

NORTH CAROLINA PUBLIC UNIVERSITY AND COMMUNITY COLLEGE ANNUAL RECYCLING REPORT

July 1, 2019 – June 30, 2020

North Carolina Department of Environmental Quality
Division of Environmental Assistance and Customer Service
1639 Mail Service Center
Raleigh, N.C. 27699-1639

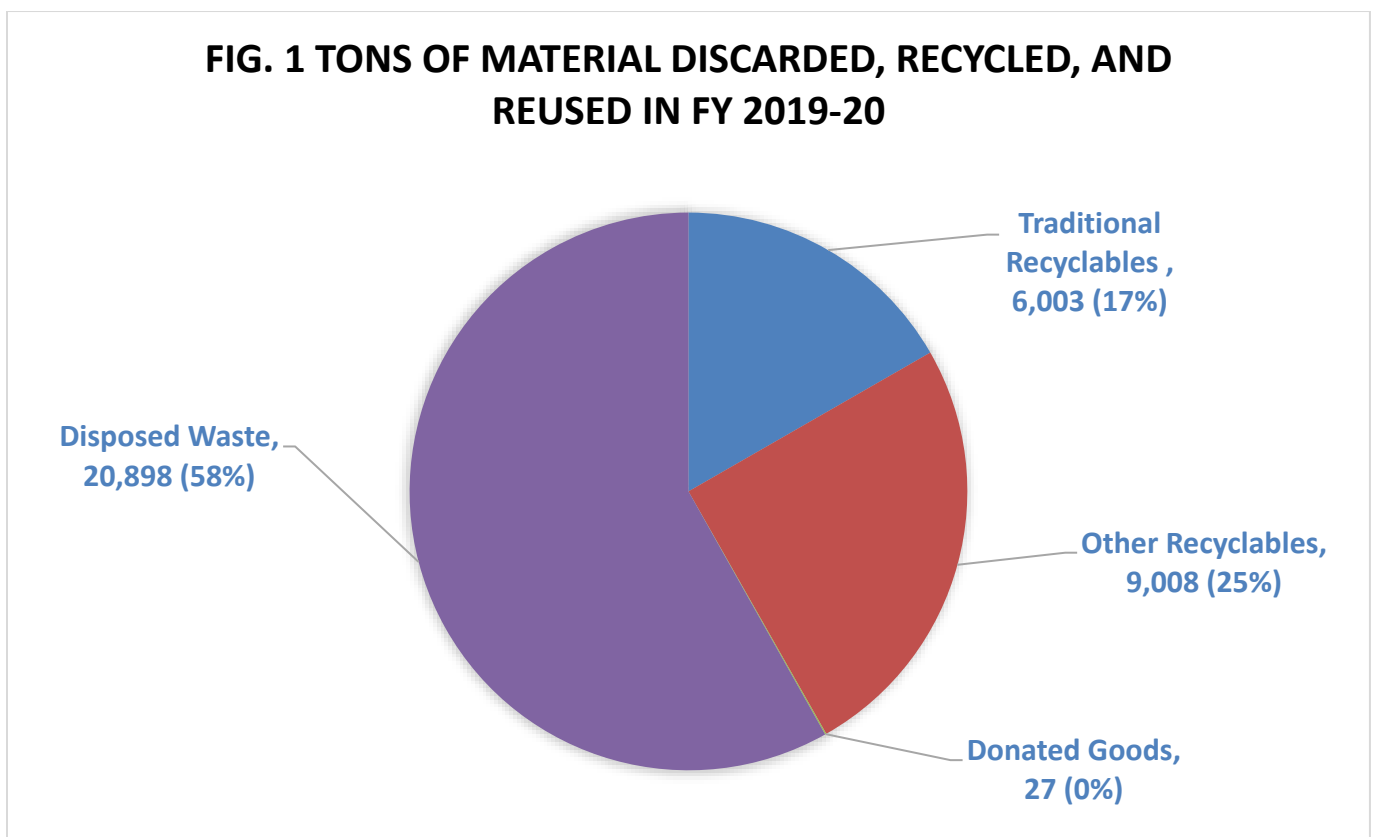
Tara Nattress
(919) 707-8123
tara.nattress@ncdenr.gov



Executive Summary

This report presents recycling and waste data from public universities and community colleges in North Carolina in FY 2019-20. During the past reporting cycle, 43 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 43 reporting schools. The chart shows that responding schools generated a total of 35,936 tons of material. Of that total, 20,898 tons (58 percent) were sent to a landfill for disposal, but 15,038 tons (42 percent) were recovered for reuse or recycling.



The 15,038 tons of material that responding schools recovered for reuse and recycling falls into one of three categories: traditional recyclables, other non-traditional recyclables, and donated material. Schools reported recycling 6,003 tons of traditional materials such as cans, bottles, paper and cardboard. Surveys showed that colleges and universities had decreases in recovering non-traditional material from the previous year, as they reported recycling a total of

9,008 tons of materials such as food waste, landscaping debris, textiles, electronics, and heavy construction and demolition material. The last category of recovery – donated material – is the smallest; however, in FY 2019-20 schools donated 27 tons of goods. Much of the decrease in collected materials can be attributed to the effects of closing campuses and limited student/staff on campus due to the Covid-19 pandemic.

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:

- Seventy-five percent of reporting schools have “twinned” (paired together) in some capacity – 22 percent have twinned all on-campus waste and recycling bins while an additional 53 percent have at least twinned some waste and recycling bins;
- Sixty percent of all reporting schools have recycling bins in dining facilities and meeting/training facilities. Colleges and universities also frequently place recycling bins in dining facilities, at special events, and in pedestrian walkways.

To improve the effectiveness and efficiency of recycling programs, DEACS 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. While recommended, DEACS also recognizes that due to the Covid-19 pandemic 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 N.C. 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 Wendy Worley (wendy.worley@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-three public universities and colleges reported data in FY 2019-20, which constitutes 57 percent of public collegiate entities.

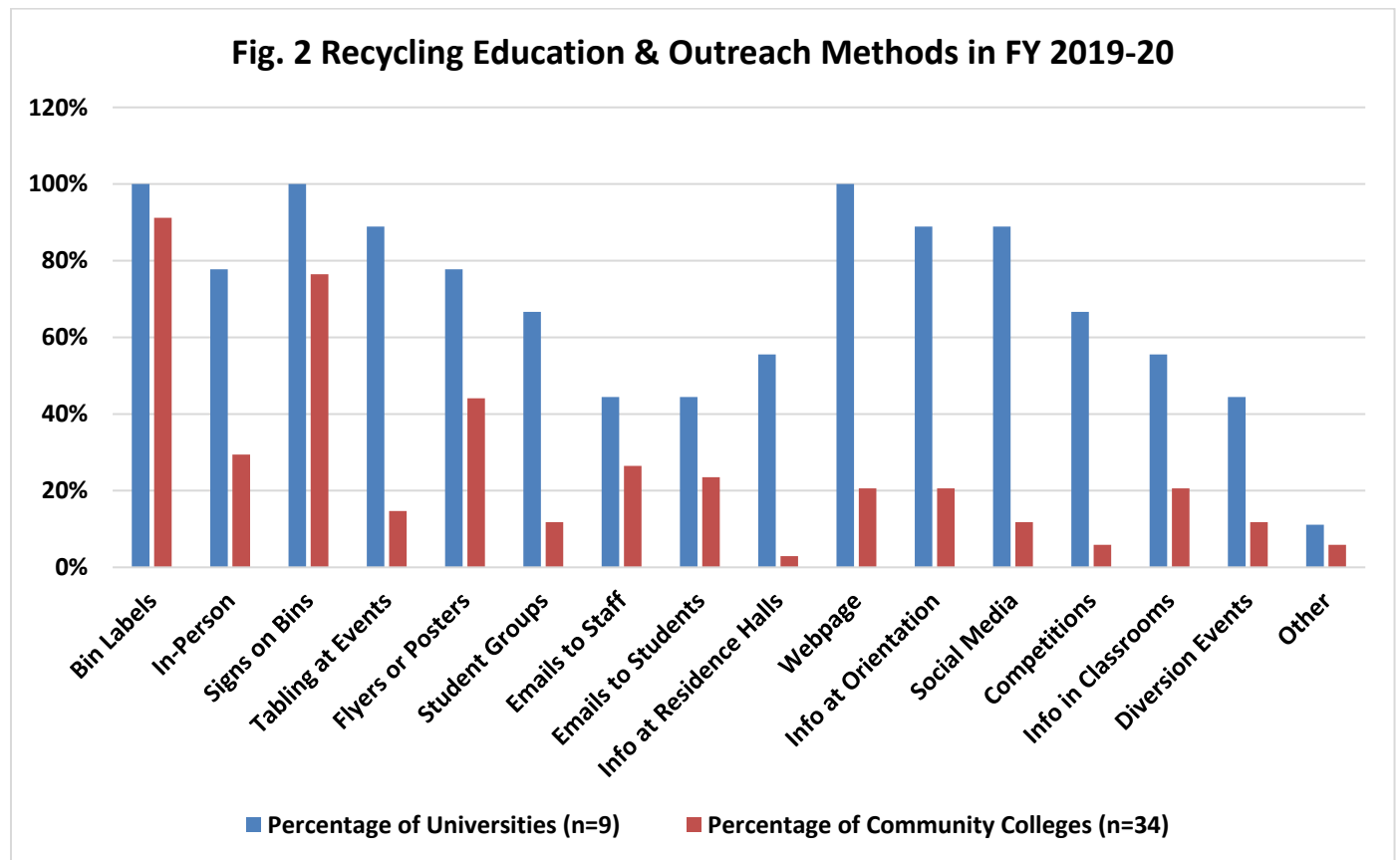
A list of reporting schools is provided below. Reports are sent to the Division of Environmental Assistance and Customer Service (DEACS) and compiled for this summary report. While the reporting process is voluntary, it is worthwhile for all schools to collect data and track progress on their solid waste programs, costs and diversion efforts. This data provides some perspective about how schools can improve their solid waste reduction and increase recycling.

Appalachian State University	Johnston Community College	Surry Community College
Beaufort County Community College	Lenoir Community College	Tri-County Community College
Bladen Community College	Martin Community College	UNC Asheville
Blue Ridge Community College	Mitchell Community College	UNC Chapel Hill
Brunswick Community College	Nash Community College	UNC Charlotte
Caldwell Community College & Tech. Institute	NC School of Science & Mathematics	UNC Pembroke
Carteret Community College	NC State University	UNC Wilmington
Craven Community College	Pamlico Community College	Wake Technical Community College
Davidson County Community College	Piedmont Community College	Western Piedmont Community College
Durham Technical Community College	Pitt Community College	Wilson Technical Community College
East Carolina University	Randolph Community College	
Fayetteville State University	Rockingham Community College	
Fayetteville Technical Community College	Rowan-Cabarrus Community College	
Gaston College	Sandhills Community College	
Guilford Technical Community College	Southwestern Community College	
James Sprunt Community College	Stanly 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. Figure 2 below shows the prevalence of each method for education and displays the number of reporting schools and universities that indicated that they participate in a specific outreach method. The blue bar indicates universities, and the red bar indicates community colleges. Nine universities responded to the survey and 34 community colleges.



By far, the most popular outreach practice involves using labels on recycling bins to inform people that it is where recyclable materials go. Ninety-three percent of the reporting schools confirmed that they use labels directly on the recycling and waste bins. Most schools (79 percent) also use signs on their bins to display what materials should and should not go into a

bin. All of the reporting universities indicated that they also display recycling education and outreach materials on their webpages.

1.2 Outreach Campaigns

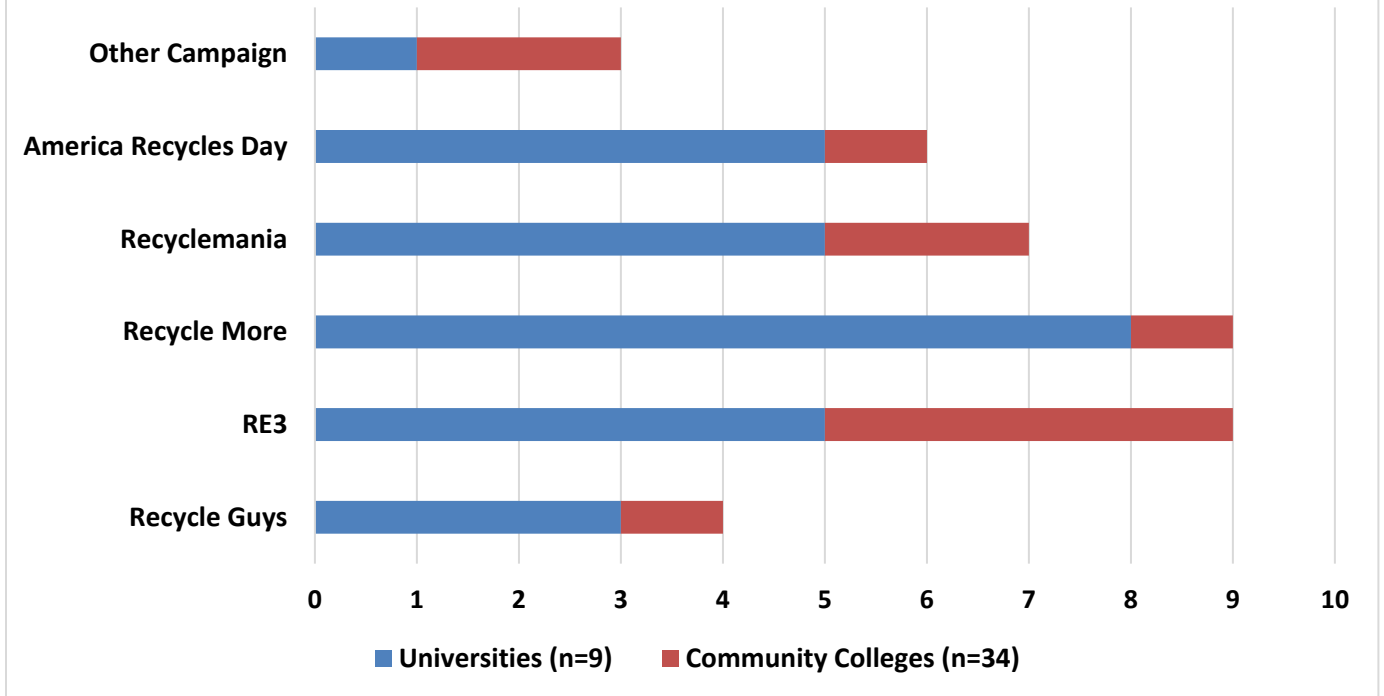
In addition to in-house education methods, the survey asked schools to report on any large-scale outreach campaigns used to educate people on their campuses.

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 to encourage recycling behavior (<http://www.recycleguys.org/>).
- RE3 – While no longer active, the RE3.org campaign was aimed at a young adult audience, from high school through late 20s.
- [Recycle More NC](http://www.recyclemorenc.org/) – Recycle More NC was a campaign initially designed to engage individuals 30 – 55 years old on recycling issues. The intent was to encourage participation in existing recycling programs and create a broad recycling ethic by fostering the development and promotion of “away from home” recycling (<http://www.recyclemorenc.org/>). *Recycle More NC has now become Recycle Right NC, which focuses on reducing contamination in the recycling stream by informing citizens about what is and is not recyclable.*

As shown in Figure 3 below, the 43 reporting colleges and universities most prevalently used the Recycle More NC and Re3 Campaigns in their outreach.

Fig. 3 Outreach Campaigns Used in FY 2019-20



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.

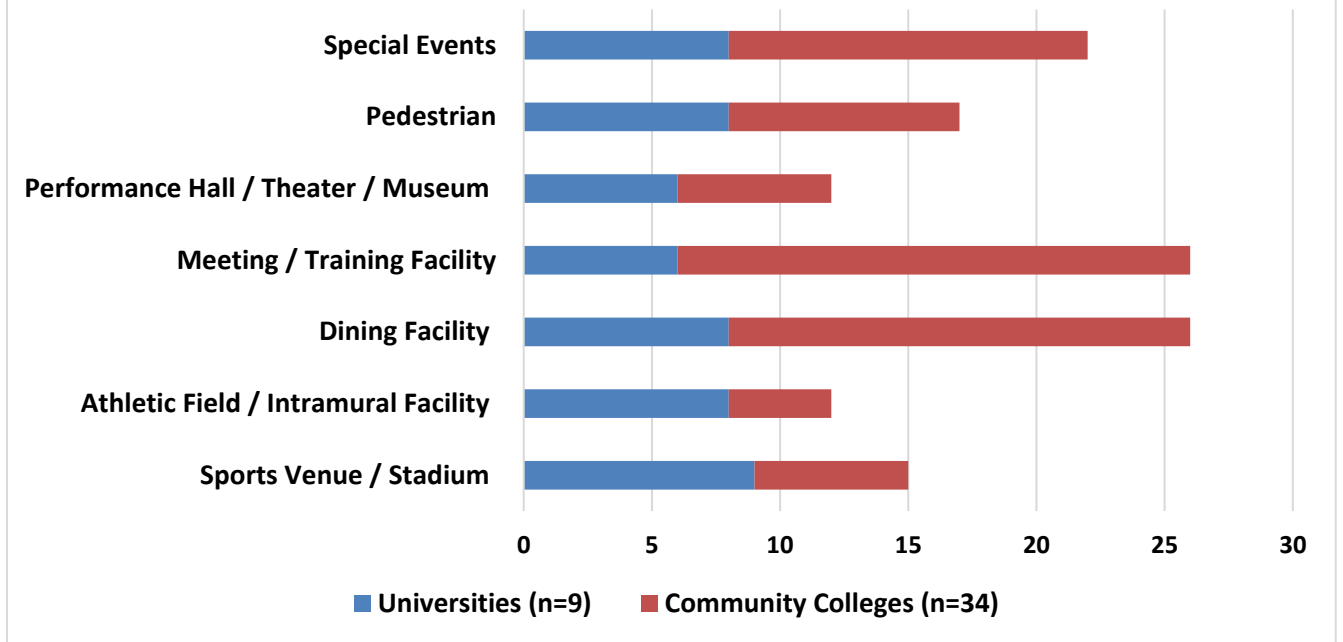
2 – Traditional Recycling (cans, bottles, and paper)

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.

Fig. 4 Recycling in Public Spaces in FY 2019-20



As indicated in Figure 4 above, the survey’s findings show that meeting/training facilities and dining facilities are the most common public areas to have recycling bins. Sixty percent of all responding schools (67 percent of responding universities and 59 percent of responding community colleges) reported having recycling bins in meeting/training facilities. Sixty percent of all responding schools (89 percent of responding universities and 53 percent of responding colleges) reported having recycling bins in dining facilities. Colleges and universities also frequently place recycling bins at special events and in pedestrian walkways.

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.

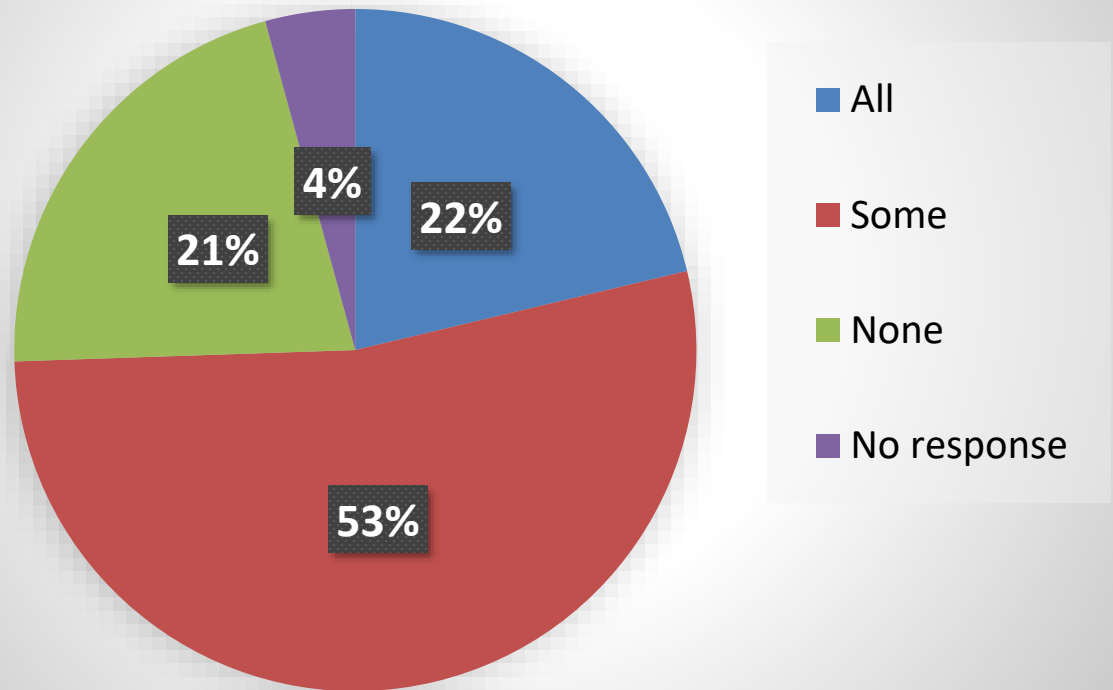


Special events collection station

As shown in Figure 5 below, 53 percent of colleges and universities have twinned at least some portion of their public recycling bins with waste bins. Twenty-two percent (11 schools) reported that **all** their bins were twinned. The remaining 25

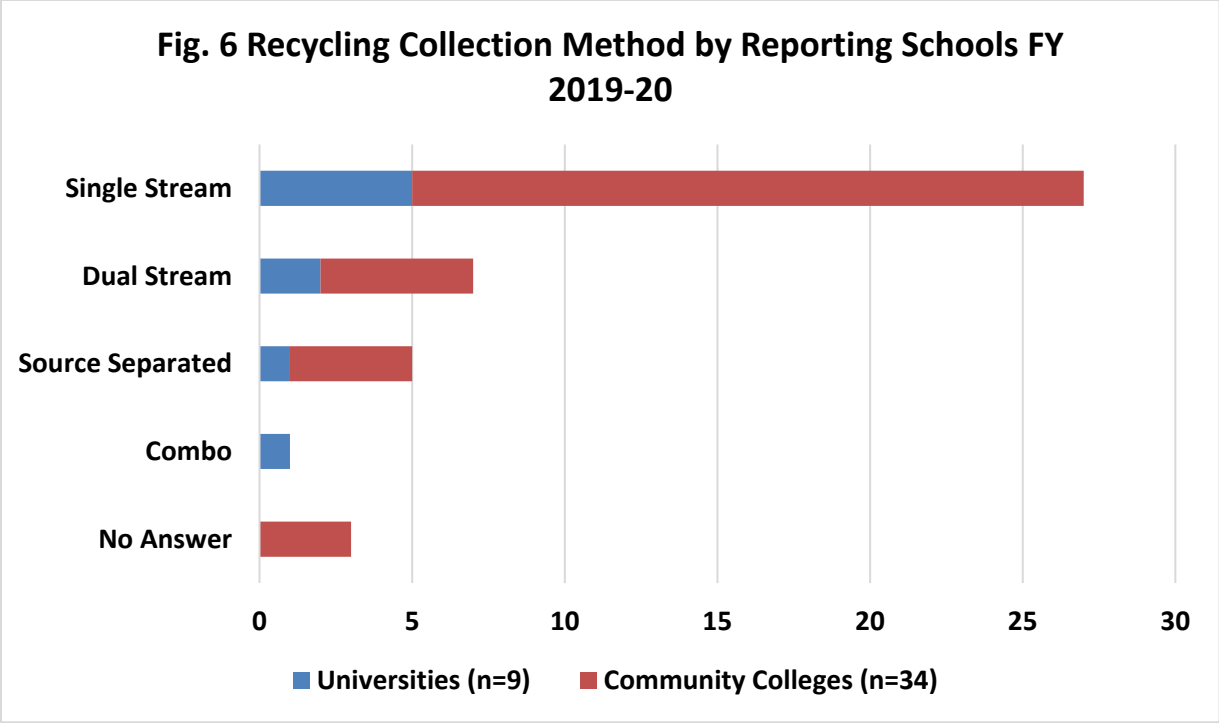
percent of schools either did not have any waste or recycling bins that were paired together or did not respond to this question.

**Fig. 5 Twinned Bins at Responding Schools FY 2019-20
(n= 43)**



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 graph of the most popular styles of recycling collection on college campuses.



Single-stream recycling programs have recently focused on reducing contamination in light of international recycling and Covid-19 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 one university that reported a combination of styles has a single-stream system on one part of its campus and a dual-stream on another. This situation occurs when schools have a different contract haulers for different campus areas.

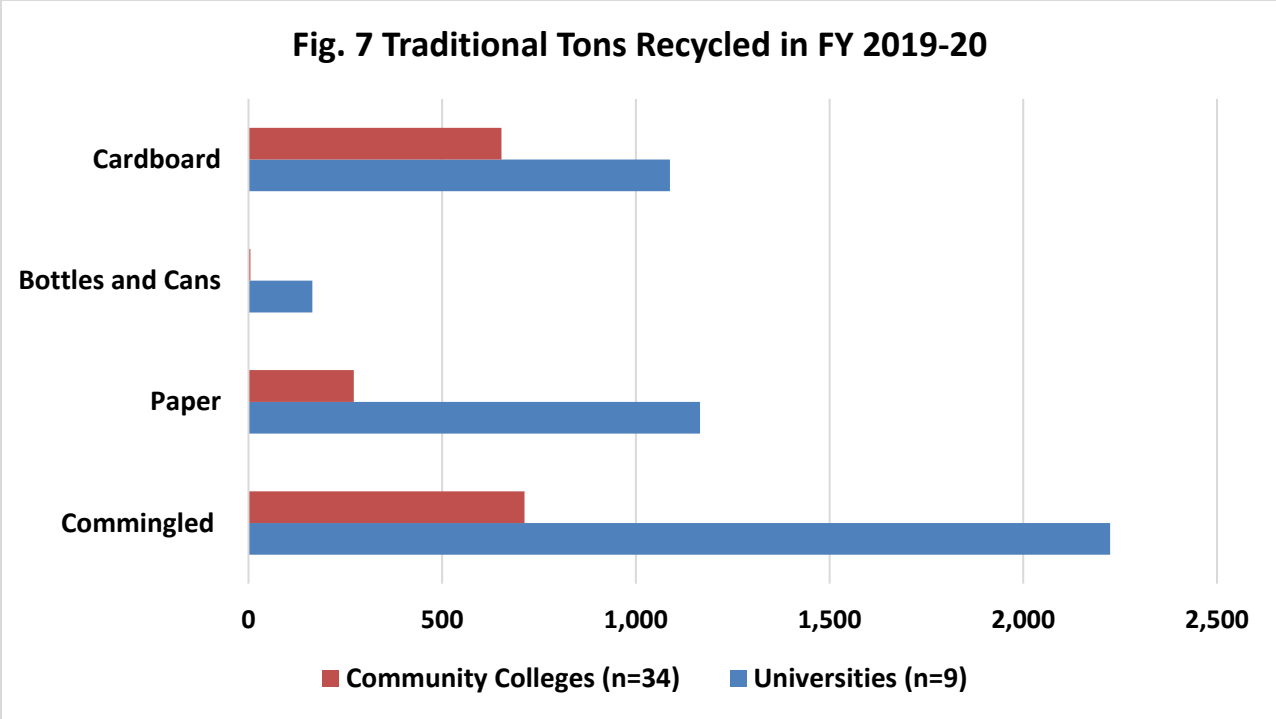
Regardless of the hauler, schools are strongly encouraged to review their hauling processes for trash and recyclables. Reviews should be conducted periodically, especially when contracts are up for renewal. Containers should be serviced or hauled when they are full or approaching full to get the most 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 2019-20, responding colleges and universities reported recycling 6,003 tons of traditional recyclable material. Universities recycled 55 pounds per person on campus (students and full-time equivalent staff), and community colleges recycled 41 pounds per person on campus. About 2 percent of all the material discarded on college campuses was diverted through recycling programs for traditional recyclable materials including bottles, cans, and paper during FY 2019-20.

Collegiate recycling programs collected most of their traditional recyclables in either a single-stream or commingled system. The materials collected in dual-stream or source-separated programs were 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, schools with dual-stream or source-separated programs reported recycling 3,179 tons of fiber materials and 170 tons of containers. Most schools have commingled recycling. Community colleges reported 712 tons of commingled recycling and universities reported 2,224 tons of commingled recycling. Altogether, schools reported 2,937 tons of commingled recycling collected in FY 2019-20.

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.

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.

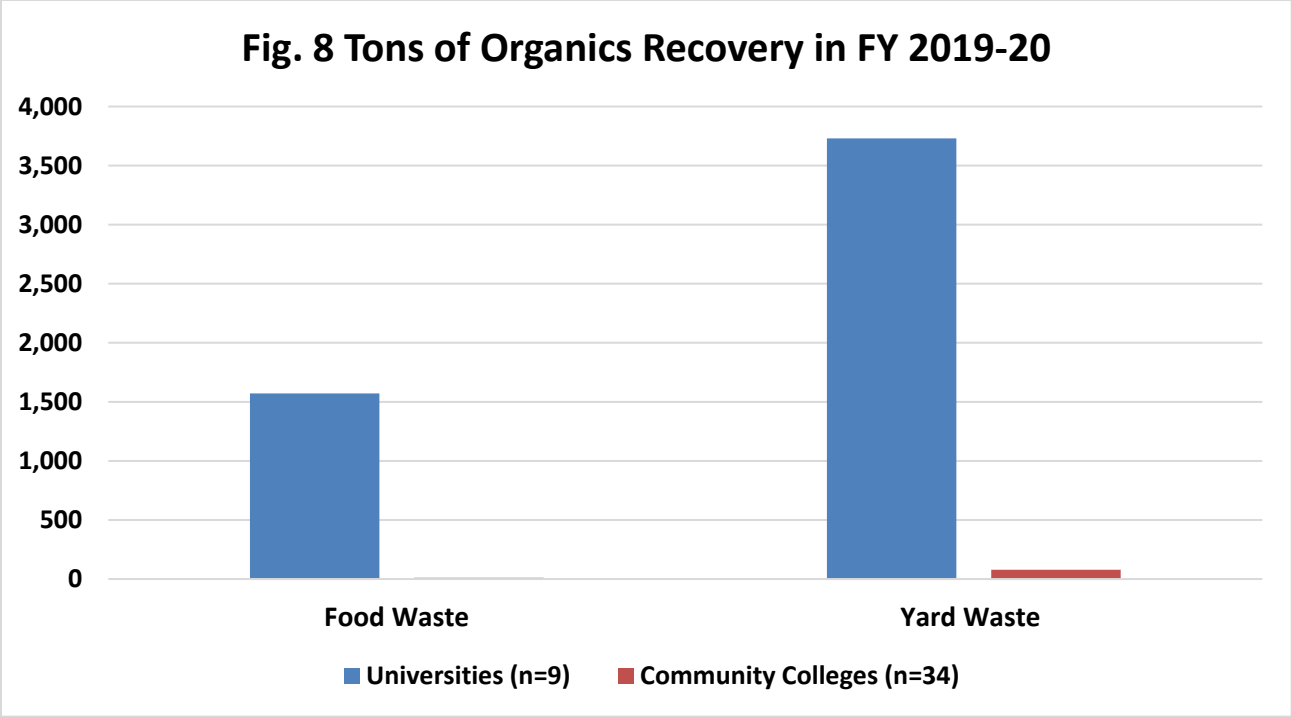
Colleges and universities have also created opportunities for reuse by establishing programs to donate student-generated materials to charity or other organizations. Schools reported donating approximately 27 tons of goods, including things like donating winter coats to the Salvation Army. From that total, colleges and universities donated 20.5 tons of food to [food banks](#) and local shelters to feed hungry North Carolinians.

Many schools reported donating additional goods but did not have access to the totals, so that tonnage is a low estimate of what schools actually donated. For example, Appalachian State University students operate a “Don’t Throw it Away (DTiA)” program in the Spring that intends to reduce the landfill waste produced during end-of-year move out. Students donate their unwanted items when they move out of their dormitories and apartments. The items are stored at the University and sold to buyers during the summer at bargain prices. This program raised and awarded \$25,593 of grants for eligible community partners to pay for energy efficiency improvements.

The effects of Covid-19 also heavily impacted in-person donation events in FY 2019-20 and prevented some donatable items from being collected.

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 8 below shows the amount of food and yard waste that universities and community colleges recovered in FY 2019-20.

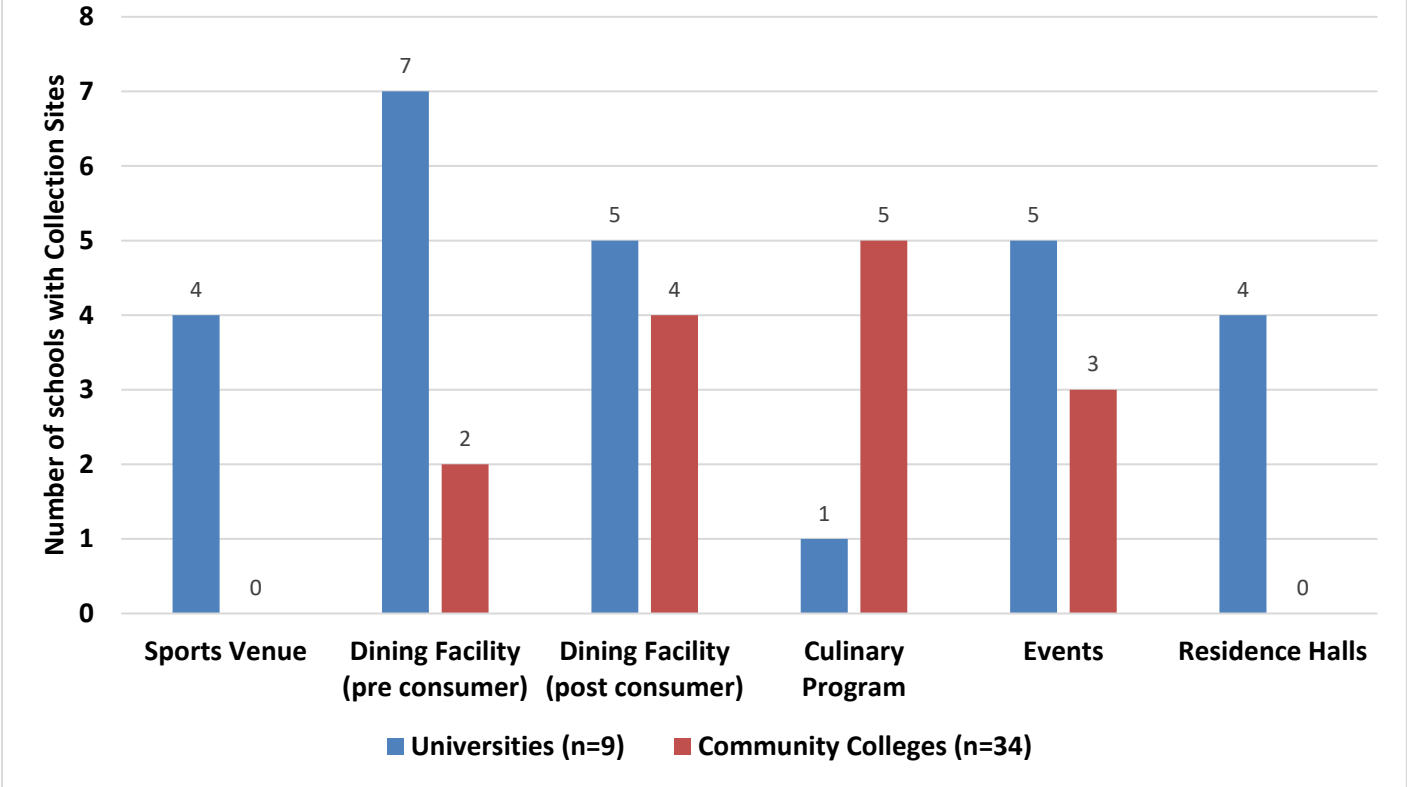


Responding colleges and universities recovered 3,809 tons of yard waste and 1,582 tons of food waste (not including donated food) in FY 2019-20. Community colleges reported recovering 78.5 tons of yard waste and 10.8 tons of food waste, while universities reported recovering 3,730 tons of yard waste and 1,572 tons of food waste.

For the annual survey, schools responded to questions asking about how they collect compostable material. Figure 9 below shows the sites where universities and community colleges collected food waste.

Five universities and four community colleges reported that they collect compostable food scraps from the dining room area (post-consumer). This is an increase of two community colleges reporting this site for collection from last year. Recycling programs typically locate compost bins with compostable liners next to trash and recycling stations for the diners' convenience. Four universities collect food scraps from residence halls. Some universities have custodial or facility management staff empty compost buckets. Also, seven universities and two community colleges operate a back-of-the-house compost collection program in which kitchen staff collect scraps from food preparation. Five community colleges and one university also have culinary teaching programs that collect scraps from food preparation. This is an increase of three schools from last fiscal year.

Fig. 9 Food Waste Collection Sites in FY 2019-20



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.

3.3 Special Wastes

[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 2019-20 reporting schools recovered a total of 3,882 tons of special wastes. Table 1 shows a breakdown of special wastes collected by colleges and universities.

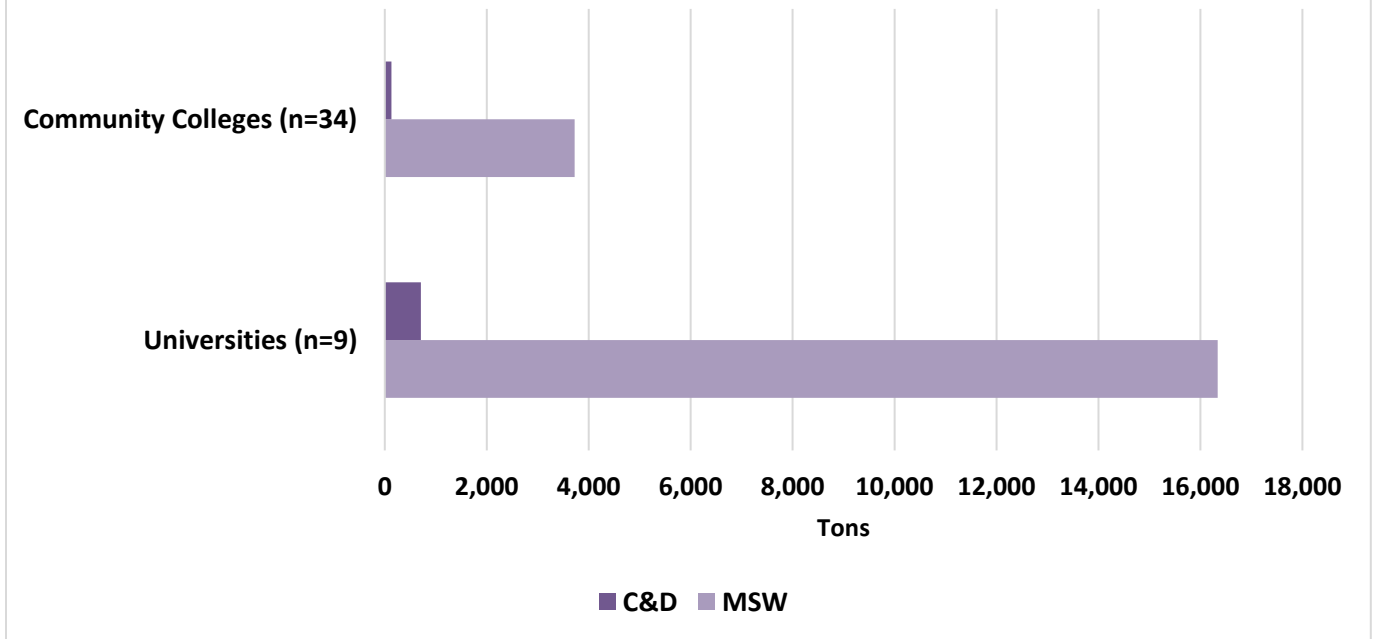
Table 1	
Special Material	Tons Recovered
Used Cooking Oil	72.4
Pallets	155.9
C&D Recycling	681.3
Other Metal	885.3
Electronics	996.5
Auto Batteries	21.5
Dry Cell Batteries	2.0
Textiles	4.7
Motor Oil	23.9
Oil Filters	3.6
Anti-Freeze	2.0
Tires	35.8
Bulbs	51.7
Ink Cartridges	9.5
Expanded Polystyrene	5.9
Other Misc. Tons	665.0
Total	3,671.0

4 – Disposal

4.1 Tons Disposed

According to the reporting colleges and universities, during FY 2019-20, North Carolina public colleges and universities disposed of 20,898 tons of material. This tonnage includes both municipal solid waste disposal and construction and demolition (C&D) waste disposal. Shown in Figure 10 below, 96 percent of the disposed material went to municipal solid waste landfills, and 4 percent went to C&D landfills.

Fig. 10 MSW and C&D Tons Disposed in FY 2019-20



With 16,338 tons of municipal solid waste (MSW) generated at responding universities and 3,724 tons generated at responding community colleges, universities had 159 pounds of MSW generated per person and community colleges had 68 pounds of MSW per person. To calculate the pounds per capita of MSW generated, population data includes full time equivalent staff (FTE) and students enrolled at the university or community college. This is a decrease from last fiscal year that could be explained by fewer students being on campus due to the Covid-19 pandemic.

As colleges and universities continue tracking and estimating the amount of solid waste disposed, it is recommended that they consider the following best management practices:

- 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 collects 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. Two universities conducted a waste study in FY 2019-20, with four universities and two community colleges siting waste studies within the past few years. Two respondents indicated that Covid-19 prevented them from doing a planned waste study this year.

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 43 universities and community colleges, data shows that recycling and waste generation decreased during FY 2019-20 compared to the previous fiscal year. Of the 35,936 tons of total material generated at reporting colleges and universities, they recovered 42 percent for recycling or reuse. This is a slight decrease from the previous fiscal year, but can be attributed, at least in part, to lack of student residence and time spent on campuses due to the Covid-19 pandemic restrictions. The summary of materials generated by category can be seen in Table 2 below.

Table 2

Material	Tons
Total Material Generated	35,936
Traditional Recyclables	6,003
Other Recyclables	9,008
Donated Goods	27
Disposed Waste	20,898

Universities recycled 54 pounds of *traditional* recyclables per person (students and FTE staff), and community colleges recycled 35 pounds of traditional recyclables per person. In total, universities diverted approximately 111.7 pounds of total material for reuse or recycling per person, and community colleges diverted approximately 40.9 pounds of total material for reuse or recycling per person. Universities disposed of approximately 166 pounds per person of MSW

and C&D materials, and community colleges disposed of approximately 71 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 outreach 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) Work with your MRF operator** – Schools can work with the operator of their MRF to create a service contract for long-term stability for both organizations, and create uniform messaging about recycling based on the accepted materials for the MRF.

- 3) 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.

- 4) Recover non-traditional materials** – Much of the increases in collegiate recycling during the past fiscal year stem from expansions in non-traditional recycling. 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.

- 5) 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.

6) 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 to share information and network with related partners. 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.