms

Similar to office deskside settings, classrooms were traditionally set up with trash bins serviced by custodians in decades past. This legacy arrangement, which expects people to walk past the trash bin inside the classroom to use a recycling bin located in the hallway, is still in place at 25% of the subset of larger, US-based 4-year schools surveyed (Figure 2.9). The remaining schools generally address this convenience disparity in one of two ways. 30% have simply added recycling bins to classrooms. Another 39% have done the opposite, removing all bins from classrooms and directing students and faculty to carry trash and recyclables out to bin stations in the hallway. Among the schools with this system in place are the University of Nebraska-Lincoln, Kent State University, Cal State Sacramento and UNC Charlotte, as well as schools transitioning to it over time, like Johns Hopkins University, University of Kentucky and University at Buffalo. Written comments from the 6% that marked Other Arrangement indicate they either lack any coordinated pattern of bins in classrooms, or they have a system that restricts bins to select classrooms such as larger lecture halls or labs. In practice, comments suggest many of the schools that indicated no classroom bins, likewise, make similar exceptions.

ARE WASTE BINS LOCATED INSIDE CLASSROOMS?

- TRASH ONLY — 25%
- OTHER ARRANGEMENT — 6%
- TRANSITIONING TO NO BINS — 8%
- TRASH & RECYCLING — 30%
- NO CLASSROOM BINS — 31%
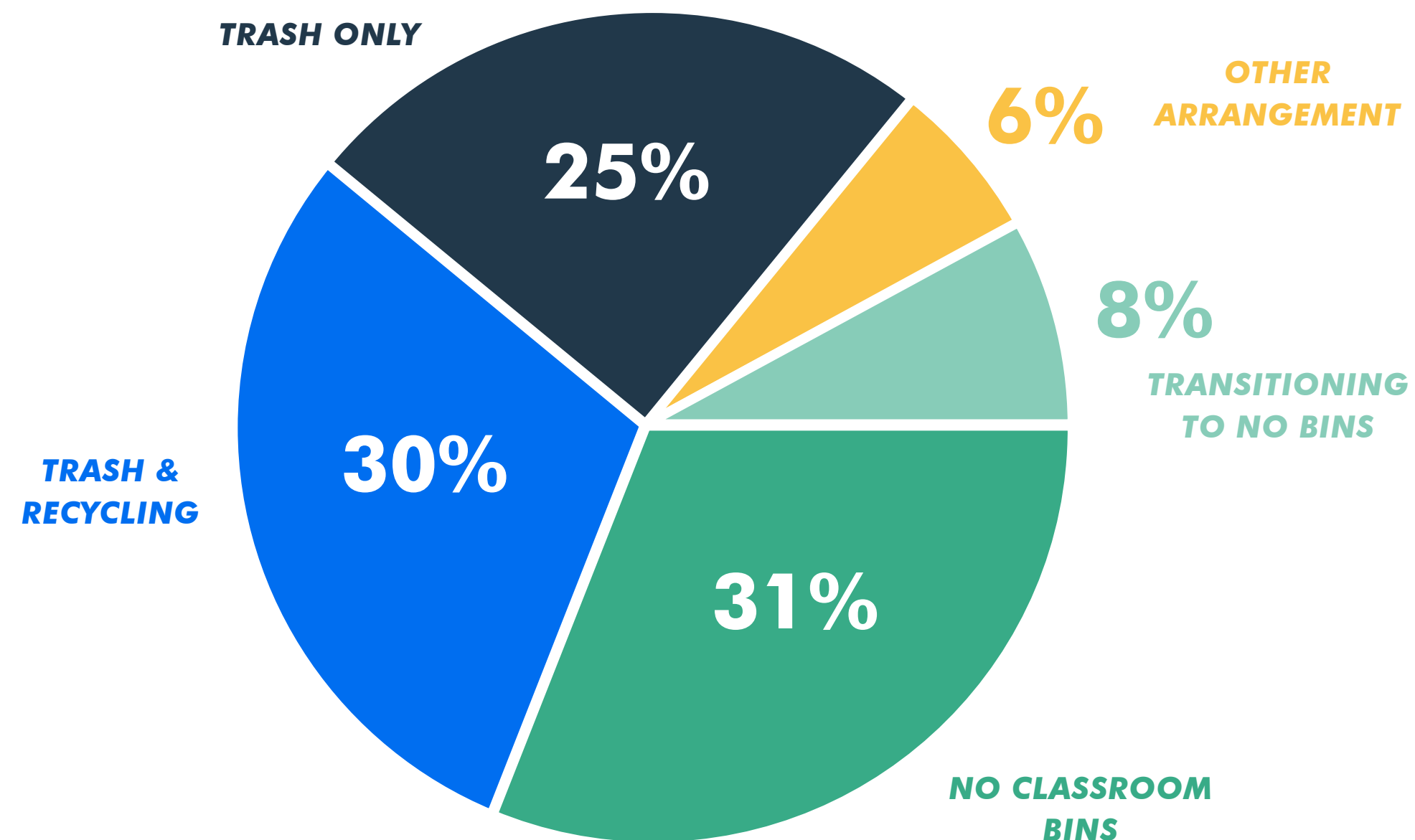
Figure 2.9

Key Takeaway
39% have removed waste bins from classrooms in some or most classrooms.

*Figure 2.9 data based on 4 year, large, US-based schools (84)

Food Waste Collections

Collecting food waste and other compostable material from academic and administrative office areas is a relatively new trend over the past ten to fifteen years. Because of the unique operational and potential nuisance considerations, these efforts often start with limited or informal collection arrangements. In some cases, compost collections may be limited to five-gallon buckets provided to select departments or early-adopting staff and faculty given access to locked bins placed on a building's loading dock. To understand how compost collections are evolving in these non-dining locations the survey asked two parallel questions, whether food waste and other compostables are being recovered in any form from these areas, and whether bins for compost are included with the standard centralized bin station in common areas.

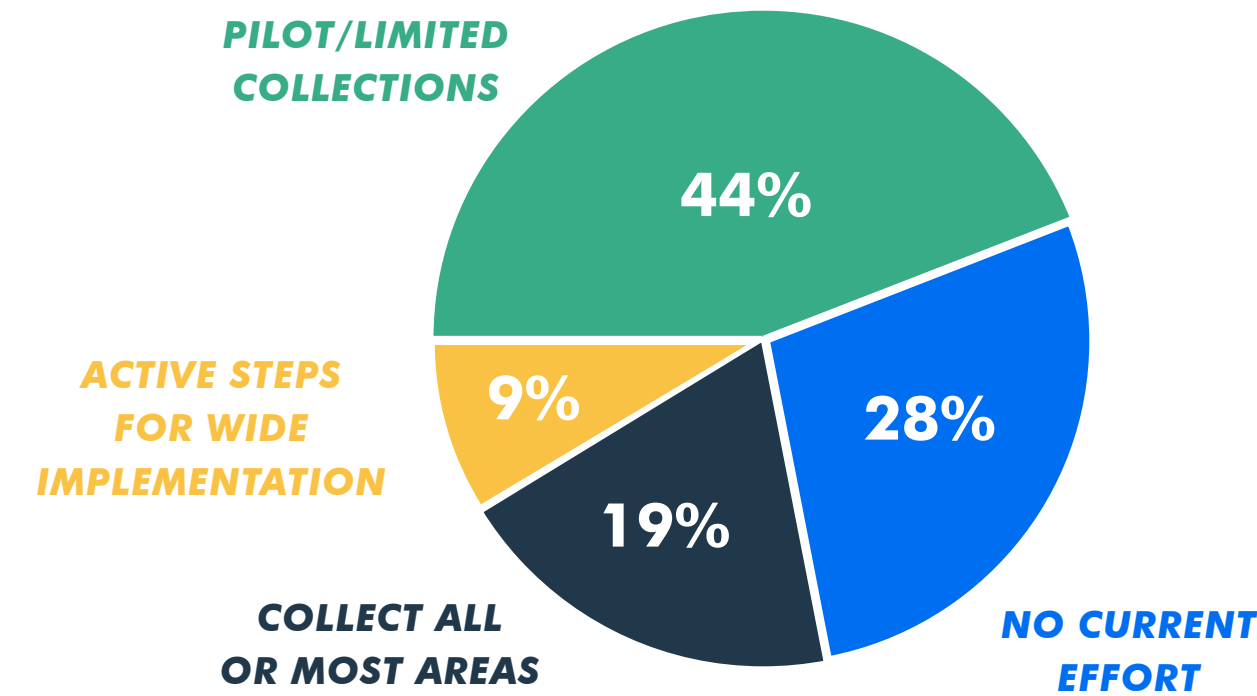**IS FOOD WASTE RECOVERED IN ACADEMIC/ADMINISTRATIVE LOCATIONS?**

PILOT/LIMITED COLLECTIONS **44%**

NO CURRENT EFFORT **28%**

COLLECT ALL OR MOST AREAS **19%**

ACTIVE STEPS FOR WIDE IMPLEMENTATION **9%**

Figure 2.10 (94)*

IS FOOD WASTE/COMPOSTABLES INCLUDED WITH STANDARD BIN STATIONS?

SOME LOCATIONS **33%**

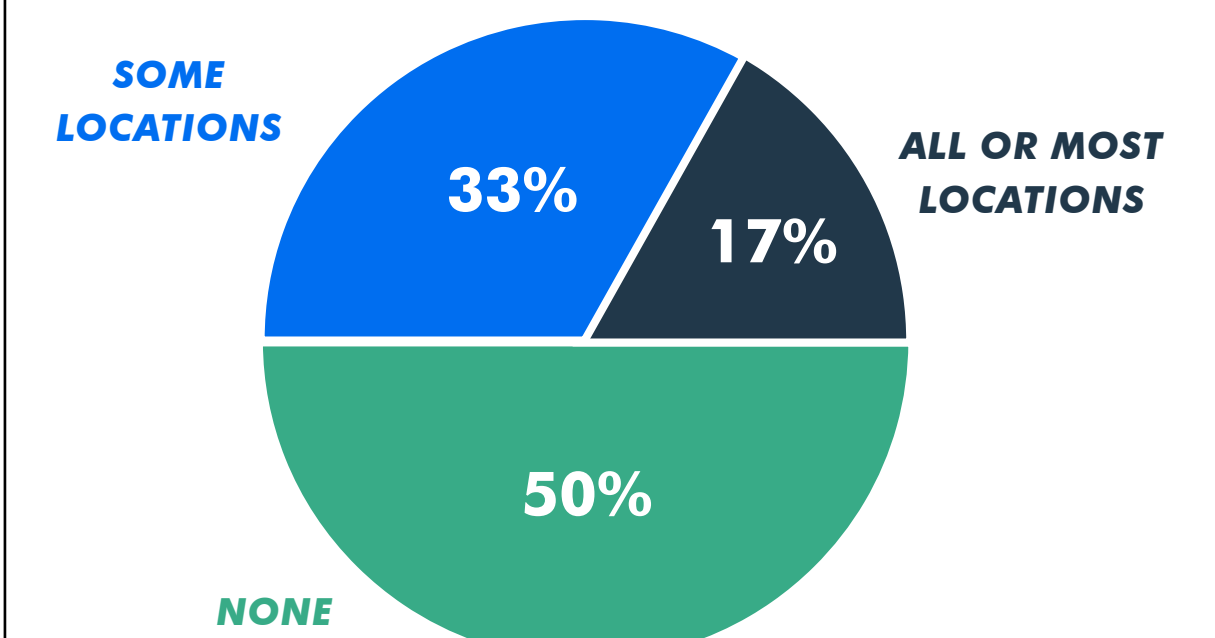ALL OR MOST LOCATIONS **17%**

NONE **50%**

Figure 2.11 (90)*

Figure 2.10 suggests that 63% of schools currently have some type of compost collection in place, most of these limited or pilot arrangements (44%). A further 9% are actively planning to introduce widely available collection arrangements. The 17% who said compost bins have been incorporated into the standard bin station arrangements in all or most locations (Figure 2.11) largely overlaps with the 19% shown in Figure 2.10. This group, which includes schools such as Emory University, University of Michigan and Cal State Dominguez Hills generally represents the more advanced end of the trend, having fully institutionalized compost recovery into their diversion programs.

Just under half of the 44% that said they had a pilot or limited collection effort (Figure 2.10) simultaneously said they did not have bins for compost with any of their standard bin stations (Figure 2.11). For the most part, these are the schools working with 5-gallon buckets or other less formal arrangements.
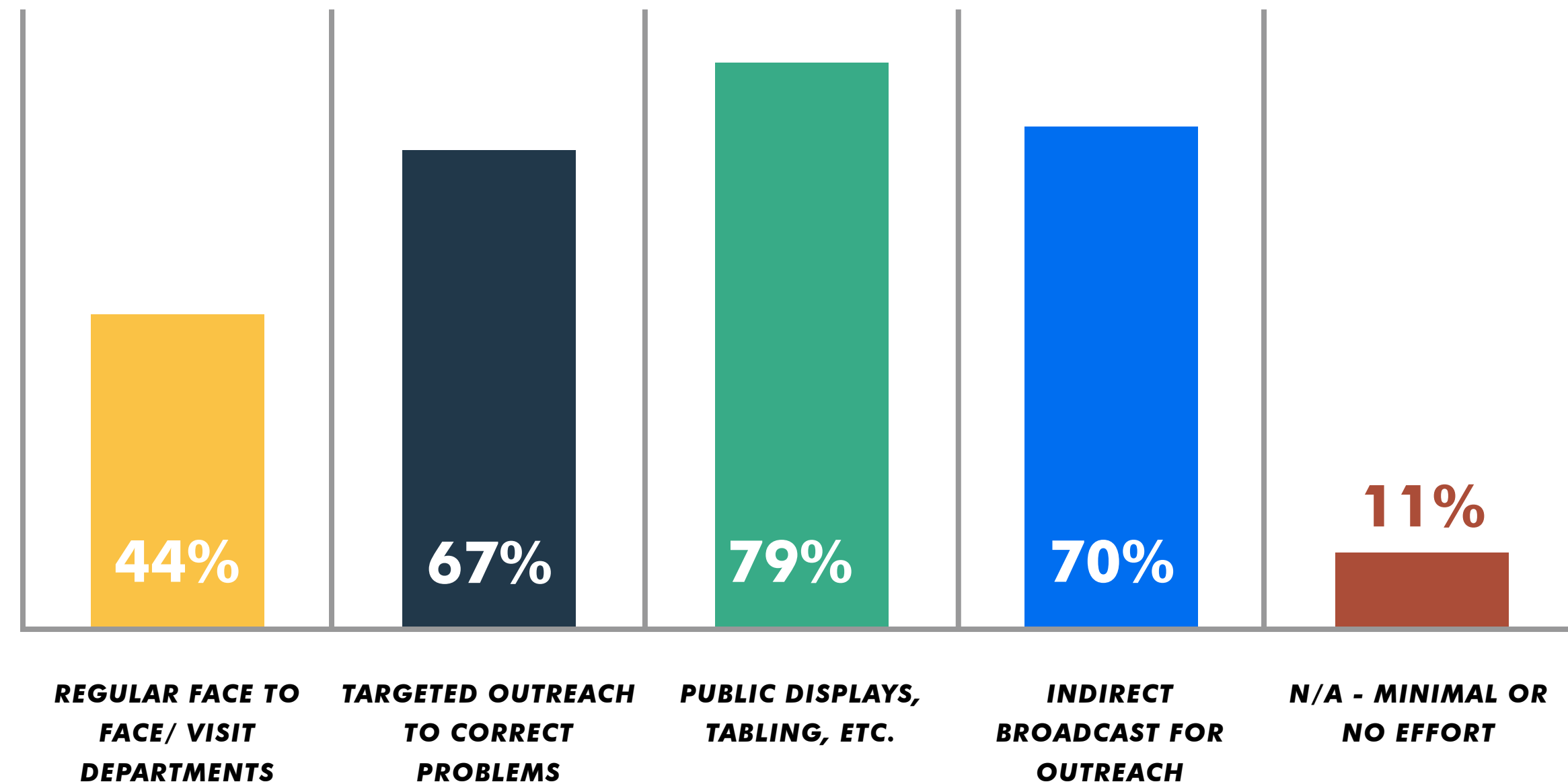
Key Takeaway
62% are making some effort to collect food waste in academic and/or administrative locations.

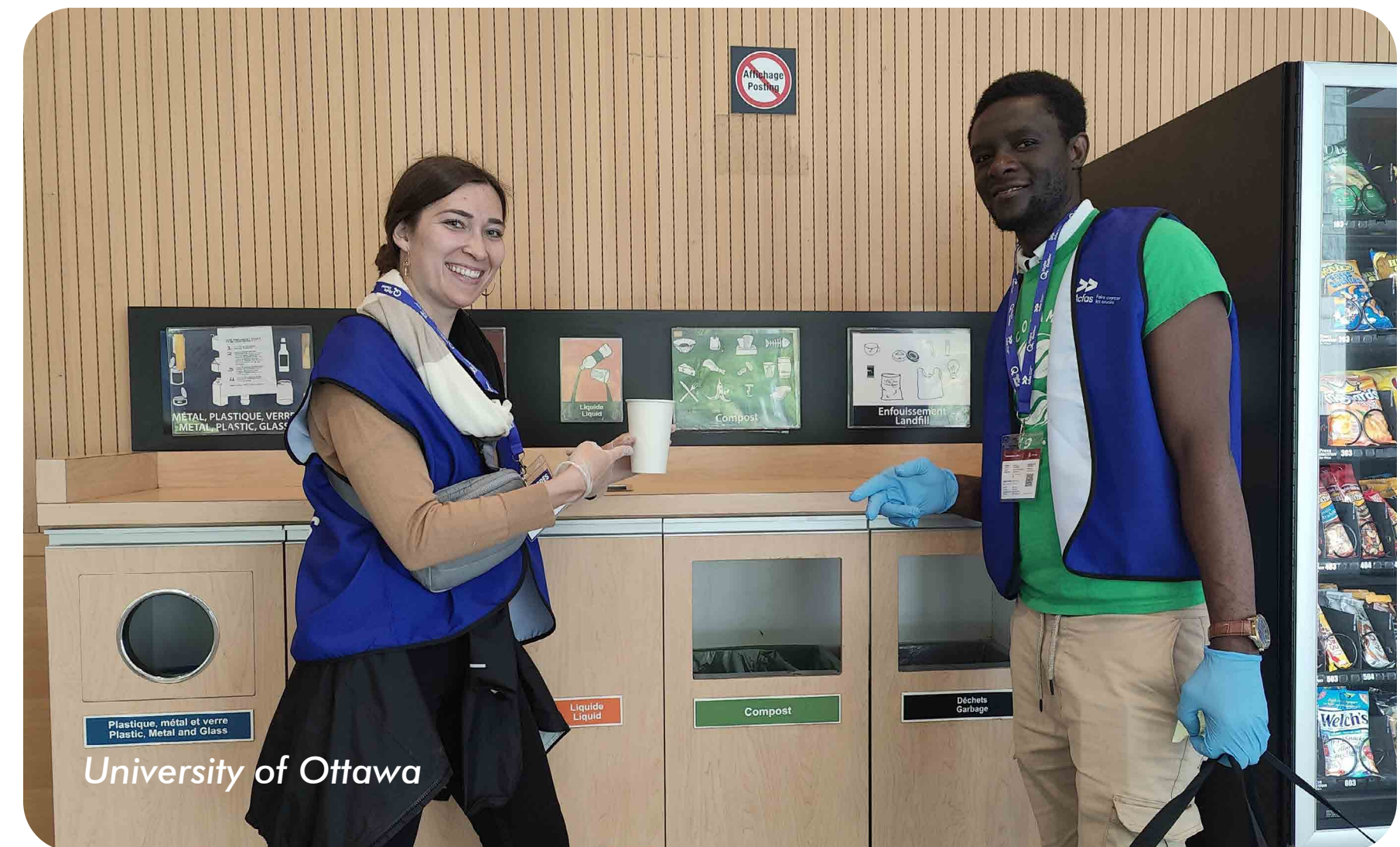**Data of all figures based on 4 year, large, US-based schools.*

Outreach to Staff & Faculty

Regardless of how a diversion program is designed, education and outreach remain critical steps to improve participation and sorting accuracy. Though indirect outreach such as the use of posters or broadcast emails can be influential, as a general rule, more personalized, interactive and frequent engagement has a greater overall impact. This survey question was intended as a rough, unscientific barometer of the level of effort schools made to engage staff and faculty about recycling and waste reduction. Participants could select any or all of the first four options. Reflecting the often-constrained resources and bandwidth of sustainability initiatives, Figure 2.12 shows a significantly higher percentage of schools relying on passive, less direct outreach methods such as public displays (79%) and indirect outreach (70%) than more resource-intensive efforts like face-to-face visits or even outreach to address specific issues (67%).

WHAT TYPES OF EDUCATIONAL OUTREACH ARE DONE TO IMPROVE DIVERSION?

| 44% | 67% | 79% | 70% | 11% |
| REGULAR FACE TO FACE/ VISIT DEPARTMENTS | TARGETED OUTREACH TO CORRECT PROBLEMS | PUBLIC DISPLAYS, TABLING, ETC. | INDIRECT BROADCAST FOR OUTREACH | N/A - MINIMAL OR NO EFFORT |

Figure 2.12 data based on 4 year, large, US-based schools (89)

University of Ottawa

📌 **Key Takeaway**
44% do regular face-to-face outreach including visits to departments or offices.

Impact of Centralized Collection Arrangements

Diversion & Contamination Rates

———————————

Direct Costs & Litter

———————————

Labor Savings

———————————

Practices Associated with Performance
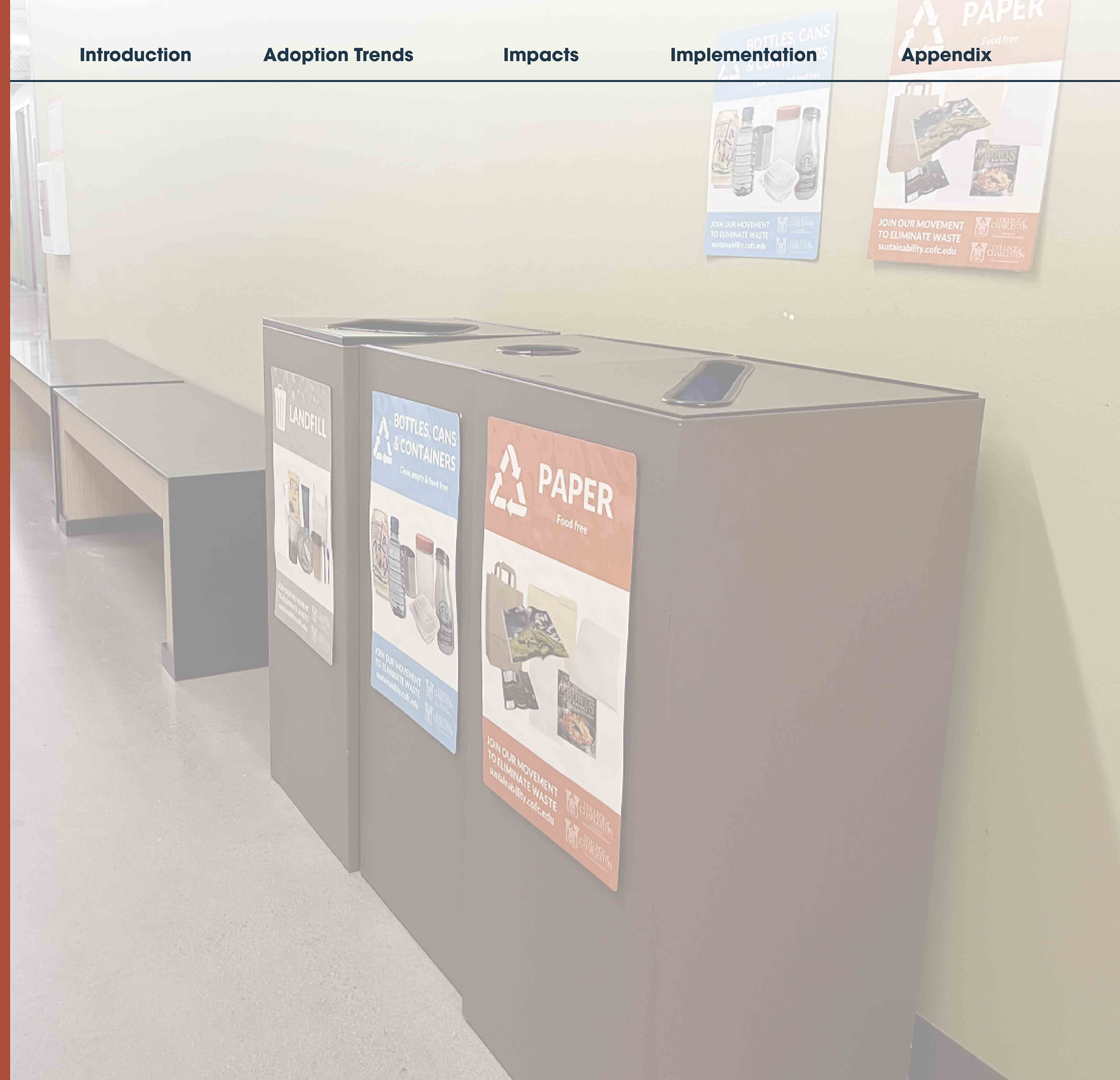
Diversion & Contamination Rates

Schools that indicated they had eliminated custodial service of baskets in offices or removed bins from classrooms were presented with additional multiple-choice and open-response questions to gauge what if any impact they experienced as a result. The following results are drawn from the overall pool of participating schools, including smaller, two-year and Canadian institutions. In each case, a sizeable number of schools replied that the operational changes were too recent, or simply that no effort had been made to observe an impact. These schools have been excluded from the results.

The open-response comments confirmed an inherent challenge in gauging the impact of centralized collection programs. In many if not most cases, steps to eliminate custodial deskside service or remove bins from classrooms are taken in conjunction with each other or with other operational changes such as revamping common-area bins according to new bin standards or implementing food waste collections. At the same time, limited staff bandwidth often inhibits schools' ability to measure the before and after results of such changes. For these reasons, the survey did not attempt to track quantitative results but simply recorded the best-judgement observations of impacts sustainability and facilities staff could attribute to these operational changes.

Key Takeaway

The University of Nebraska-Lincoln observed a reduction in contamination from 18% to 8% during the pilot phase of its "All in the Hall" recycling program. Subsequent waste audits where the program has been active for three years have shown similarly reduced contamination rates.

A majority of schools that have adopted a no-custodial deskside service arrangement or removed bins from classrooms credited these steps with improving diversion and lowering contamination, with the effect more widely observed in classroom settings. (Figures 3.1 – 3.4). Beyond the potential effects of any simultaneous operational changes, the improvements are likely tied to placing recycling and trash on an equal footing. In place of existing arrangements that allowed people to conveniently discard trash inside classrooms or at their desk while requiring they carry recyclables to common areas, the changes introduce a parity between the two waste stream arrangements.

Comments from a number of schools point to another dynamic. The University of Calgary observed that staff removing their personal deskside waste appeared to give greater care when sorting into the centralized bin stations. The University of Montana received feedback after implementing the no-deskside service arrangement suggesting the extra attention focused on emptying their own waste caused staff to be more conscious of the items they consumed.

DID ELIMINATING DESKSIDE CUSTODIAL SERVICE IMPACT DIVERSION?

NO CHANGE/MIXED RESULTS 42%
WORSENED 3%
SIGNIFICANT IMPROVEMENT 10%
SOMEWHAT IMPROVED 45%
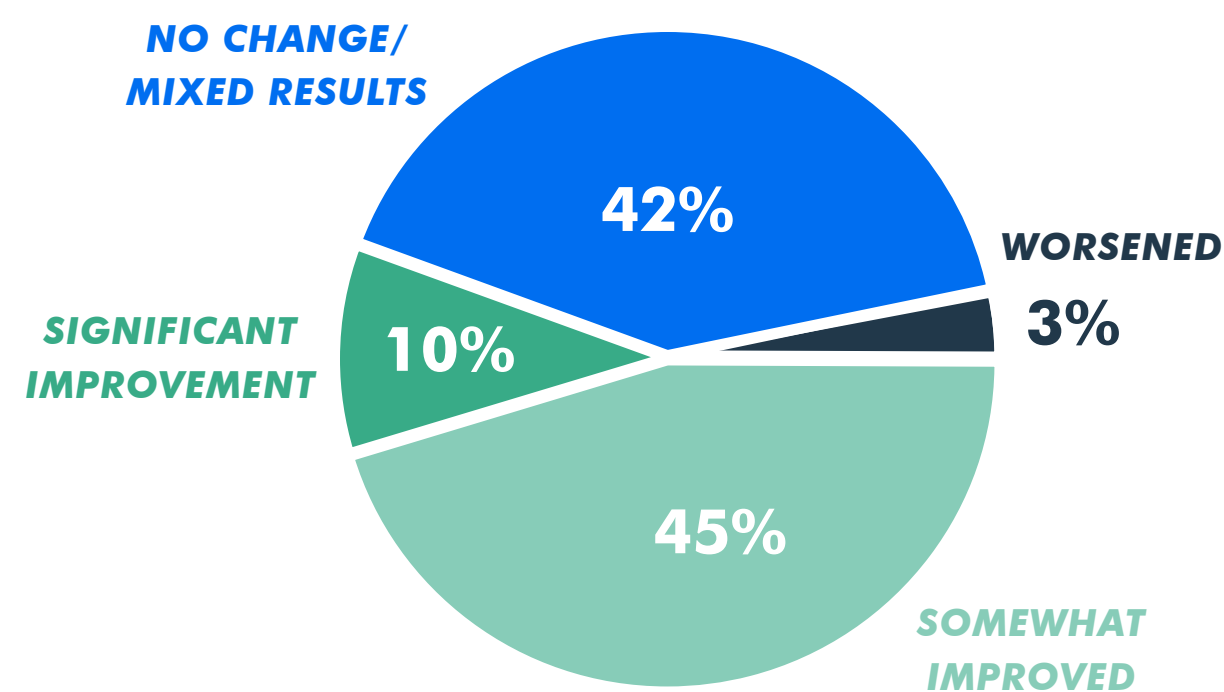
Figure 3.1 (29)*

DID ELIMINATING DESKSIDE CUSTODIAL SERVICE IMPACT CONTAMINATION RATES?

NO CHANGE/MIXED RESULTS 40%
SIGNIFICANT IMPROVEMENT 12%
SOMEWHAT IMPROVED 48%
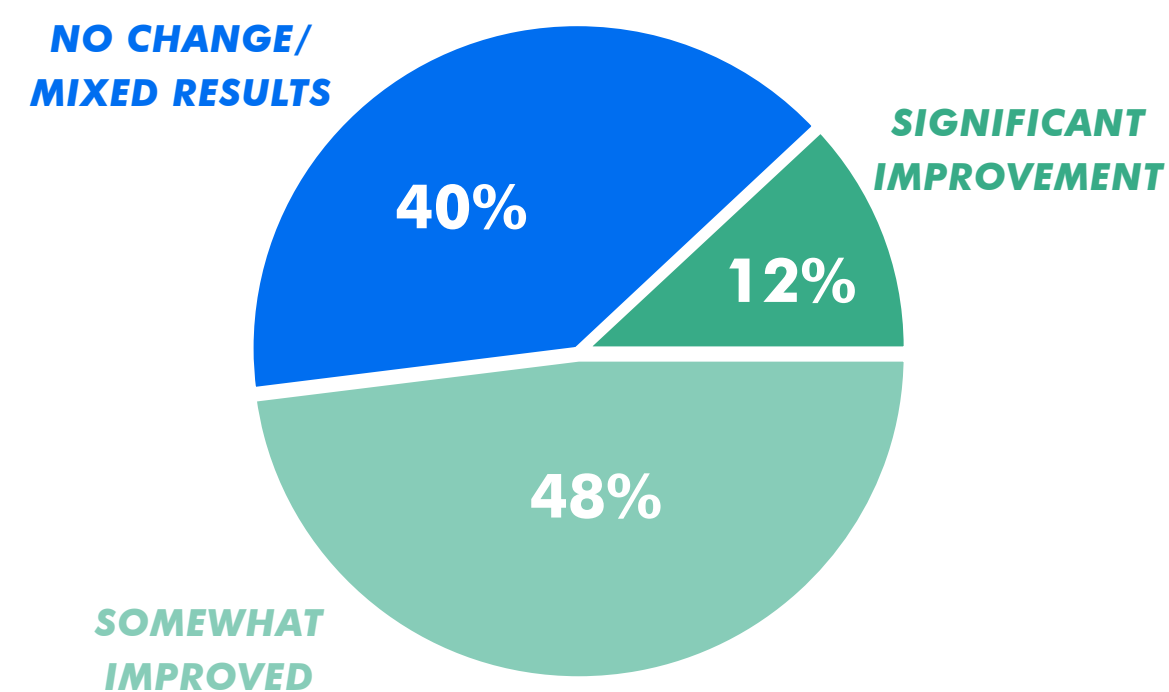
Figure 3.2 (25)*

DID REMOVING CLASSROOM BINS IMPACT DIVERSION?

SIGNIFICANT IMPROVEMENT 11%
NO CHANGE/MIXED RESULTS 22%
WORSENED 4%
SOMEWHAT IMPROVED 63%
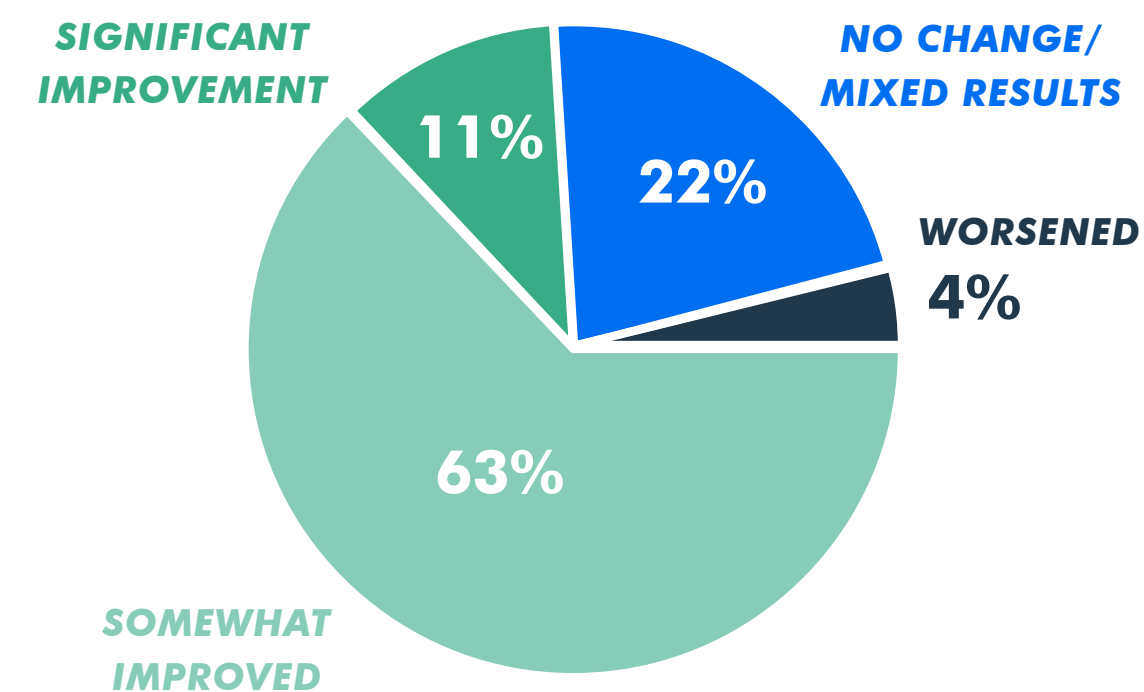
Figure 3.3 (27)*

DID REMOVING CLASSROOM BINS IMPACT CONTAMINATION RATES?

NO CHANGE/MIXED RESULTS 33%
SIGNIFICANT IMPROVEMENT 17%
WORSENED 3%
SOMEWHAT IMPROVED 47%

Figure 3.4 (30)*

*Data of all figures based on schools that have discontinued custodial deskside service, all survey responses.

Direct Costs & Litter

Two-thirds of schools that have discontinued custodial collection service for deskside waste baskets cite direct cost savings (Figure 3.5). In most cases, the savings comes from custodians no longer replacing bag liners when they emptied the baskets. Across a large institution, these savings could be significant. A 2023 campus-wide conversion to deskside self-service at Valparaiso University in Indiana eliminated 35,000 bag liners for an annual savings of $13,000 (See Appendix B). Appalachian State's 2013 conversion to a mini-bin system has eliminated nearly 900,000 bags over ten years. Miami University in Ohio cited separate capital savings for the bins themselves. A 2018 pilot in just two buildings led to 34 class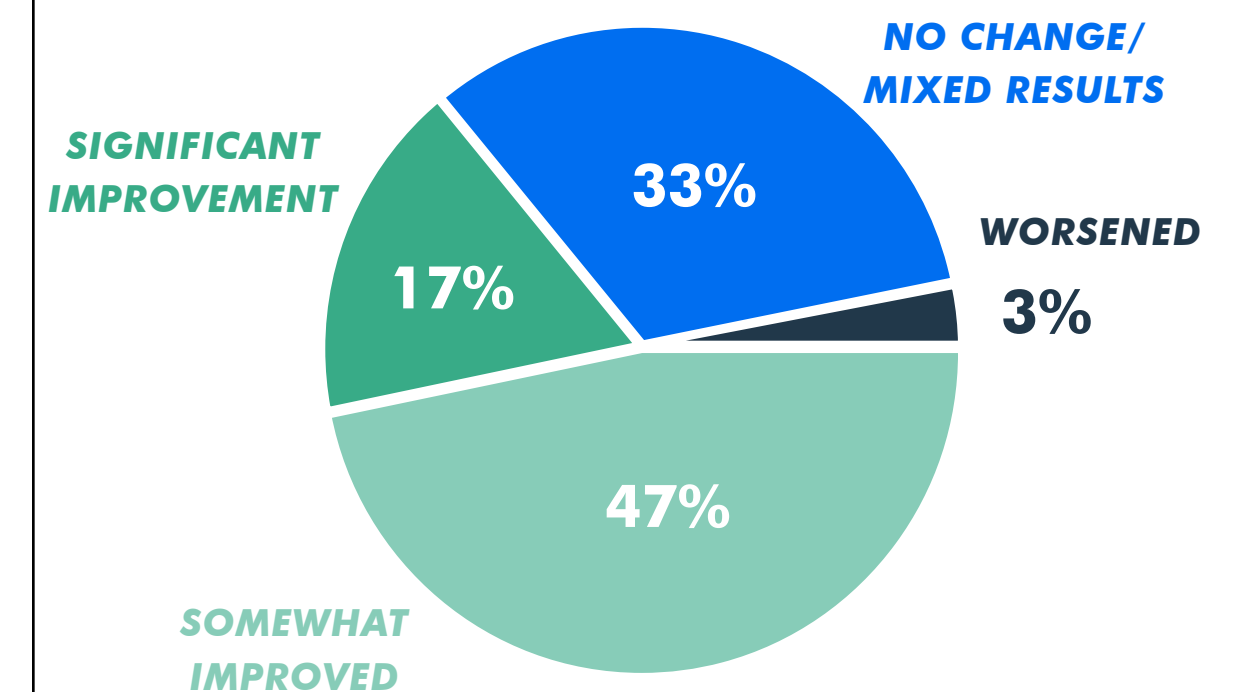room trash bins being reallocated to other locations, allowing them to avoid the $770 cost of buying new bins (See Appendix B). For schools that would otherwise need to add a second bin in classrooms to place recycling on an equal footing with trash, alternately removing the existing trash bin avoids similar ongoing liner and capital bin costs applied across all academic locations.

A common objection to removing classroom bins is that doing so will cause students to leave their waste by their desks rather than carry it out to the centralized waste bins in the hallway. The vast majority of schools found this not to be the case with 61% observing no change in the amount of litter left behind. And while 8% of schools did experience more litter, 32% said the opposite, with schools like the University of Wisconsin-Stevens Point, SUNY New Paltz and UC Berkeley saying the removal of bins actually resulted in less litter. With an effective education effort, a "pack-it in, pack-it out" system can reset student expectations to take greater responsibility for their waste.

After removing bins "there is less litter left inside classrooms for housekeeping to service which is a real labor savings and enhances the aesthetics of the classroom." - UNC Greensboro

DID ELIMINATING DESKSIDE CUSTODIAL SERVICE RESULT IN DIRECT COST SAVINGS?

NO CHANGE/MIXED RESULTS 30%
SIGNIFICANT IMPROVEMENT 33%
WORSENED 3%
SOMEWHAT IMPROVED 33%
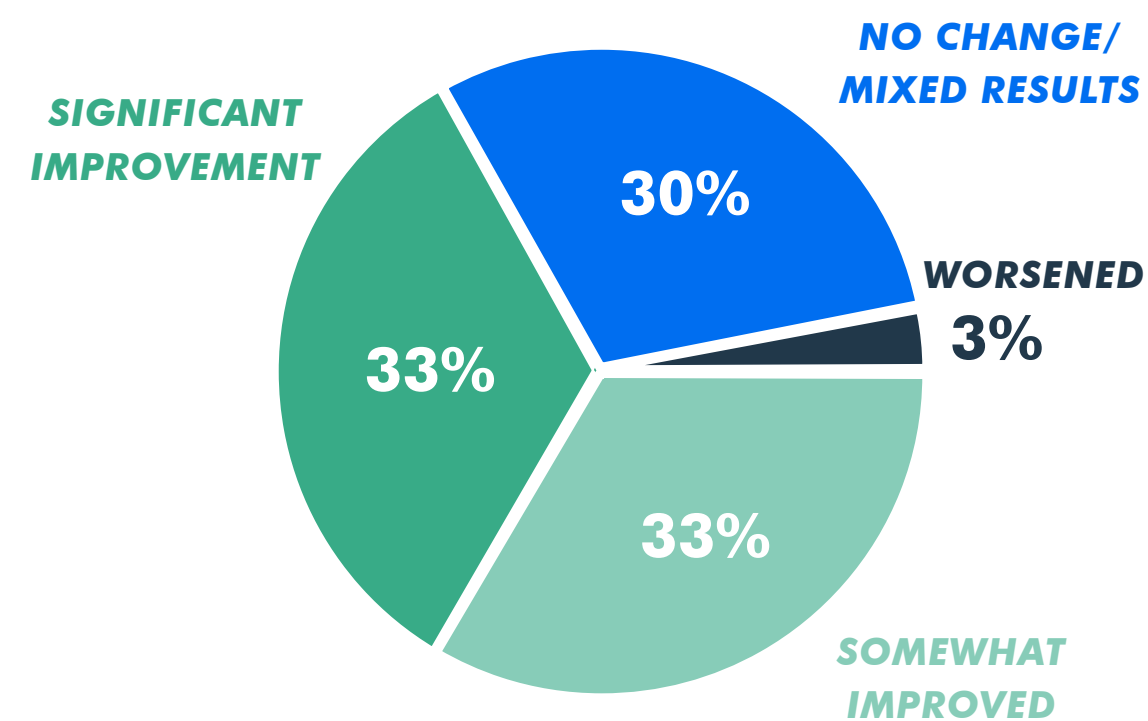
Figure 3.5 (33)

DID REMOVING CLASSROOM BINS IMPACT LITTER LEVELS?

SOMEWHAT IMPROVED 21%
SIGNIFICANT IMPROVEMENT 11%
WORSENED 8%
NO CHANGE/MIXED RESULTS 61%

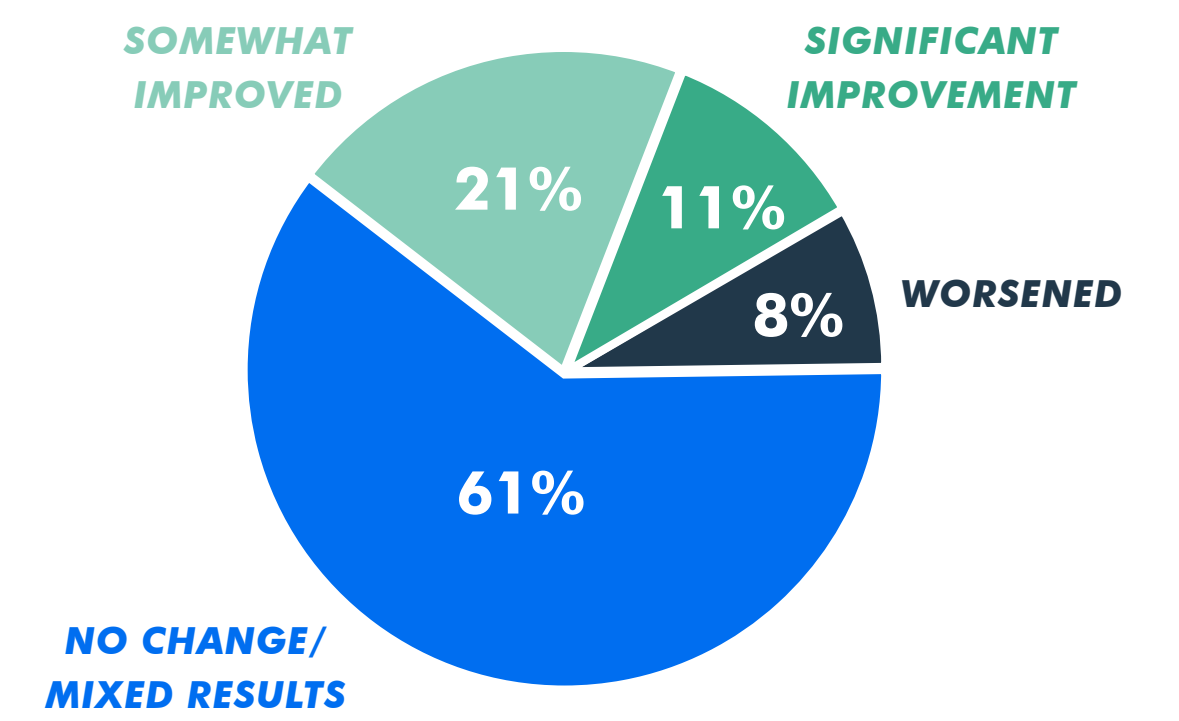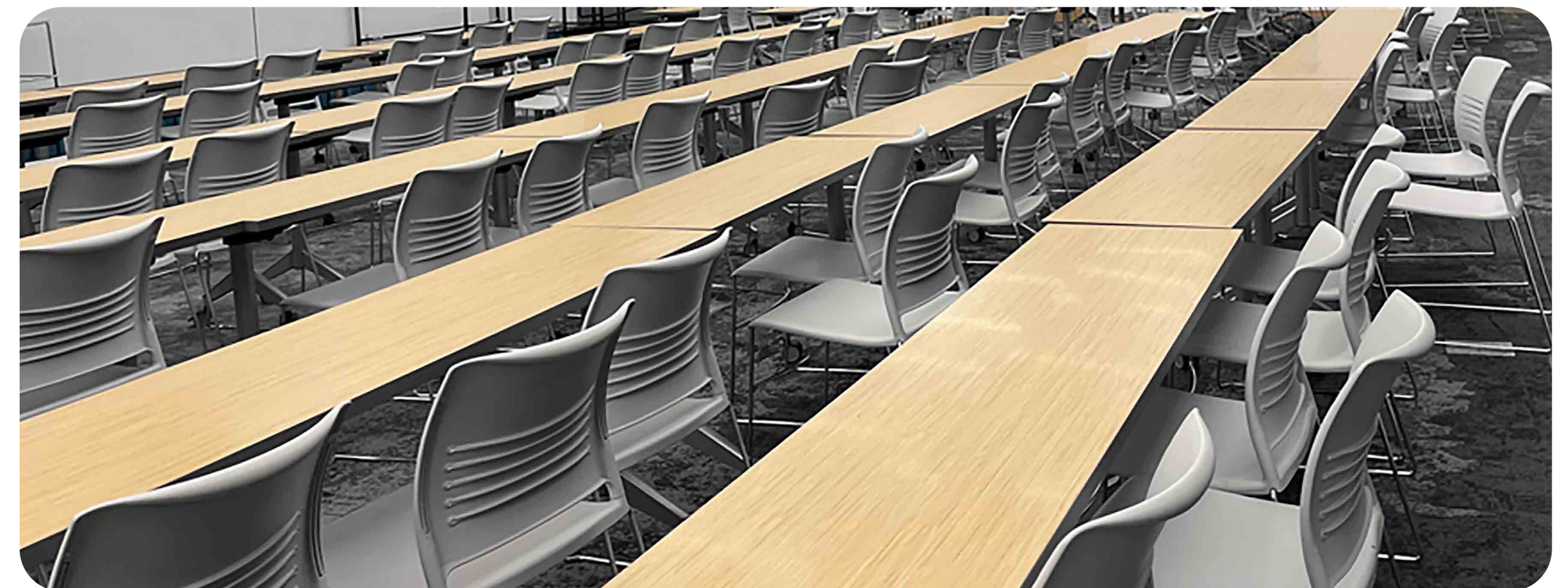*Figure 3.6 (38)*

Data of all figures based on schools that have discontinued custodial deskside service, all survey responses.

Labor Savings

Labor savings drew the greatest response about impacts for both settings. 86% of schools cited improvement in relation to deskside service (Figure 3.7) and 93% did so for removing classroom bins (Figure 3.8). UMass Dartmouth, Winthrop University and Penn State are a few of the schools that cited "significant" impact from classrooms, while Kent State University, CSU Dominguez Hills and Johnson County Community College attributed the same from office desksides. The University of Washington found changes to deskside routines shaved as much as three hours from some custodian's daily workload. The University of Calgary estimated their self-service deskside system reduced housekeeping's campus-wide workload equivalent to 10 FTE positions.
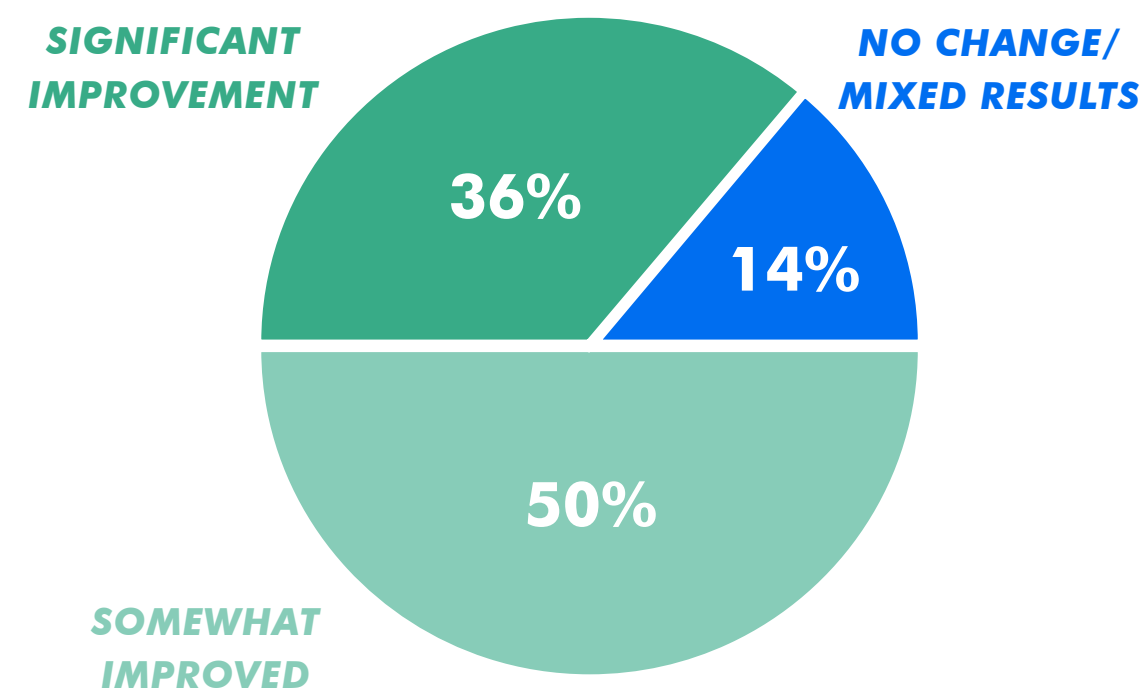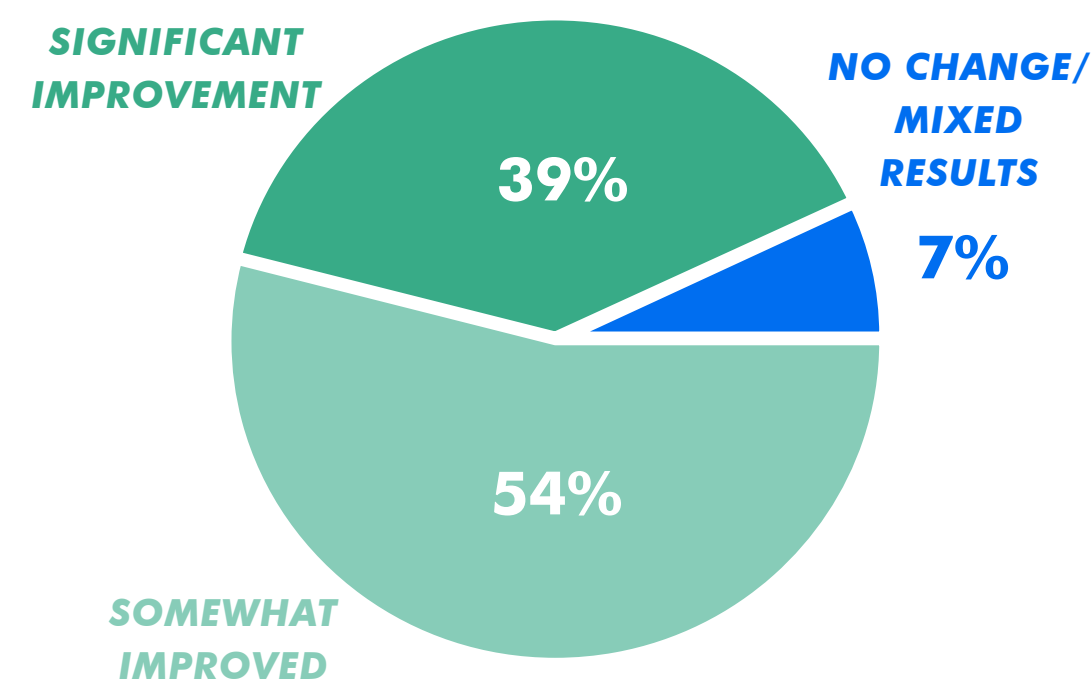
An obvious source of this time savings comes from custodial crews no longer emptying and re-bagging hundreds if not thousands of individual waste baskets. A University of Minnesota time/motion study measured this time commitment at anywhere from 30 to 60 seconds per basket (See Appendix B). UNC Chapel Hill cited time savings from optimizing routing efficiencies as custodians no longer needed to enter rooms in some cases. Miami University noted that removing classroom bins simultaneously eliminated the extra labor to clean spills on the bins and surrounding wall and floor surfaces caused by the sloppy efforts of students tossing waste items (See Appendix B).

Some of these FTE savings are likely to be offset by increased collection needs from the centralized bin stations that absorb the redirected trash and recyclables. In many cases, like the University of Minnesota, schools reallocate labor savings to other custodial tasks or to expand diversion opportunities. Starting with a pilot in 2017 and since expanded campus-wide, Minnesota redirected the labor saved by staff and faculty handling their own deskside waste to service a new collection stream for food waste/compost added to centralized waste stations (See Appendix B).

While these findings lack quantitative data measuring the impacts, the collective experience of individual waste and sustainability managers gives weight to an understanding that centralized collections, especially when paired with standardized bin arrangements and food waste collections, can significantly improve diversion, help control contamination and reduce costs. As mentioned previously, the nature of how these projects typically get implemented has made it difficult to isolate the impact of specific practices with empirical data. This is an area that warrants more careful research in the future.

Key Takeaway

93% of schools that have removed bins from classrooms have realized labor savings.

### DID ELIMINATING DESKSIDE CUSTODIAL SERVICE SAVE LABOR?

SIGNIFICANT IMPROVEMENT — 36%

NO CHANGE/ MIXED RESULTS — 14%

SOMEWHAT IMPROVED — 50%

Figure 2.7 (92)*

DID REMOVING CLASSROOM BINS SAVE LABOR?

SIGNIFICANT IMPROVEMENT — 39%

NO CHANGE/ MIXED RESULTS — 7%

SOMEWHAT IMPROVED — 54%

Figure 2.8 (60)*

University of Vermont

*Data of all figures based on schools that have discontinued custodial deskside service, all survey responses.

Practices Associated with Performance

In addition to asking if schools had experienced direct impacts from the various best practices, this project considered what if any relationship might exist between their adoption and the performance of a school's waste reduction program. Towards this end, participants were prompted to list their school's overall diversion rate. Focusing again on just the smaller sample of large, US-based 4-year schools, participants were divided between high performers (41% or higher diversion | 38 schools) and low (40% or lower diversion | 48 schools). Figure 3.9 shows the percentage of each group that have adopted various best practices. In each instance, the better-performing schools are shown to be adopting recycling/diversion-friendly practices at higher rates. The greatest difference is found with food waste, where high-diversion schools are more than three times as likely to have deployed dedicated collection bins. High diversion schools were also 52% more likely to provide small if any deskside trash baskets and 45% more likely to engage in regular, face-to-face education outreach.
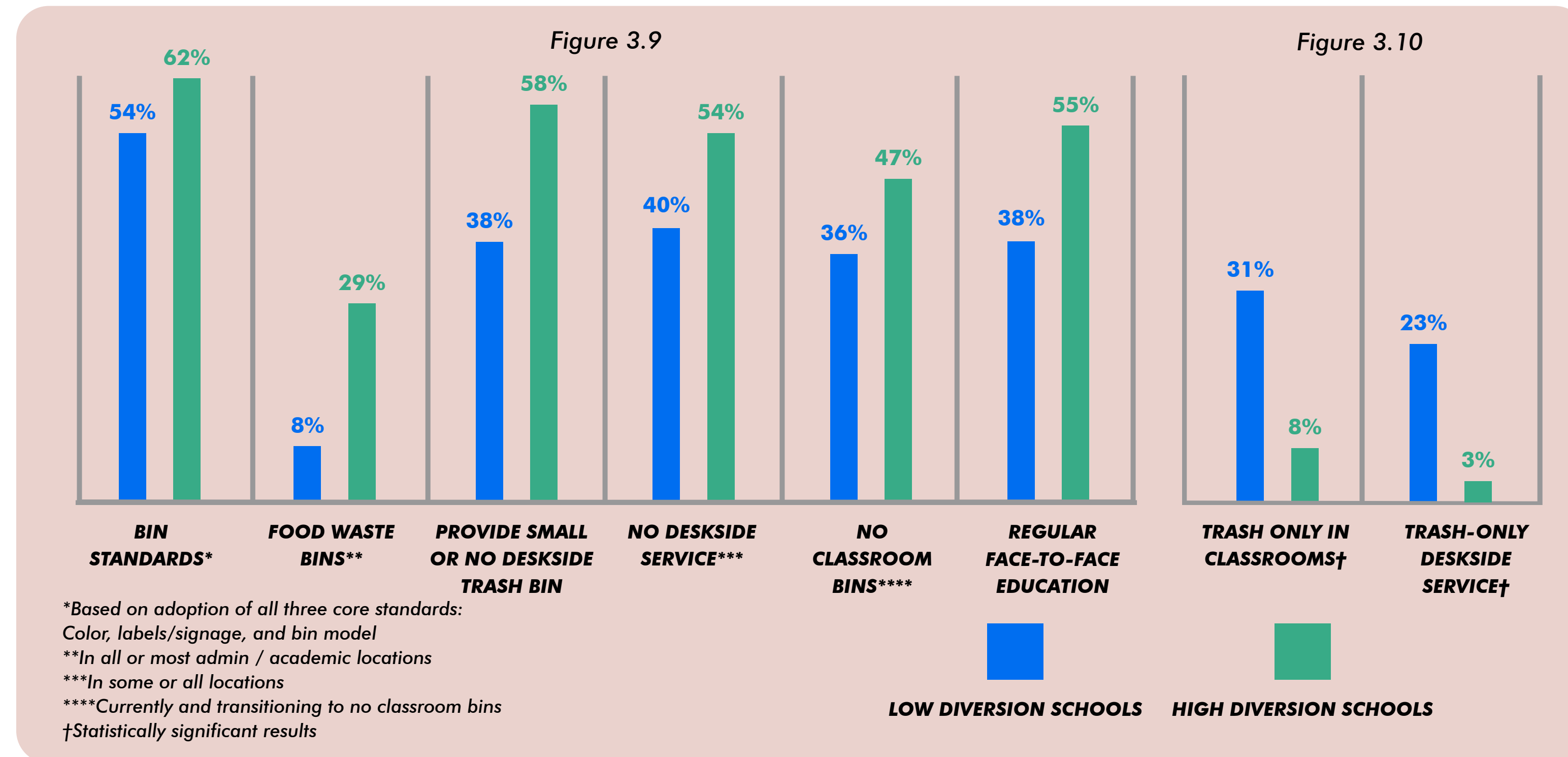
Two of the practices shown (Figure 3.10) would be considered regressive and more likely to result in lower performance: trash-only custodial service for office deskside baskets and only trash baskets provided in classrooms. In both cases, low-diversion schools were much more likely to rely on these arrangements that make access to trash more convenient than recycling. In both cases, there is a statistically significant difference between the odds of a low-diversion school using the trash-friendly practice compared to high-diversion schools. In other words, while the differences with high-performing schools using diversion-friendly best practices are noteworthy and may reflect trends among all large, US-based 4-year schools (Figure 3.9), the results of Figure 3.10 come with greater confidence that they reflect actual patterns with this group.

The different adoption rates shown in Figures 3.9 and 3.10 do not imply any of the practices are responsible for the school's overall performance. There are any number of variables and room for subjective interpretation to draw causal relationships. However, in the same spirit of observing the "7 Habits of Highly Effective People", these findings show an association between the practices and performance and offer some evidence of what leads some schools to reach higher waste diversion.

Figure 3.9

Figure 3.10

	Low Diversion	High Diversion
BIN STANDARDS*	54%	62%
FOOD WASTE BINS**	8%	29%
PROVIDE SMALL OR NO DESKSIDE TRASH BIN	38%	58%
NO DESKSIDE SERVICE***	40%	54%
NO CLASSROOM BINS****	36%	47%
REGULAR FACE-TO-FACE EDUCATION	38%	55%
TRASH ONLY IN CLASSROOMS†	31%	8%
TRASH-ONLY DESKSIDE SERVICE†	23%	3%

*Based on adoption of all three core standards: Color, labels/signage, and bin model
**In all or most admin / academic locations
***In some or all locations
****Currently and transitioning to no classroom bins
†Statistically significant results

LOW DIVERSION SCHOOLS   HIGH DIVERSION SCHOOLS

Implementing Centralized Collection Arrangements

Resistance to No-Deskside Custodial Service

Importance to Successful Implementation

Resistance to No-Deskside Custodial Service

Centralized collection arrangements require changing routines. This inevitably raises objections and the potential for institutional resistance. For individual staff and faculty, being told to carry their waste to bins in a common area challenges long-held expectations about convenience and housecleaning responsibilities. Though experience shows that people adapt and come to accept handling their personal waste, without careful planning, complaints from even a handful of people can give campus leadership pause and stall the implementation of a new collection arrangement.

Drawing from the overall sample of schools that have eliminated custodial deskside service, the survey asked whether the introduction of the new system generated significant resistance from any of several key stakeholder groups. Not surprisingly, 75% pointed to their experience with opposition from the staff and faculty instructed to handle their own waste. The most commonly cited objection was the belief that professional staff's time was too valuable to spend on a custodial task. In other cases, concerns about germs or odor and pests were raised. Several schools mentioned staff and faculty fears that service cutbacks would result in custodians losing their jobs.

WAS THERE RESISTANCE TO ELIMINATING CUSTODIAL DESKSIDE WASTE SERVICE?

75%

8%

8%

23%

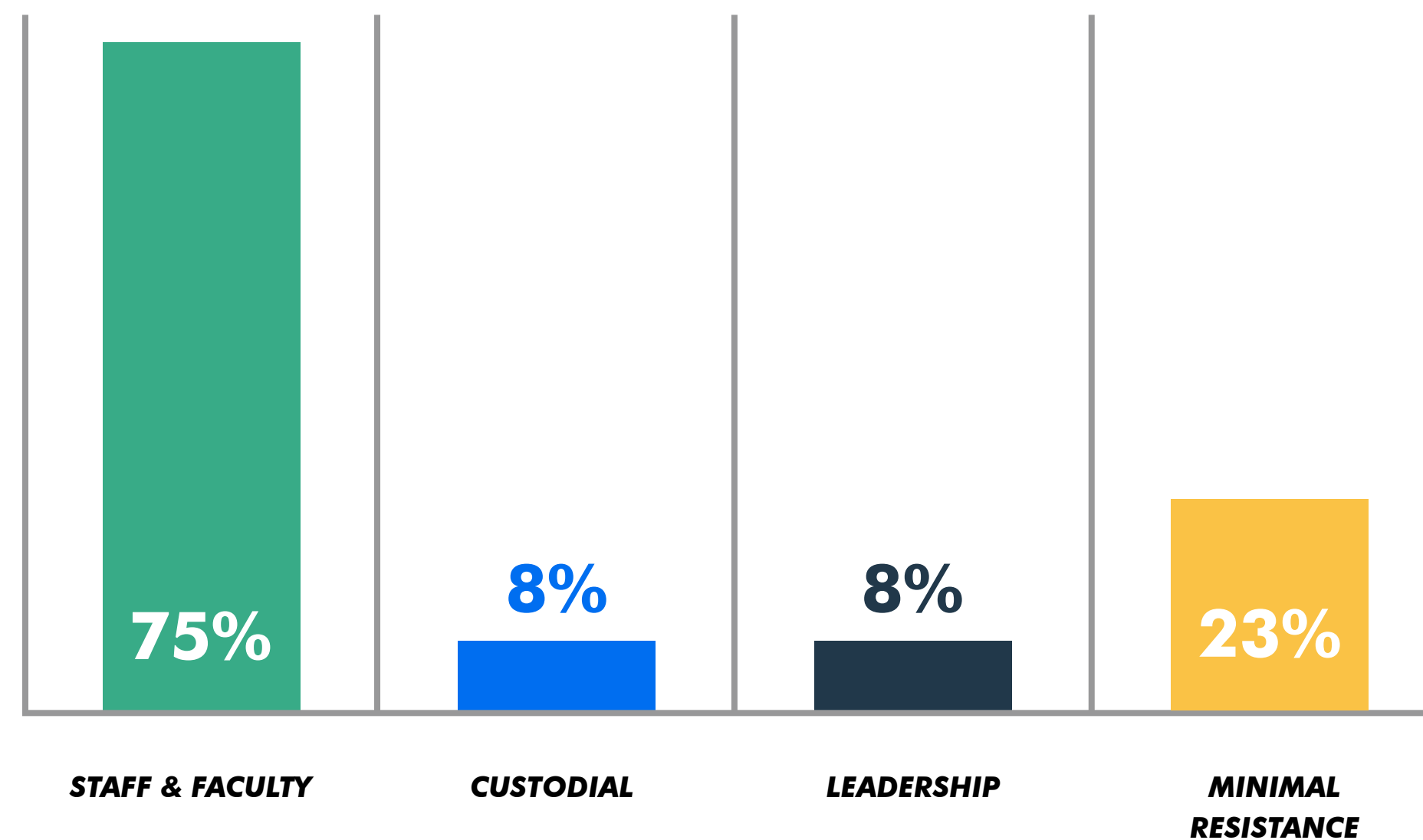STAFF & FACULTY   CUSTODIAL   LEADERSHIP   MINIMAL RESISTANCE

*Figure 4.1**

"The majority of concerns occur when presented with the upcoming change in operations. Once program begins there are minimal concerns expressed that can't be easily addressed." - University of Montana

Staff and faculty resistance played out in different ways. Multiple survey respondents emphasized that a relatively small number of people were vocally protesting the changes while most office workers were on board with them. The University of Virginia noted that complaints came from existing office locations where deskside custodial service was discontinued but not from new buildings opening with self-service as the default. UC San Francisco said that hybrid staff who only work in the office part-time tend to be less attuned to protocols and more likely to complain. UNC Charlotte and the University of Michigan's Dearborn campus were among half a dozen schools that noted some custodians feel pressured to ignore new protocols and continue servicing deskside baskets. At Kent State University, opposition was not widespread but nonetheless led the administration to pause for several years the rollout of an already partially implemented deskside waste policy. It was only following the Covid pandemic and pressure to reduce the custodial workload that implementation resumed.

*Figure 4.1 data based on schools that have discontinued custodial deskside service, all survey responses. (48)

Importance to Successful Implementation

The survey did not ask about complaints specific to removing bins from classrooms, but a few schools volunteered issues they experienced. Custodians frequently voice concern about additional litter when removing bins is first proposed. And while evidence suggests this doesn't typically play out, Michigan State University and the University of Minnesota both referenced a tendency for individual custodians and others to unilaterally move bins back into certain classrooms. Though less common with classrooms, UNC Greensboro and SUNY New Paltz were among a few others that have experienced complaints from students or faculty.

RATE AS 'VERY IMPORTANT' TO IMPLEMENTING DESKSIDE SELF-SERVICE ARRANGEMENT

83%	68%	68%	56%	58%	57%	47%	23%
COMMUNICATION STRATEGY	LEADERSHIP SUPPORT	CUSTODIAL SUPPORT	OTHER STAKEHOLDER SUPPORT	MONITOR POST-IMPLEMENTATION	PILOT TEST	STRATEGY TO ADDRESS COMPLAINTS	STAFF AMBASSADORS

*Figure 4.2**

Many written comments reinforced that regardless of initial objections, people come to accept centralized collection arrangements. Getting past the objection stage, however, requires careful planning from the outset. Campuses that had already implemented no-custodial deskside arrangements were asked to rate the importance of different factors to ensure a successful rollout (Figure 4.2). CSU Channel Islands captured the broad consensus of schools observing that "[outreach to] the campus community about changes to waste bins is incredibly important". More than any other factor, 83% of schools rated communication strategy as very important. Kent State University advised that "having an effective communication strategy in place before a roll-out helps the implementation of a change go smoothly. Every building occupant receives information where we explain why we are making a change, who to contact for accessibility, and the date the change will begin." Echoing SUNY College of Environmental Science and Forestry and other schools, North Carolina State University suggested that schools "collect data to show the benefits [in] diversion and cost savings. Refer to success from other universities" or early pilot results to sell the value of the program.

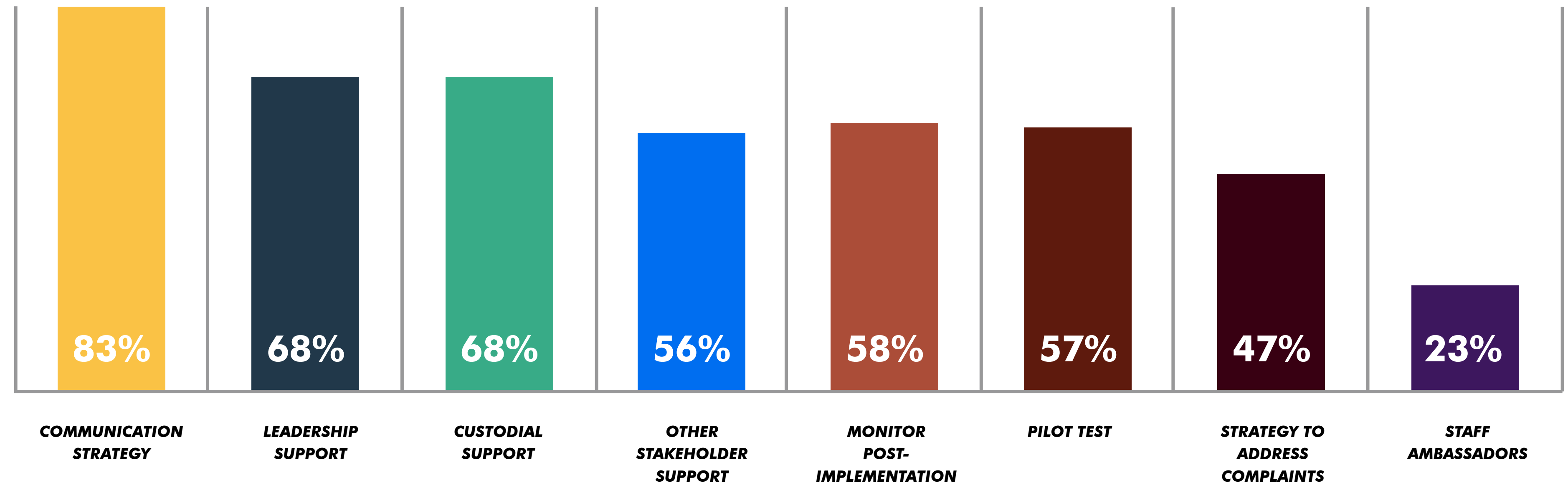**Figure 4.2 data based on schools that have discontinued custodial deskside service, all survey responses. (53)*

"Be open and transparent with the entire campus community throughout the process and communicate as much as possible." - Appalachian State

Stanford University recommended that schools "survey people [beforehand] to understand their attitudes about the changes and either modify or prepare outreach and communications based on the survey results." Their own surveys found that terminology directing people to use "shared" waste stations generated less friction than referring to "centralized" collections. They also relied on normative messaging, using testimonials and highlighting other departments that had already implemented the program to foster a sense of common purpose. (See Appendix B).

Sixty-eight percent of respondents endorsed each of two other factors: having visible leadership support and getting custodians onboard with the changes. According to the University of Oregon, "even the campus president made a big deal of saying he would receive no special service or collection so that pretty much shut the door on any… protest or public complaints." Regarding the latter point, the University of Washington encouraged "supporting and training custodians so they don't get hit with all the complaints or get coerced to service the [personal] bins" of angry customers.

The University of Montana was one of 57% of schools which included pilot tests among the "very important" factors, adding they've "been an easy gateway to introduce new programs and infrastructure. We've documented materials through weight/volume and characterization studies to demonstrate the results which have been positively received by building managers and stakeholders such as campus custodial."

Appendix

Appendix A: Examples of Bin & Signage Standards

Appendix B: Examples of Centralized Collection Programs

Appendix C: Additional Resources

Appendix A: Examples of Bin & Signage Standards

The following are examples of guidelines or other documents related to their campus bin standards, either provided by survey respondents or shared in other public forums. Click the links below to view documents.

Boston University
➜ **Internal Waste Bin & Signage Standardization**

Dalhousie University
➜ **2016 Implementing Bin Standards Presentation**
➜ **Indoor/Outdoor Waste Bin Standards**

Harvard University
➜ **Waste Signage**

Johns Hopkins University
➜ **Waste Infrastructure Standards**

Kent State University
➜ **Indoor Recycling & Trash Placement Plan**

Swathmore College
➜ **Campus-Wide Waste Stations & Signage**

The Ohio State University
➜ **Building Design Standards**
(see Materials Management Planning, pg 31)

Tufts University
➜ **Bin Standards**   ➜ **Labels & Wall Signage**

Villanova University
➜ **Bin Standards and Waste Uniformity**

University of California, Berkeley
➜ **Cal Zero Waste Bin List**   ➜ **2019 Zero Waste Plan**

University of California, Davis
➜ **Waste Bin Standards**   ➜ **Waste & Recycling Signage**

University of California, Los Angeles
➜ **Bin & Signage Requirements**

University of Florida
➜ **Waste Infrastructure Standards**

University of Michigan
➜ **Signage & Promotional Materials**
➜ **Waste and Recycling Bin Standardization Guidelines**
➜ **2023 Bin Placement Guidelines**

University of Nebraska, Lincoln
➜ **Guide to All-in-the-Hall Recycling**

University of North Carolina, Chapel Hill
➜ **Office of Solid Waste Design Guidelines**

University of North Carolina, Wilmington
➜ **Waste Stream Bin Standards**

University of Oregon
➜ **Zero Waste Collection & Equipment Guidelines**

University of Washington
➜ **Facilities Services Design Guidelines**

Appendix B: Examples of Centralized Collection Programs

The following are examples of pilot projects, program overviews and other documents either provided by survey respondents or shared in other public forums. Click the links below to view documents.

Glendale Community College

➔**Deskside Collection Case Study**

Johns Hopkins University

➔**Centralized Waste Station Pilot**

Miami University

➔**2018 Centralized & Glassroom Collections Pilot Study**

Stanford University

➔**Case Study + Messaging Research**

University of British Columbia

➔**2019 Rightsizing Collection Infrastructure Presentation**

University of California, Los Angeles

➔**Campus Waste Bin Standardization**

➔**Custodial Training Presentation on Zero Waste Program**

University of California, Santa Barbara

➔**2018 Optimizing Bin Infrastructure Presentations**

University of Minnesota

➔**Deskside Collections Pilot & Time / Motion Study**

University of Nebraska, Lincoln

➔**Guide to All-in-the-Hall Recycling**

University of Washington

➔**2013 Denny Project - Deskside Pilot Report**

➔**2016 MiniMax Overview Presentation**

➔**MiniMax Program Overview Webpage**

Valparaiso University

➔**Campus Recycling Program Overview**

Appendix C: Additional Resources

Busch Systems

�➜**Fact Sheet on Above-Bin Signage Research**

Keep America Beautiful

➜**Fact Sheet on 2015 Deskside Bin Research**

➜**2015 Recycle@Work Deskside Bin Study - Full Report**

University of Houston, Clear Lake

➜**2017 Academic Paper on Removing Bins from Classrooms**

University of Southern Maine

➜**Guide to Establishing My Tiny Trash Program**

Western Michigan University

➜**2012 Academic Paper Measuring Impact Centralized Waste Stations**