

NORTH CAROLINA PUBLIC COMMUNITY COLLEGE AND UNIVERSITY ANNUAL RECYCLING REPORT

July 1, 2018 – June 30, 2019

North Carolina Department of Environmental Quality
Division of Environmental Assistance and Customer Service
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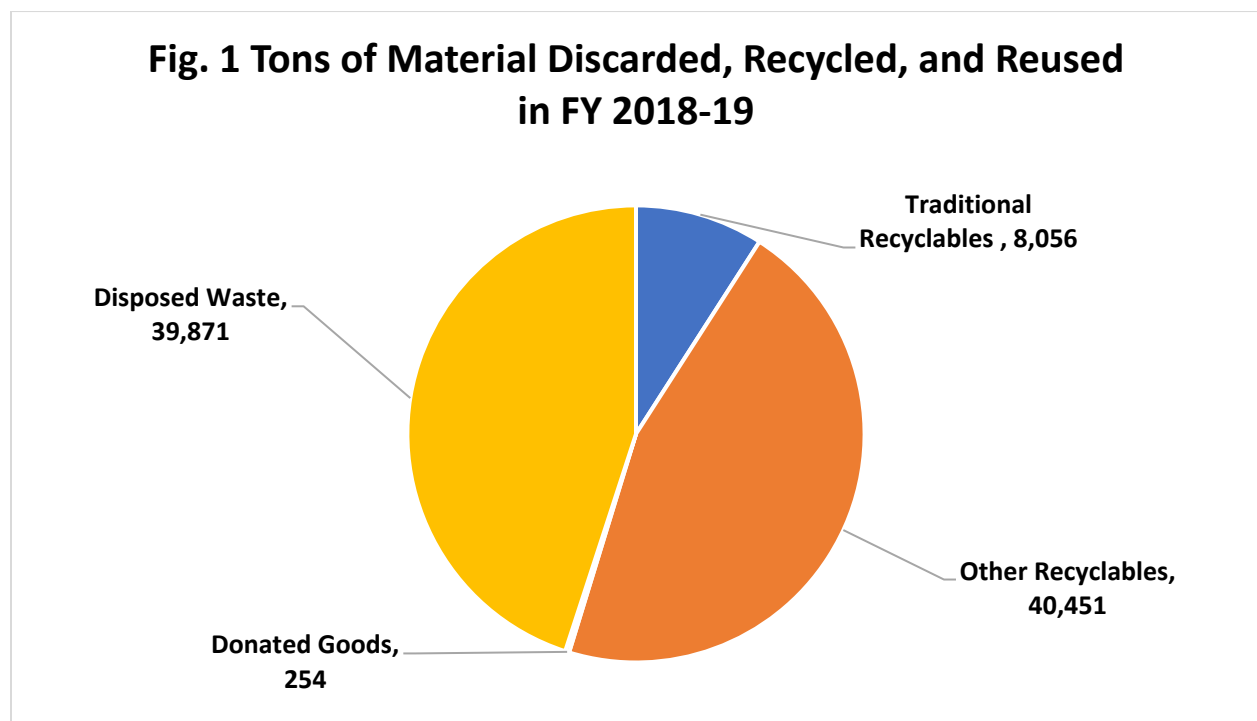
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Executive Summary

This report presents recycling and waste data from public universities and community colleges in North Carolina in FY 2018-19. During the past reporting cycle, 47 of 75 colleges and universities completed a survey administered by the N.C. Department of Environmental Quality's Division of Environmental Assistance and Customer Service (DEACS). The submitted surveys provided recycling and waste data for this summary report.

Figure 1 below shows the amount and distribution of recyclable and solid waste materials managed by the 47 reporting schools. The chart shows that schools generated a total of 88,633 tons of material. Of that total, 39,871 tons (45 percent) were sent to a landfill for disposal, but 48,507 tons (55 percent) were recovered for reuse or recycling.



The 48,507 tons of material that schools recovered for reuse and recycling falls into one of three categories: traditional recyclables, other non-traditional recyclables, and donated material. Schools reported recycling 8,056 tons of traditional materials such as cans, bottles, paper and cardboard. Surveys showed that colleges and universities made significant increases in recovering non-traditional material, as they reported recycling a total of 40,451 tons of materials such as food waste, landscaping debris, textiles, electronics, and heavy construction

and demolition material. Much of this increase was due to thousands of tons of construction and demolition debris (C&D) recycling.

The last category of recovery – donated material – is the smallest; however, in FY 2018-19 schools donated 254 tons of goods. This is 166 tons more than the previous fiscal year (2017-18).

In compliance with N.C. General Statute 130A-309.14, each school has implemented some type of recycling program to capture traditional recyclables (paper, cardboard, plastic, metal cans, and glass bottles). Several schools have implemented practices to continually improve their recycling programs and achieve waste diversion beyond their statutory requirement:

- Twenty-one percent of reporting schools have “twinned” (paired together) all on-campus waste and recycling bins, and an additional 53 percent have at least twinned some waste and recycling bins;
- Sixty percent of schools have traditional recycling collection in dining halls; and
- Eighty-nine percent of reporting schools have recycling available in academic buildings and 87 percent have recycling in office buildings.

To improve the effectiveness and efficiency of recycling programs, DEACS generally recommends that colleges and universities budget to expand their recycling outreach, twin all of their public bins, recover non-traditional recyclables, and donate reusable goods. However, DEACS recognizes that with the COVID-19 pandemic that began in late 2019, schools may not have the funds to expand their recycling budgets. Schools can contact DEACS to learn how other programs have overcome similar challenges.

About DEACS - RMMS

The Recycling and Materials Management Section (RMMS) in DEQ's Division of Environmental Assistance and Customer Service works with recycling businesses, local governments and state agencies. The section provides data-based technical assistance to colleges and universities. Using data from this report, DEACS offers solutions to common recycling challenges such as contamination, low participation rates and implementation of new programs on college campuses. Staff members frequently make site visits to North Carolina colleges to offer face-to-face assistance, and staff also presents data and recycling strategies at regional conferences. Contact Tara Nattress (tara.nattress@ncdenr.gov) with requests for technical assistance or data about collegiate recycling.

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Introduction

State agencies are required by [North Carolina General Statute 130A-309.14](#) to recycle office paper, newspaper, aluminum cans, glass and plastic bottles. State agencies are also required to recycle fluorescent bulbs and must comply with statewide landfill bans, which prohibit the disposal of the following materials in landfills: used oil and oil filters, antifreeze, yard trash, wooden pallets, tires, lead acid batteries, plastic bottles, aluminum cans, televisions, and computer equipment.

Forty-seven agencies reported data in FY 2018-19, which constitutes 63 percent of public collegiate entities.

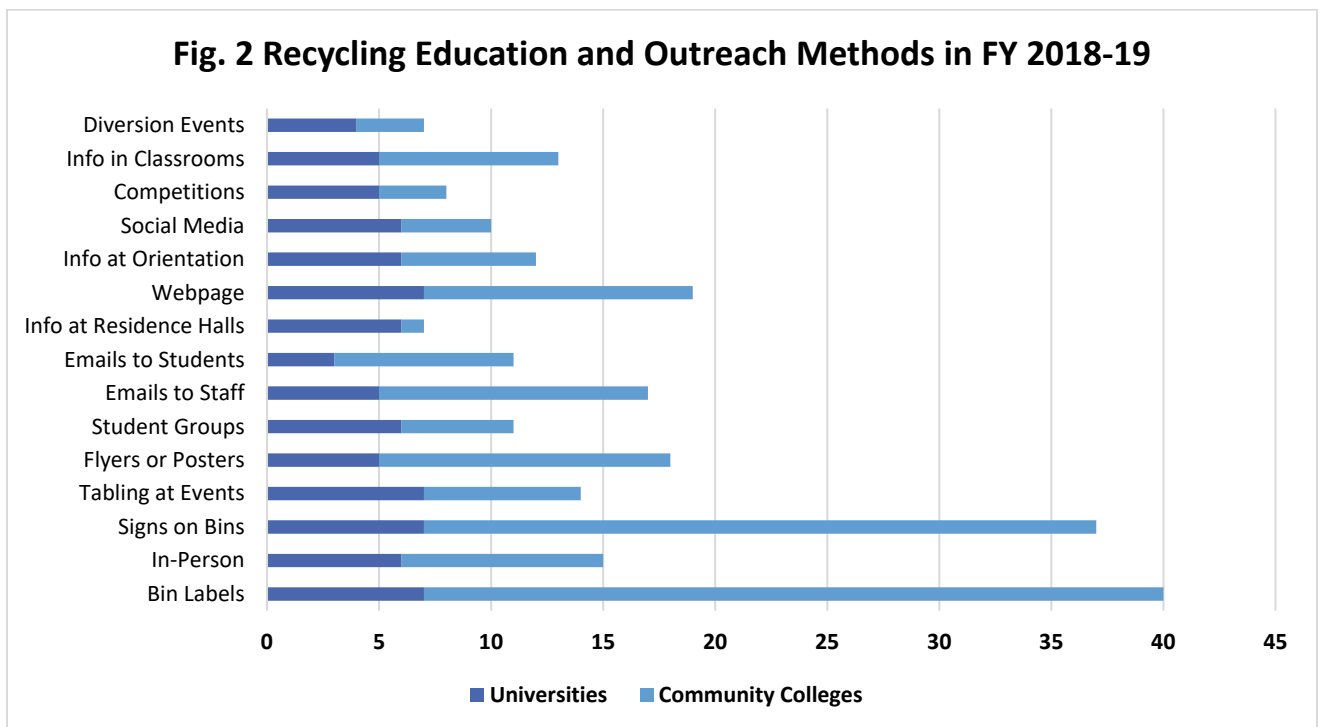
A list of reporting agencies is provided below. The Division of Environmental Assistance and Customer Service (DEACS) would like to thank these agencies for completing and submitting the annual recycling report. While the reporting process is voluntary, it is worthwhile for all schools to collect data and track progress on their solid waste programs, costs and diversion efforts. This data provides some perspective about how schools can improve their solid waste reduction and increase recycling.

Alamance Community College	Guilford Technical Community College	Stanly Community College
Asheville-Buncombe Technical Community College	James Sprunt Community College	Surry Community College
Appalachian State University	Lenoir Community College	Tri-County Community College
Beaufort County Community College	Martin Community College	UNC Asheville
Bladen Community College	Mitchell Community College	UNC Chapel Hill
Blue Ridge Community College	Montgomery Community College	UNC Charlotte
Brunswick Community College	Nash Community College	UNC Greensboro
Caldwell Community College & Tech. Institute	NC School of Science & Mathematics	Wake Technical Community College
Carteret Community College	NC State University	Western Carolina University
Catawba Valley Community College	Pitt Community College	Western Piedmont Community College
Central Carolina Community College	Randolph Community College	Wilson Community College
Central Piedmont Community College	Richmond Community College	
Craven Community College	Rockingham Community College	
Davidson County Community College	Rowan-Cabarrus Community College	
Durham Technical Community College	Sampson Community College	
East Carolina University	Sandhills Community College	
Fayetteville State University	South Piedmont Community College	
Fayetteville Technical Community College	Southwestern Community College	

1 – Education and Outreach

1.1 Education Methods

Education to students and employees is essential to operating a functioning recycling program on a college campus. Signage and outreach help people know what materials do and do not belong in the recycling bin, and a lack of outreach leads to problems such as contamination and low recycling rates. Currently, recycling markets emphasize the importance of clean, non-contaminated recycling loads, so outreach is vital to ensure quality recyclable material. The following graph shows the prevalence of each method for education.



By far, the most popular outreach practice involves using labels and signs by the recycling bins to inform people of which materials go into the recycling bin. Eighty-five percent of the reporting schools confirmed that they use labels directly on the recycling and waste bins. Also, most of the universities engage in additional education ranging from face-to-face outreach to establishing a recycling web presence.

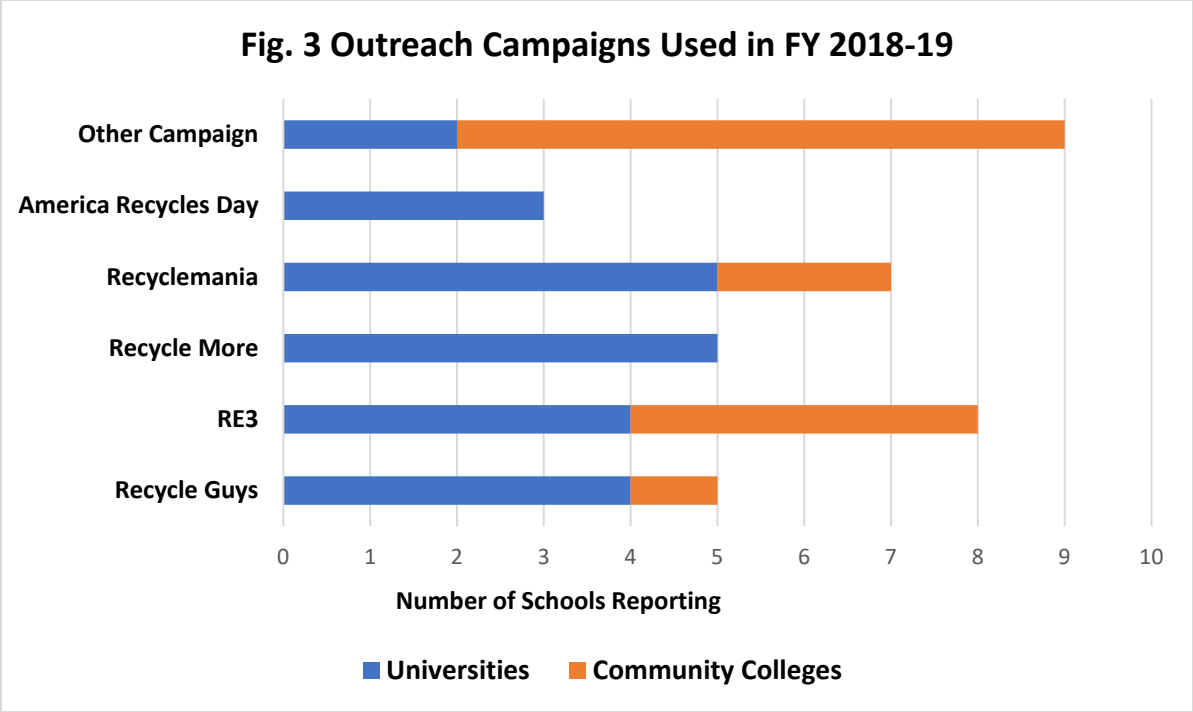
1.2 Outreach Campaigns

In addition to in-house education methods, the survey asked schools to report on any large-scale outreach campaigns used to educate people on their campuses. During FY 2018-19 the state had three social marketing campaigns: Recycle Guys, RE3 and Recycle More NC. DEQ now primarily uses the Recycle Right NC campaign. There is not data on this campaign yet as it began after the report survey went out.

- [Recycle Guys](http://www.recycleguys.org/) – The Recycle Guys campaign is intended to reach a younger audience with videos, activity books, stickers, pencils, temporary tattoos and other promotional materials to encourage recycling behavior (<http://www.recycleguys.org/>).
- [RE3](http://www.re3.org/) – The RE3.org campaign is no longer active, but was aimed at a young adult audience, from high school through late 20s, also using videos but more focused on use of social media. The campaign made use of commercials or short films submitted by students and amateur film producers and a number of these video pieces included anti-littering themes (<http://www.re3.org/>).
- [Recycle More NC](http://www.recyclemorenc.org/) – Recycle More NC was a campaign initially designed to engage the 30 – 55 age range on recycling issues. The intent was to encourage broader participation in existing recycling programs but also to create a recycling ethic everywhere people go by fostering the development and promotion of “away from home” recycling (<http://www.recyclemorenc.org/>). Recycle More NC has now become Recycle Right NC. Recycle Right NC focuses heavily on reducing contamination in the recycling stream by informing citizens about what is and is not recyclable.

Other national campaigns include [Recyclemania](https://recyclemania.org/), an eight-week national competition held each spring to encourage colleges and universities to benchmark and improve efforts to reduce or eliminate waste (<https://recyclemania.org/>). America Recycles Day, celebrated each year on November 15, is a national initiative of Keep America Beautiful to promote and celebrate recycling. Keep America Beautiful offers promotional materials and guidance for event planning and education to all types of public and private organizations, including schools.

As shown in Figure 3 below, colleges and universities most prevalently used “other campaigns,” which included campus-wide competitions, sustainability promotions and recycling events planned and developed by their own staff. The RE3 and Recyclemania campaigns were the most used ‘official’ campaign programs for colleges and universities.

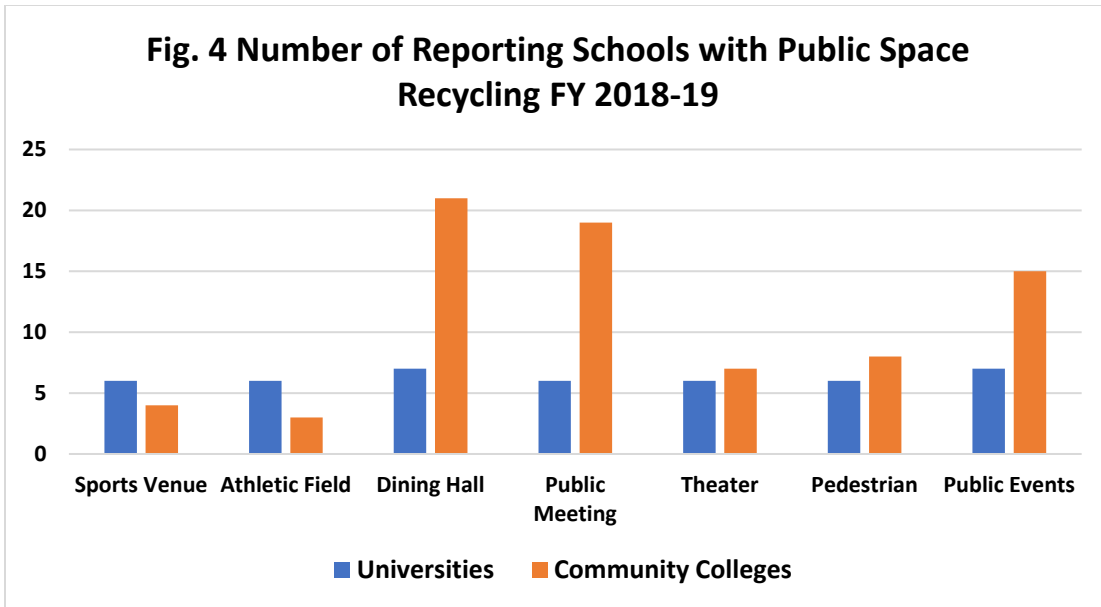


2 – Traditional Recycling (cans, bottles, and paper)

2.1 Public Space Recycling

The recycling survey asked colleges to detail where people on campus had opportunities to recycle. Specifically, colleges reported where bins are publicly located, what buildings had recycling collection, and the percentage of recycling bins paired with waste bins.

Placing bins in public areas is a best practice because students, faculty and staff often need the opportunities to recycle away from their desks, offices and dorm rooms. While walking through campus, people are more inclined to recycle when a bin is nearby.



As indicated in Figure 4 above, the survey’s findings show that on-campus dining halls are the most common public area to have recycling bins with positive responses from 78 percent of reporting universities and 55 percent of reporting community colleges. Colleges also frequently place recycling bins at public events, meeting areas and on pedestrian walkways.

Public athletic fields and sports venues have fewer opportunities for recycling. Schools that do offer recycling at sports games use a variety of strategies. For example, UNC-Chapel Hill reports that waste reduction volunteers and staff hand out recycling bags to tailgaters before home football games. Other schools set up clear stream containers, like those seen in the picture below, so attendees can correctly sort compost and recycling materials from the trash.

Another best practice includes twinning bins - pairing recycling and waste bins side-by-side in public areas. Waste bins are more prevalent in public areas. When recycling bins are co-located with them, people are more likely to recycle. Additionally, recycling bins have lower contamination rates when they are next to a waste bin because people are less likely to incorrectly discard trash in them. Lone recycling bins are often treated as trash cans.



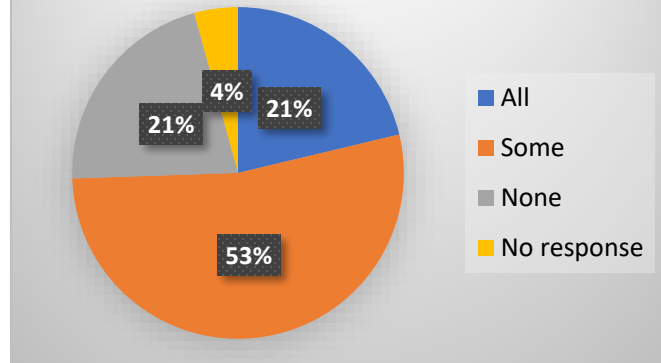
As shown in Figure 5 below, 74 percent of colleges and universities have twinned at least some portion of their public recycling bins with waste bins. Ten schools reported that all their bins were twinned. The remaining 26 percent of schools did

not have any waste or recycling bins that were paired together or did not respond to this question.



Twinned Bins in Cramerton, NC

Fig. 5 Twinned Bins at Responding Schools (FY 2018-19)



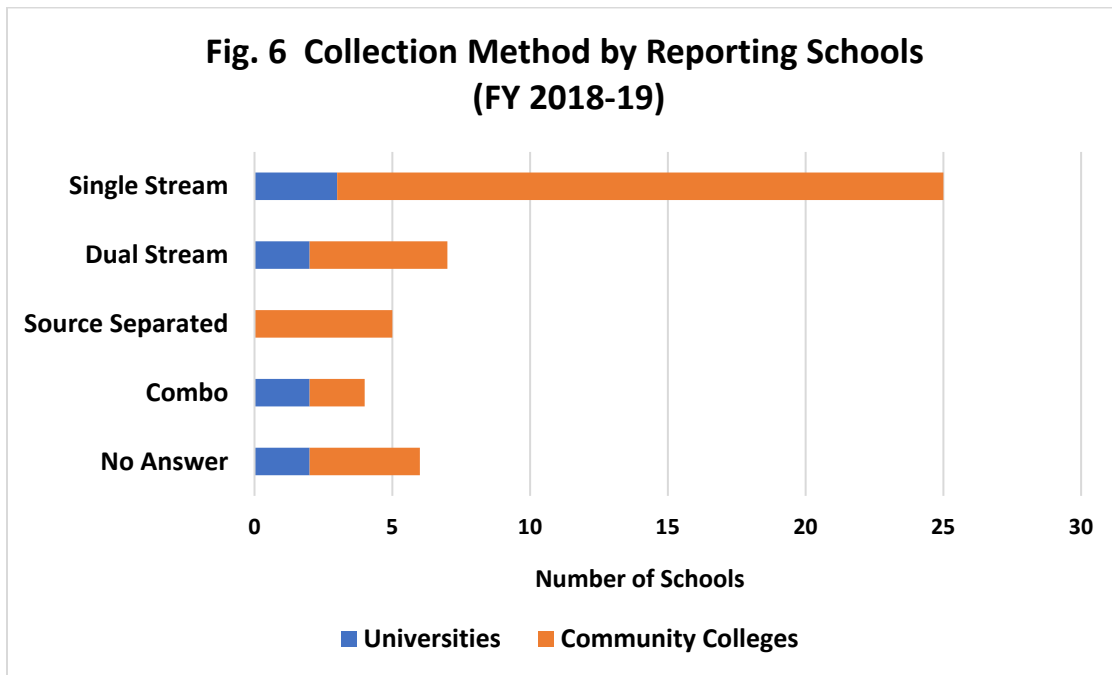
2.2 Recycling Collection Styles

By far, single-stream recycling is the most popular style of recycling collection on college campuses. More than half of the schools reported using a single-stream recycling system in which all of their traditional recyclable materials—cans, bottles and paper—are collected in the same receptacles. Single-stream proponents recognize the system’s convenience and simplicity for people on campus. Not only does recycling participation increase with single-stream, but the system is also more efficient since staff empty fewer receptacles. Figure 6 below provides a graphical representation of the most popular styles of recycling collection on college campuses.

Single-stream recycling programs have recently focused more than ever on reducing contamination in light of international recycling policy changes. With evolving material markets, material recovery facilities (MRFs) seek to ensure that collectors bring quality recyclables to their facilities. Contaminated, low-quality recyclables require expensive processing costs for MRFs, and they are often unable to market these materials. Haulers and recycling generators, like colleges and universities, will bear some of those costs.

Dual-stream recycling is the next most common recycling style on college campuses. In this system, there are two bins for different materials. One bin collects fiber materials (cardboard and paper) while the other collects containers (cans and bottles). While recycling participation drops in dual-stream recycling, the system may experience lower processing costs due to a

smaller reliance on automatic sorting and a potential decrease in contamination. However, collecting two recycling bins may be less convenient for housekeeping staff and haulers.



The remaining reporting schools have source-separated recycling, a combination of recycling systems, or did not answer. Source-separated recycling involves using a different receptacle for each type of recyclable material, and this system generally receives the most revenue from material sales. However, source-separated recycling has higher collection costs and lower participation due to the inconvenience of having to sort by hand. The four schools that have a combination of styles may have a single-stream system on one part of their campus and a dual-stream on another. This situation occurs when schools have a different contract haulers for different sections of campus.

The survey also asked schools to report on who collects and transports recyclables from campus to processors or markets. Responses indicated that colleges most frequently use private contractors to haul recyclables (36 percent) and a combination of private contractors and school employees (30 percent). When internal employees are the primary hauler, custodial or maintenance staff usually collects recyclables from bins and transports the material to a local drop-off center or recycling processor. Five colleges partner with their local governments for collection, and seven schools listed their collection arrangement as “other.”

Regardless of the hauler, schools are strongly encouraged to review their hauling process for trash and recyclables. Reviews should be conducted periodically, especially when contracts are up for renewal. Containers should be serviced or hauled when they are full or approaching full

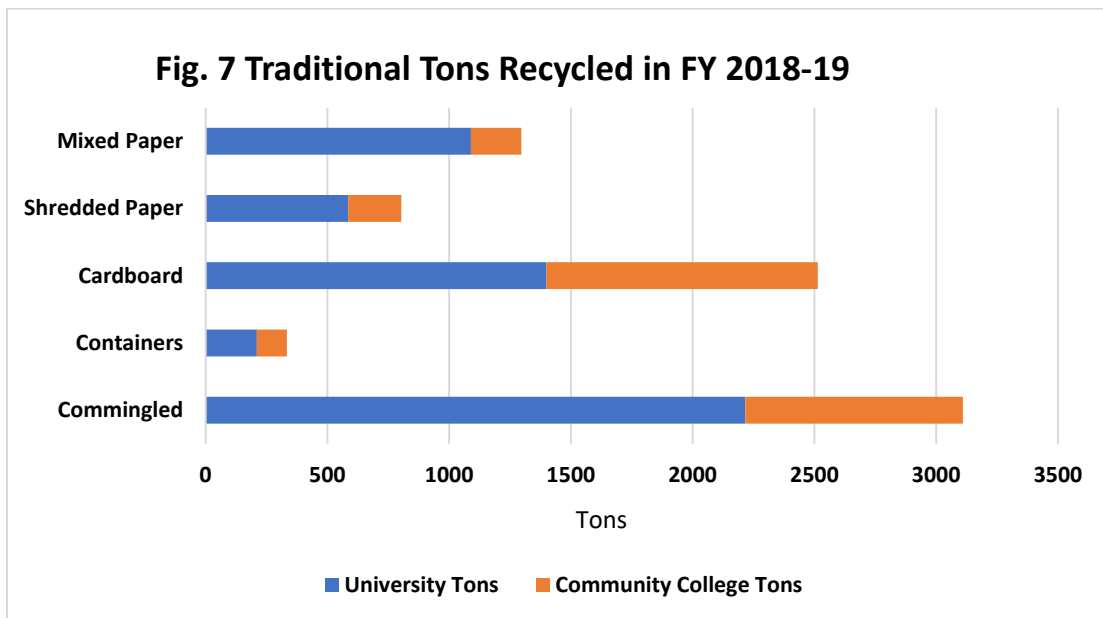
to get the most value for the services rendered or labor spent. Underused containers can be addressed by replacing them with smaller units, switching to a more consolidated system with fewer containers, or reducing collection frequency. All these options present opportunities to reduce collection costs through decreased labor or services.

2.3 Tons Recycled

In FY 2018-19, colleges and universities reported recycling 8,056 tons of traditional recyclable material. Universities recycled 52.5 pounds per person on campus (students, faculty and staff), and community colleges recycled about 37.5 pounds per person on campus. About 9 percent of all the material discarded on college campuses was diverted through traditional recycling programs during FY 2018-19.

Collegiate recycling programs collected most of their traditional recyclables in a single-stream system. The materials collected in dual-stream or source-separated programs have been grouped into the following categories:

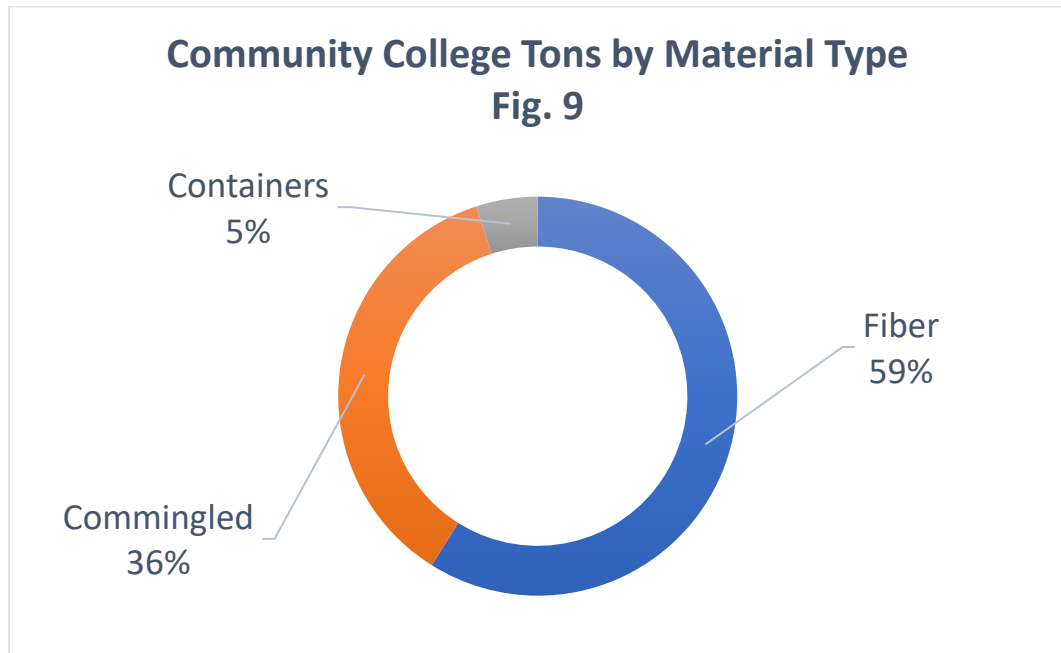
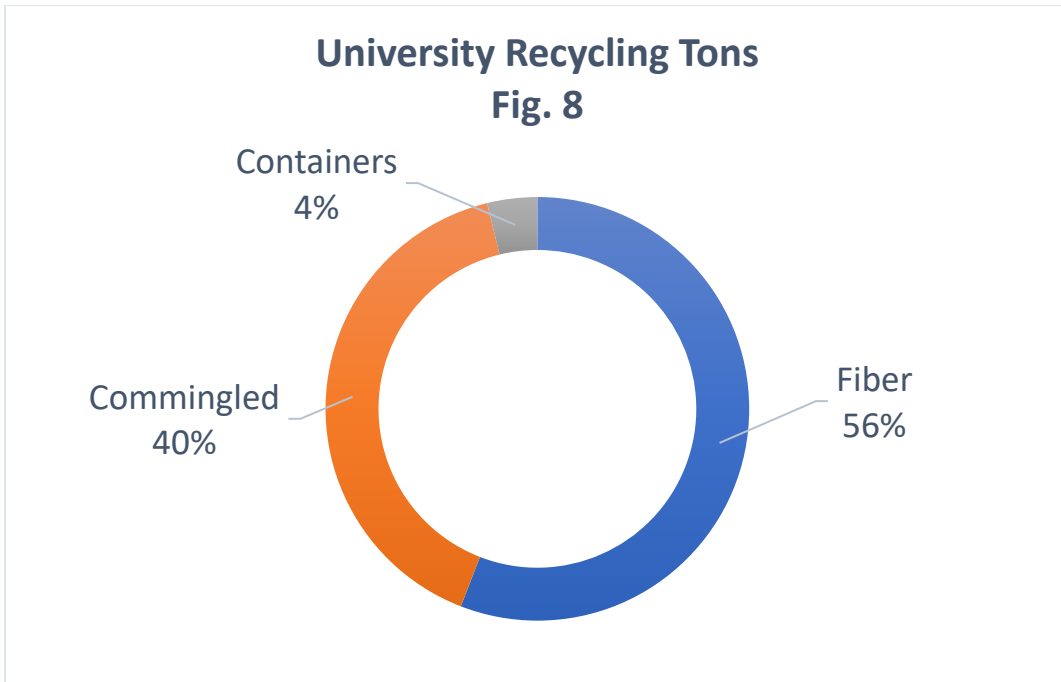
- Containers, including aluminum cans, steel cans, glass bottles and plastic bottles;
- Cardboard, which is often collected separately from other materials;
- Shredded paper, which is often shredded and recycled by a private company; and
- Mixed paper, including office paper, newspaper and paper cartons.



As shown in Figure 7 above, in dual stream or source separated systems, fiber materials—cardboard, shredded paper and mixed paper—comprised 57 percent of the material in colleges’ traditional recycling programs. Containers—bottles and cans—made up 4 percent of the total

recycling mix. Schools reported recycling 4,613 tons of fiber materials and 334 tons of containers.

Figures 8 and 9 below show the percentage of materials types recycled by universities and community colleges. The commingled category includes both containers and fiber material that were recycled together.



3 – Other Recycling and Diversion

Waste diversion and recycling has expanded beyond the traditional materials diverted in previous decades. Colleges seek new methods to reduce, reuse and recycle quality materials, and several schools have adopted solid waste plans to divert as much material from landfills as possible. As a result, organizations increased their recovery of materials like organics, electronics, construction and demolition waste, textiles and hazardous waste.

North Carolina colleges achieved significant increases in the amount of non-traditional materials diverted during FY 2018-19. However, it is important to note that the majority of this increase came from major construction and demolition projects at two schools. Compared to the previous fiscal year, schools recovered 23,083 more tons of non-traditional materials.

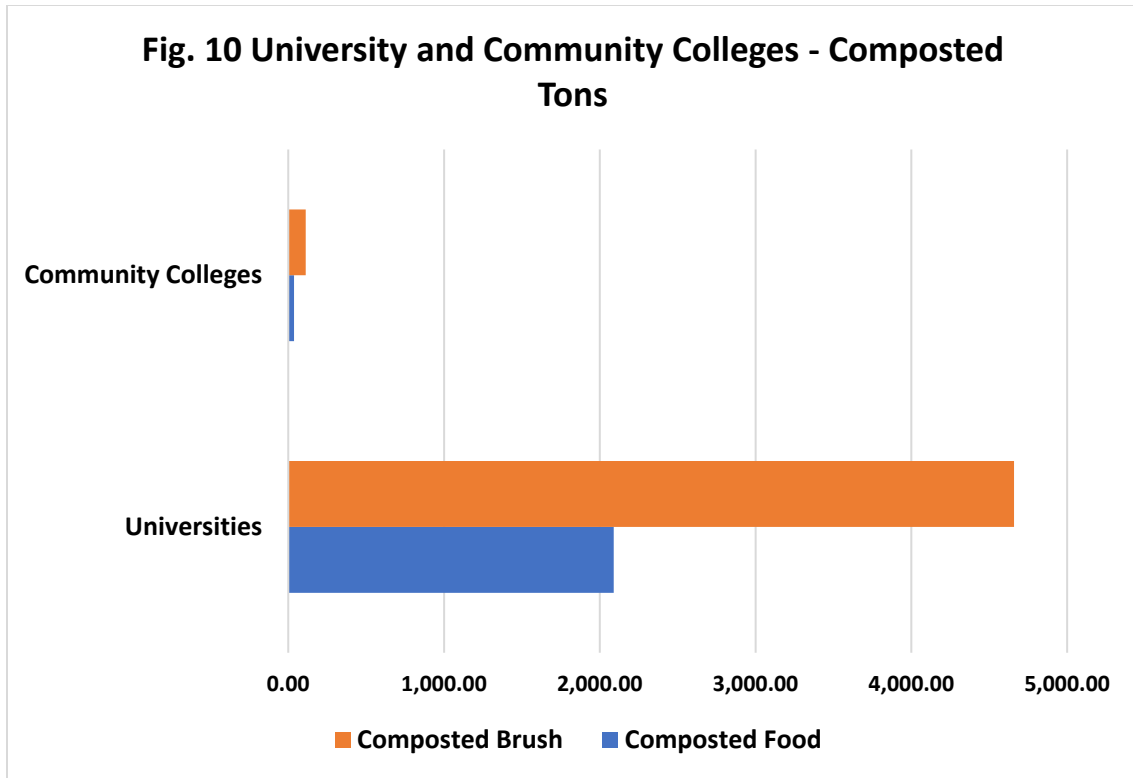
3.1 Surplus and Donation

The N.C. Department of Administration's [State Surplus Property Agency](#) is the seller of all surplus supplies, materials and equipment owned by the State of North Carolina. Through the surplus process, items that are no longer needed or useful are evaluated to determine the preferred disposition method. Reusing, trading-in, selling or recycling is prioritized over sending items to the landfill. Eighty-seven percent of the reporting schools acknowledged that they participated in the state's surplus program.

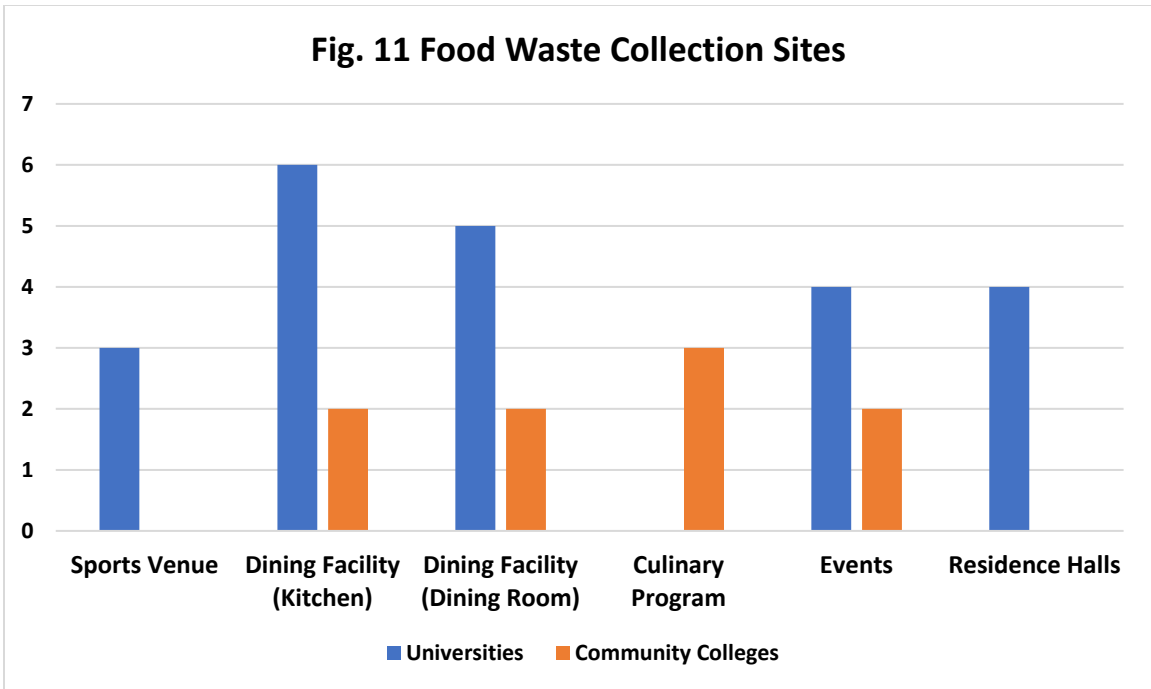
Colleges and universities have also created opportunities for reuse by establishing programs to donate student-generated materials to charity or other organizations. Schools reported donating a total of 254 tons of goods. From that total, colleges and universities donated 32 tons of food to [food banks](#) and local shelters to feed hungry North Carolinians.

3.2 Organics Recovery

Colleges feed thousands of people daily, and they have expansive campuses that produce leaves and brush clippings. Recovering this organic material has become important in the field of waste reduction. Figure 10 below shows the amount of food and yard waste that universities and community colleges composted in FY 2018-19.



For the annual survey, schools responded to questions asking about how they collect compostable material. Figure 11 below shows the sites where universities and community colleges collected food waste. Five universities and two community colleges reported that they collect compostable food scraps from the dining room area. Usually recycling programs locate compost bins with compostable liners next to trash and recycling stations for the diners' convenience. Also, seven schools operate a back-of-the-house compost collection program in which kitchen staff collect scraps from food preparation. Three community colleges also have culinary teaching programs that collect scraps from food preparation.



Four universities collect food scraps from residence halls. Some universities have custodial or facility management staff empty compost buckets. The higher cost for compostable liners is a common challenge for residence hall food scrap collection. Generally, compostable liners are more expensive than standard trash bags. Therefore, if a school were to consider implementing a residence or academic building compost program, program managers should consider the cost of liners in yearly budgets.

Universities and community colleges reported recovering 2,158 tons of organic material for composting or food donation.

3.3 Special Wastes

Colleges and universities have made significant strides collecting non-traditional materials and hazardous wastes for recovery. [North Carolina General Statute 130A-309.10\(f\)](#) bans many of these materials from landfill disposal in the state, so organizations must recycle items like yard waste, electronic equipment, antifreeze, motor oil and filters, pallets, tires and batteries.

During FY 2018-19 reporting schools recovered a total of 33,554 tons of special wastes recovered. Table 1 shows a breakdown of special wastes collected by colleges and universities.

Table 1

Special Material	Tons Recovered
Used Cooking Oil	207.9
Pallets	285.5
C&D Recycling	28,158.8
Other Metal	2,961.9
Electronics	518.4
Auto Batteries	16.6
Dry Cell Batteries	10.7
Textiles	8.9
Motor Oil	23.0
Oil Filters	12.1
Anti-Freeze	4.4
Tires	35.5
Bulbs	41.6
Ink Cartridges	22.5
Expanded Polystyrene	267.0
Other Misc. Tons	978.8
Total	33,553.7

3.4 Construction and Demolition Recycling

The largest increases in special waste during FY 2018-19 came in construction and demolition (C&D) recycling as schools recovered 28,152 tons of material. The highest increases came from Central Piedmont Community College and North Carolina State University. Tonnage from other schools included C&D materials such as wood, gypsum, metal, brick, concrete, shingles and asphalt.

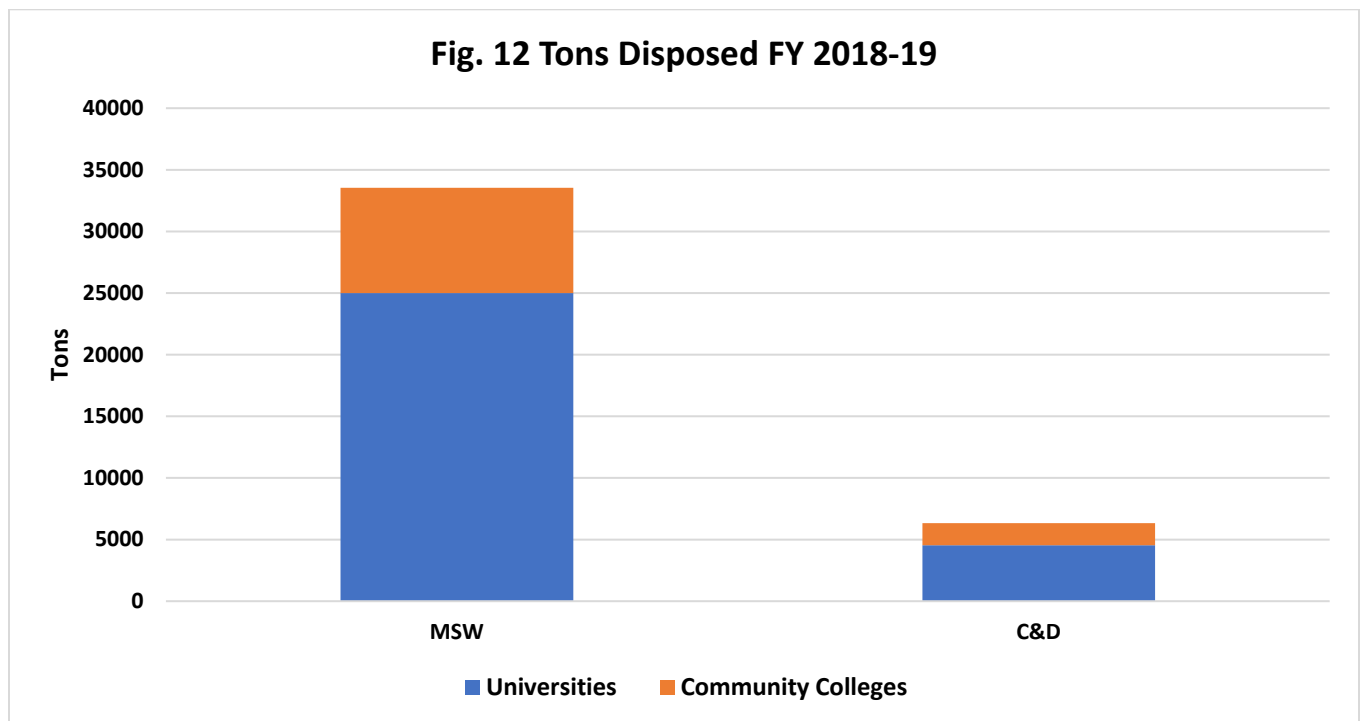
Central Piedmont Community College reported 16,697 tons of C&D recycling in FY 2018-19. This tonnage came from two five-story buildings that the college demolished during the fiscal year.

North Carolina State University reported 11,067 tons of C&D recycling. It had some major demolition projects in FY 2018-19 that resulted in thousands of tons of concrete and scrap metal recycling. These included three Greek houses, two buildings on Oberlin Street, and a building at Carmichael Gym. Additionally, there were road work projects that resulted in tons of recycled asphalt.

4 – Disposal

4.1 Tons Disposed

According to the reporting colleges and universities, during FY 2018-19, North Carolina public colleges and universities disposed 39,871 tons of material. Eighty-four percent of the disposed material went to municipal solid waste landfills, and 16 percent went to C&D landfills (Figure 12 below).



With 24,999 tons of municipal solid waste generated at universities and 8,543 tons generated at community colleges, universities had 238.6 pounds of municipal solid waste generated per person and community colleges had 125.4 pounds of municipal solid waste per person.

As colleges and universities continue tracking and estimating the amount of solid waste disposed, they may want to consider the following best management practices to facilitate information gathering from their hauler:

- Include language in solid waste contracts to require monthly tonnage reports from the hauler. This can be actual weights if the capability exists or estimates from the hauler; or
- Request that the hauler periodically collect actual solid waste tonnage information. For example, during one week per quarter, the hauler collects all the school's regularly

scheduled pickups and takes that material directly to a scale to be weighed before servicing other customers on the route.

4.2 Waste Assessments

Waste assessment studies are valuable tools for agencies to learn what they are discarding in their waste stream and how much of that material is recyclable. Understanding what and where material is being thrown away can help colleges direct recycling strategies to recover the most material possible. Eight universities and three community colleges did a waste study during FY 2018-19.

The study methodologies differ depending on the school. Some have contractors administer the study while others handle the audit internally. Best practices include measuring waste from several different types of buildings across several months. Studying various building types will provide more robust data about the nature of disposal across campus. Diversifying the times of year studied will show how waste and recycling rates differ from month-to-month.

Schools seeking advice on waste characterization studies can contact DEACS, which has data from other school and local government waste assessments, and staff can assist in identifying a partner organization to help with the study.

5 – Summary and Recommendations

Based on reports submitted by 47 universities and community colleges, data shows that recycling and waste diversion increased substantially during FY 2018-19. Of the 88,633 tons of total material generated at reporting colleges and universities, they recovered 55 percent for recycling or reuse, which is about an 18 percent increase from FY 2017-18. The summary of materials generated by category can be seen in Table 2 below.

Table 2

Material	Tons
<i>Total Material Generated</i>	<i>88,633</i>
Traditional Recyclables	8,056
Other Recyclables	40,451
Donated Goods	254
Disposed Waste	39,871

Universities recycled 52.5 pounds of *traditional* recyclables per person (staff, faculty and students), and community colleges recycled 37.5 pounds of traditional recyclables per person. In total, universities diverted approximately 179.5 pounds of total material for reuse or recycling per person, and community colleges diverted approximately 327.1 pounds of total material for reuse or recycling per person. Universities disposed of approximately 281.9 pounds per person of MSW and C&D materials, and community colleges disposed of approximately 151.6 pounds per person of MSW and C&D materials.

Schools with the highest rates of diversion practiced a few common best practices:

- 1) **Abundant outreach** – Most schools placed signage or labels directly on bins, but the highest performing college recycling programs invested in educational materials beyond information at recycling stations. DEACS encourages public recycling systems to:
 - a. Budget about \$1 for every student and employee under its purview;
 - b. Expand outreach efforts beyond signage at recycling stations; and,
 - c. Use clear and consistent messaging to avoid confusion.

- 2) **Twinned bins** – Twinned bins in public spaces have several benefits.
 - a. People are more likely to recycle if given the opportunity. Recycling bins next to trash bins reminds people that certain items belong in the recycling container.
 - b. People are less likely to treat a twinned recycling bin as a garbage can. If a recycling bin is left alone without a trash bin, people are more likely to throw garbage—food and non-recyclable waste—into the recycling container. Any contamination diminishes the quality of the entire recycling mix.
 - c. Public space recycling bins remind people to recycle. Seeing recycling bins next to trash bins in public may remind them to recycle at home too.

- 3) **Recover non-traditional materials** – Much of the increases in collegiate recycling during the past fiscal year stem from expansions in non-traditional recycling. Schools made leaps in construction and demolition material recovery, food donation and composting, and managing hazardous wastes. Several public and private colleges have proven the effectiveness of on-site composting and partnerships with commercial composters. Colleges can also work with contracted food service providers to determine an organics management plan at their dining halls.

- 4) **Donation and reuse of materials** – Reusing commodities is more environmentally sustainable than throwing them away. Colleges and universities should use contracts and services available through the State Surplus Property Agency and Division of Purchasing and Contract to manage office furniture and supplies, equipment, vehicles and special recyclables such as scrap metal, motor oil and filters, electronics and fluorescent bulbs. Food banks also accept edible pre-consumer food across the state.

DEACS encourages colleges to measure their tonnage of donations to better estimate their waste reduction progress.

- 5) Peer-to-peer collaboration** – A key objective of DEACS is to foster inter-organizational collaboration for colleges and universities to encourage the employment of best management practices for waste reduction. One entity may face a challenging recycling problem, while another may have already solved a similar obstacle.
- a. **Collegiate Recyclers Coalition** – One opportunity for connecting is through the Collegiate Recyclers Coalition (CRC), a council of the Carolina Recycling Association. The CRC holds quarterly meetings and an annual workshop, which provides an opportunity for networking and information sharing. More information can be found by contacting [DEACS](#) , or visiting the [CRC website](#).
 - b. **MRFshed collaboration** – A MRFshed includes all communities that feed recyclables to a single MRF. DEACS encourages colleges and universities to work with their surrounding community, haulers, and regional MRF to use a common set of educational recycling materials. This will help provide consistent messaging and reduce confusion for students, faculty and staff that live, work and spend time both on-campus and in the surrounding community.