

NORTH CAROLINA PUBLIC COMMUNITY COLLEGE & UNIVERSITY ANNUAL RECYCLING REPORT

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

This report presents recycling and waste data from public universities and community colleges in North Carolina for the 2016-17 fiscal year. During the past reporting cycle, 52 of 75 colleges and universities completed a survey administered by the N.C. Division of Environmental Assistance and Customer Service (DEACS). The submitted surveys provided recycling and waste data for this summary report.

Data from the 52 reporting schools show they generated a total of 56,501 tons of discarded material. Of that total, 35,673 (63 percent) were sent to a landfill for disposal, but 20,828 tons (37 percent) were recovered for reuse or recycling.

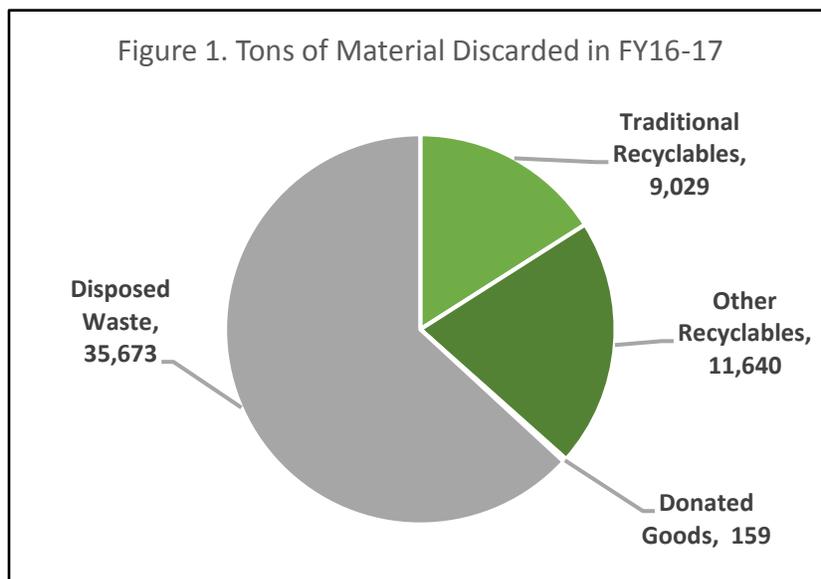
The 20,828 tons of material that schools recovered falls into one of three categories: traditional recyclables, other

non-traditional recyclables, and donated material. Schools reported recycling 9,029 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 11,640 tons of materials such as food waste, landscaping debris, textiles, electronics, and heavy construction and demolition material. This is a 1,000 ton increase over the previous fiscal year.

While the last category of recovery – donated material – is the smallest, it shows that the reported tons of donation is an increase from previous years' performance. Schools donated 159 tons of goods which is an increase of 16 tons from the previous fiscal year.

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



- 21 percent of reporting schools have “twinned” (paired together) all their on-campus waste and recycling bins, and an additional 67 percent have at least twinned some of their waste and recycling bins;
- 92 percent schools have some variety of public space recycling on campus (areas outside buildings);
- 62 percent of reporting universities have recycling events during residence hall move-in and move-out; and
- 40 percent of reporting schools manage an organics recovery and composting program.

The Division of Environmental Assistance and Customer Service 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. Schools can reach out to DEACS to learn how other programs have overcome similar challenges.

About DEACS

The Division of Environmental Assistance and Customer Service, or DEACS, is a division within the N. C. Department of Environmental Quality that works with recycling businesses, local governments and state agencies. The division 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 implementing 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 Matt James (matt.james@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.

Fifty-two agencies reported data in FY 2016-17, which constitutes 69 percent of public collegiate entities. Overall results are provided in the following sections, and individual agency responses are provided in Appendix 1.

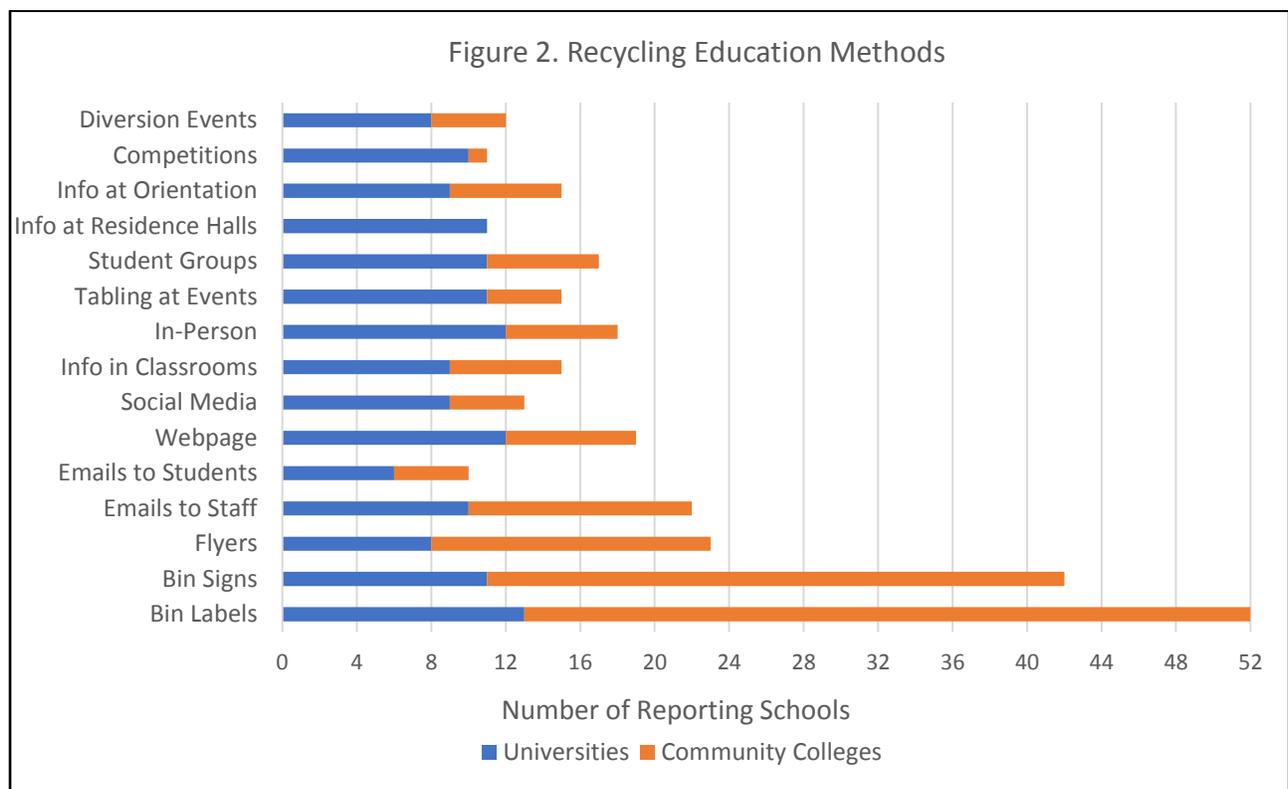
A list of reporting agencies is included below. The Division of Environmental Assistance and Customer Service (DEACS) would like to thank these agencies for completing and submitting the annual recycling report. While the reporting process is voluntary, it is worthwhile for all schools to collect data 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	Forsyth Technical Community College	Southeastern Community College
Appalachian State University	Guilford Technical Community College	Southwestern Community College
Beaufort County Community College	Halifax Community College	Stanly Community College
Bladen Community College	Haywood Community College	Surry Community College
Blue Ridge Community College	James Sprunt Community College	Tri-County Community College
Brunswick Community College	Lenoir Community College	UNC Asheville
Caldwell Community College & Tech. Institute	Montgomery Community College	UNC Chapel Hill
Carteret Community College	Nash Community College	UNC Charlotte
Catawba Valley Community College	NC School of Science & Mathematics	UNC Greensboro
Central Carolina Community College	NC State University	UNC Pembroke
Central Piedmont Community College	Piedmont Community College	UNC School of the Arts
College of the Albemarle	Pitt Community College	UNC Wilmington
Craven Community College	Randolph Community College	Wake Technical Community College
Davidson County Community College	Richmond Community College	Wayne Community College
East Carolina University	Rockingham Community College	Western Carolina University
Fayetteville State University	Rowan-Cabarrus Community College	Western Piedmont Community College
Fayetteville Tech Community College	Sampson Community College	Wilson Community College
	South Piedmont 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. One hundred 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.

Some schools, such as Western Carolina University, used data-driven methods to teach its campus about its recycling program. Western Carolina reported that students participate in an in-house waste audit event to measure the amount of recyclable material in the garbage

stream. Then, students present the findings to the campus community. Additionally, some universities have classes that host tours to the county landfill to show students the destination of non-recycled materials.

Every reporting university uses at least eight different outreach methods, and some reported using up to 15 different methods. Every community college uses at least one type of method. On average, community colleges use about four different tools to educate their campus about recycling.

1.2 Outreach Campaigns

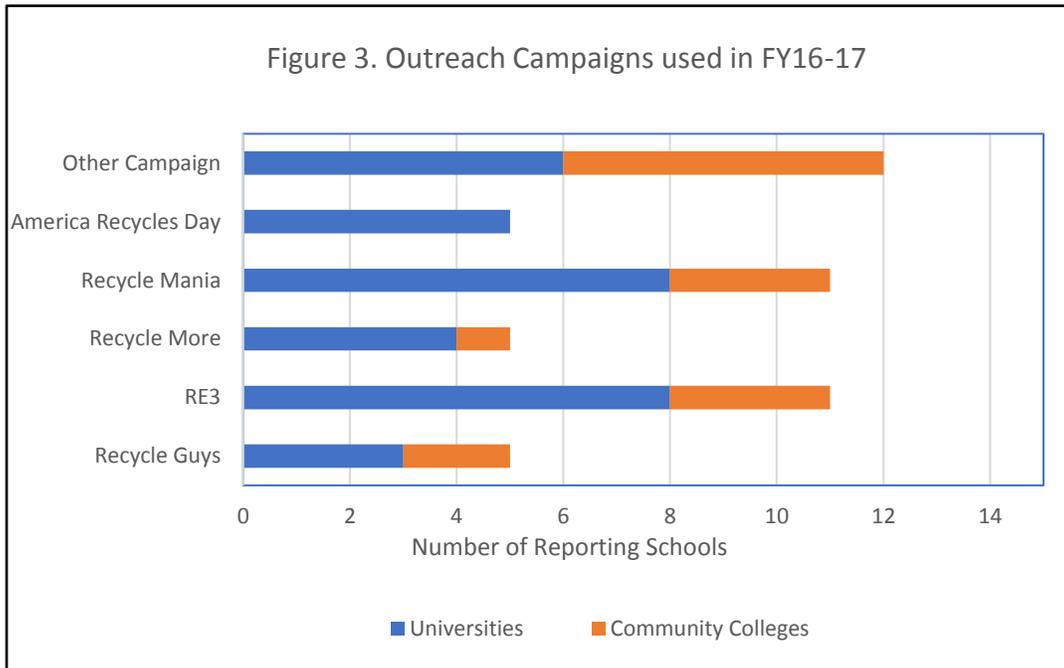
In addition to in-house education methods, the survey asked schools to report on any large-scale outreach campaigns they used to educate people on their campuses. The state has three social marketing campaigns: Recycle Guys, RE3 and Recycle More NC.

- [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 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 makes use of commercials or short films submitted by students and amateur film producers and a number of these video pieces include anti-littering themes. (<http://www.re3.org/>).
- [Recycle More NC](http://www.recyclemorenc.org/) – Recycle More NC is a campaign initially designed to engage the 30 – 55 age range on recycling issues. The intent is 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/>)

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.

All reporting universities use at least one large-scale campaign, and 13 of the 39 reporting community colleges report using at least one campaign (see Figure 3). Colleges and universities most prevalently use the RE3 and Recyclemania campaigns. Furthermore, colleges and

universities reported using “other campaigns” which include campus-wide competitions, sustainability promotions and recycling events planned and developed by their own staff.



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.

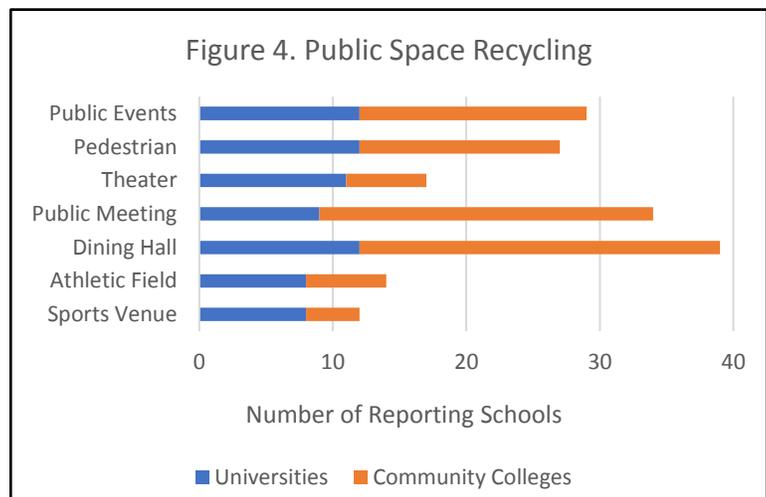
Placing bins in public areas is a best practice because students, faculty and staff often need the opportunities to recycle away from their desks, offices and dorm rooms. While walking through campus, people are more inclined to recycle when a bin is nearby.

The survey's findings show that on-campus dining halls are the most common public area to have recycling bins with positive responses from 90 percent of reporting universities and 70 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 on the right, so attendees can correctly sort compost and recycling materials from the trash.

Another best practice includes pairing (called twinning) 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. Also, 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 at trash bins.

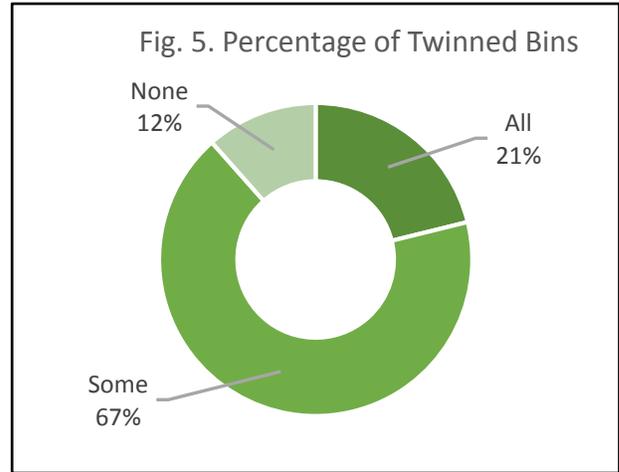


Special events collection station

Of the reporting colleges and universities, 88 percent of them have twinned at least some portion of their public recycling bins with waste bins. Eleven schools reported that all their bins were twinned. The remaining 12 percent of schools did not have any waste or recycling bins that were paired together.



Twinned bins at East Carolina University



2.2 Recycling Collection Styles

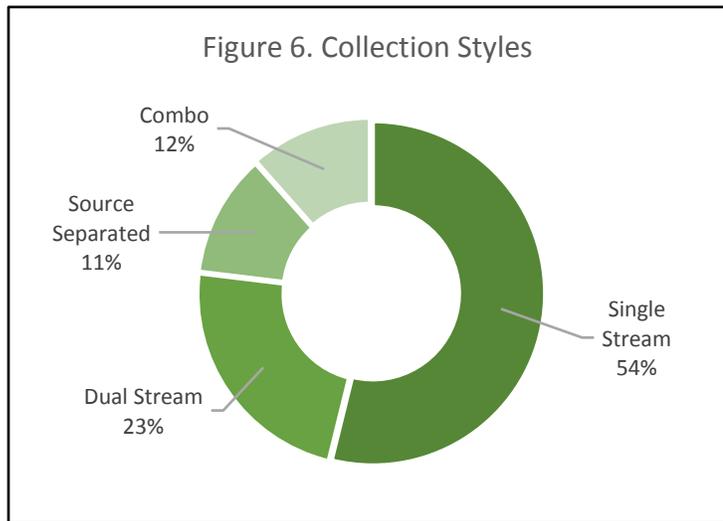
By far, single-stream recycling is the most popular style of recycling collection on college campuses. More than half of the schools reported using a single-stream recycling system in which all of the traditional materials—cans, bottles and paper—are collected in the same receptacles. Single-stream proponents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

Single-stream recycling programs have recently focused on reducing contamination. 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. 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. Almost a quarter of the schools reported using dual-stream recycling. In this system, two different bins collect fiber materials (cardboard and paper) and packaging materials (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. However, collecting two recycling bins may be less efficient for housekeeping staff and haulers.

The remaining quarter of reporting schools have source-separated recycling or a combination of recycling systems. 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. Source-separated recycling has higher collection costs and lower participation due to the inconvenience of having to sort by hand. The six 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 dedicated contract hauler for one section of the campus and another hauler for a different section.

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, while a few use school employees. 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. Three colleges partner with their local governments for collection, and four schools listed their collection arrangement as “other.”

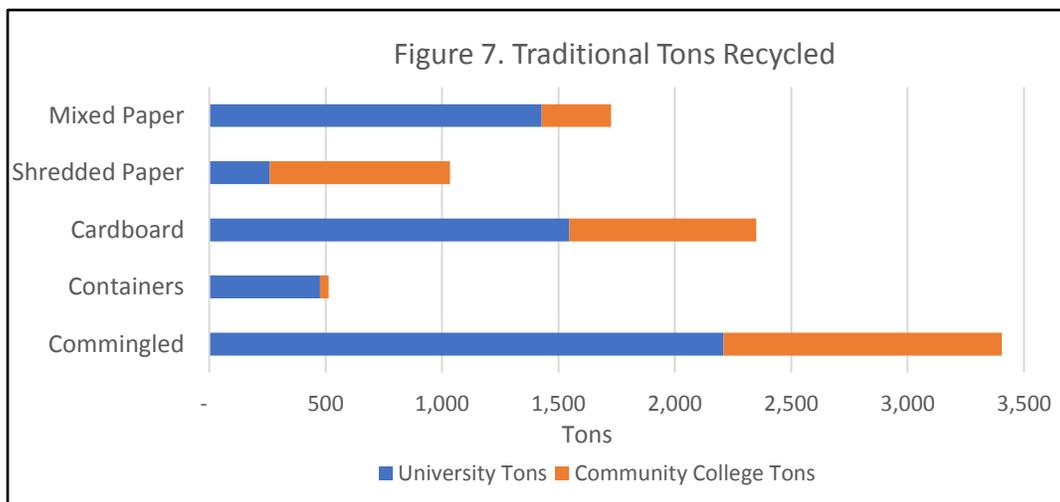
Regardless of the hauler, schools are strongly encouraged to review their hauling process for trash and recyclables. Reviews are conducted periodically, especially when contracts are up for renewal. Containers should be serviced or hauled when they are full or approaching full, to get the most value 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 2016-17, colleges and universities reported recycling 9,029 tons of traditional recyclables. Universities recycled about 52 pounds per person on campus (students, faculty and staff), and community colleges recycled about 44 pounds per person on campus. About 15 percent of all the material discarded on college campuses was diverted through traditional recycling programs during FY 2016-17.

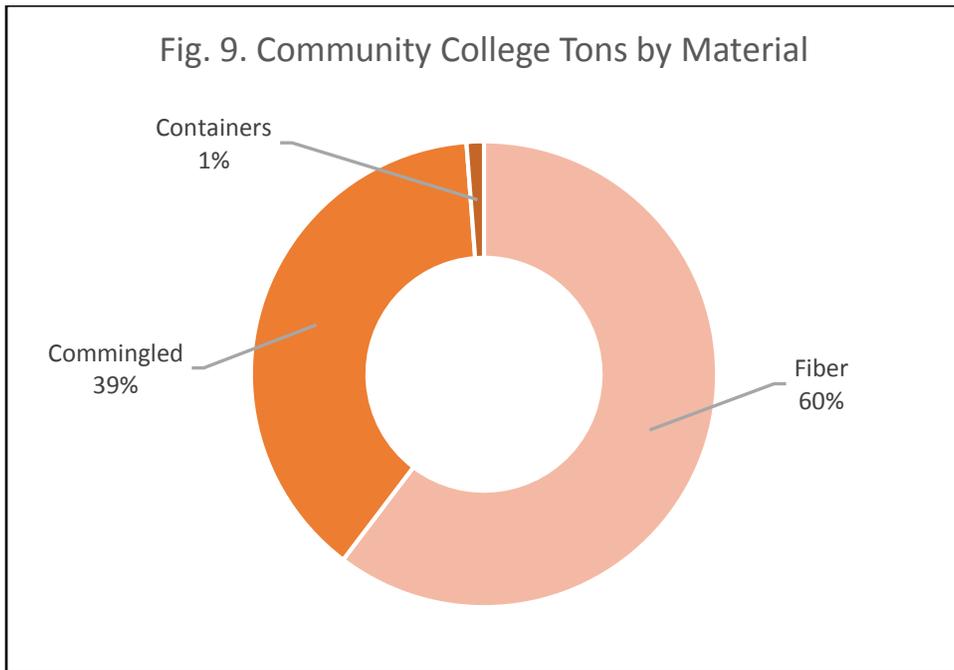
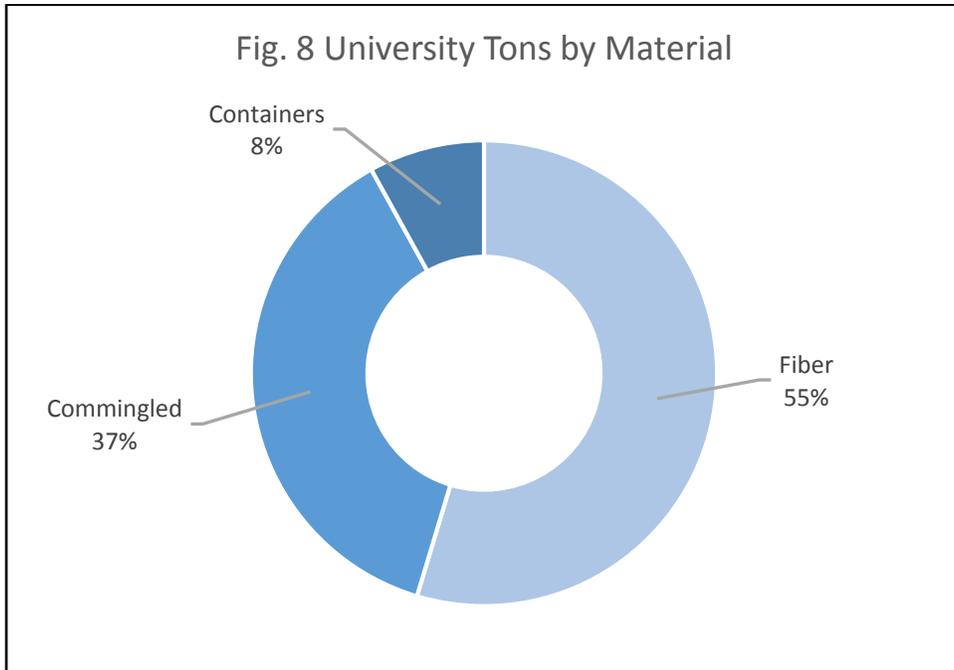
Collegiate recycling programs collected about 38 percent of its traditional recyclables in a single-stream system. The materials collected in dual-stream or source-separated programs have been grouped into the following categories:

- 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.



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 6 percent of the total recycling mix. Schools reported recycling 5,111 tons of fiber materials and 513 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 the 2016-17 fiscal year. Compared to the previous fiscal year, schools recovered 1,500 more tons of non-traditional materials.

3.1 Surplus and Donation

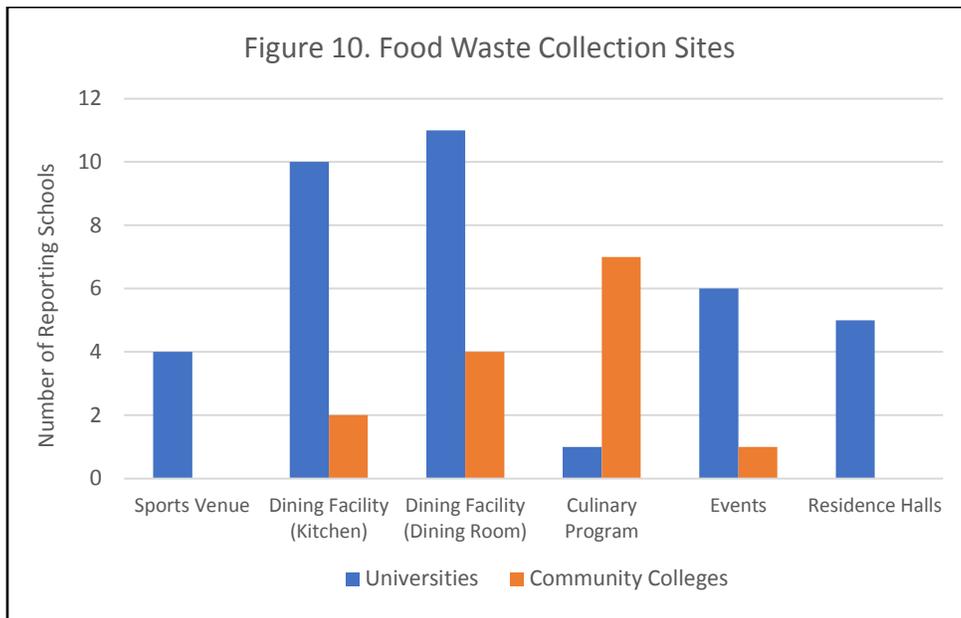
The N.C. Department of Administration's (DOA) [State Surplus Property Agency](#) is the seller of all surplus supplies, materials and equipment owned by the State of North Carolina. Through the surplus process, items that are no longer needed or useful are evaluated to determine the preferred disposition method. Reusing, trading-in, selling or recycling is prioritized over sending items to the landfill. All the reporting universities and 97 percent of the reporting community colleges acknowledged that they participated in the state's surplus program.

Colleges have also created opportunities for reuse by establishing programs to donate student-generated materials to charity or other organizations. Eleven universities and four community colleges operated donation programs, and schools reported donating a total of 159 tons of goods. From that total, colleges donated 24 tons of food to [food banks](#) and local shelters to feed hungry North Carolinians (<http://ncfoodbanks.org/finding-help/>). The University of North Carolina – Asheville, for instance, partners with a local non-profit called [Food Connection](#), which picks up excess food and delivers it to local shelters.

Additionally, eight universities operate move-in and move-out recycling programs, so the campus can divert more materials during the hectic ends and beginnings of the academic years. At these move-in and move-out events, students can donate furniture, clothes and edible food to local charities or to other students.

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 an emerging issue in the field of waste reduction. For the annual survey, schools responded to questions asking about how they collect compostable material.



Eleven universities and four 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, 12 schools operate a back-of-the-house compost collection program in which kitchen staff collect scraps from food preparation. Seven community colleges and one university have culinary teaching programs that collect scraps from food preparation too. Some schools have also established pilot projects to divert some food waste from major sporting events both at the game and pregame tailgating.

Five universities have started collecting food scraps from residence halls. A few models exist for this type of program which includes a system where each room has a bucket and residents empty it in outdoor carts. 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 lines are several times 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 5,913 tons of organic material for composting or food donation. Eight universities and three community colleges contracted with a private composter to collect organic waste from the campus. North Carolina has more than 50 [compost facilities](#), and about a dozen of those are permitted to also accept post-consumer food waste in their mix (Type 3 permit). Two universities and seven community colleges set up their own composting sites to manage compostable brush and food waste.

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 2016-17, colleges and universities made the most impressive leap in this category of recovery. Reporting schools recovered a total of 5,751 tons of special wastes. The largest increases came in construction and demolition recycling as schools recovered 2,496 tons of material—more than triple than the previous year. This progress has occurred as local governments also begin expanding their recycling programs to include these materials.

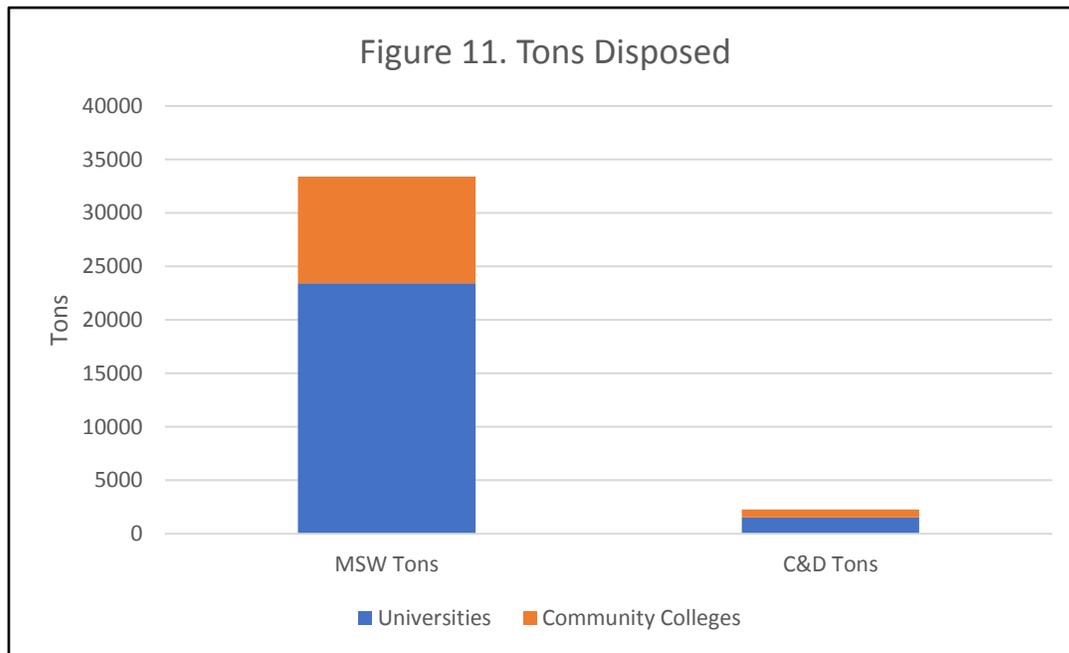
Other increases came with electronics, fluorescent bulbs and ink cartridges. Recycled non-traditional materials and compostables made up 21 percent of the material discarded by colleges and universities during FY 2016-17.

Special Material	Tons Recovered
Used Cooking Oil	164
Pallets	317
C&D Recycling	2496
Other Metal	1196
Electronics	689
Auto Batteries	20
Dry Cell Batteries	12
Textiles	0.1
Motor Oil	31
Oil Filters	5
Anti-Freeze	5
Tires	40
Bulbs	67
Ink Cartridges	37
Expanded Polystyrene	3
Other Misc. Tons	669
<i>Total</i>	5,751

4 – Disposal

4.1 Tons Disposed

According to the reporting colleges and universities, during FY 2016-17, North Carolina public colleges and universities disposed 35,673 tons of material. More than 94 percent of the disposed material went to municipal solid waste landfills, and 6 percent went to construction and demolition landfills.



With 23,425 tons of municipal solid waste generated at universities and 9,969 generated at community colleges, universities had 206 pounds of solid waste generated per person and community colleges had 140 pounds 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.
- 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 is being thrown away and where material is being thrown away can help colleges direct recycling strategies to recover the most material possible. Eight universities and five community colleges have completed a waste assessment during the past five years. Six universities and one community college did a waste study during the most recent fiscal 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. The DEACS staff has data from other waste assessments, and staff can help find a partner organization to help with the study.

5 – Summary and Recommendations

Based on reports submitted by 52 universities and community colleges, data shows that recycling and waste diversion increased substantially during the 2016-17 fiscal year. Of the 56,501 tons of total material generated at reporting colleges, they recovered 37 percent of those tons for recycling or reuse, which is a 2 percent increase from the previous year.

Universities recycled 52 pounds of traditional recyclables per person (staff, faculty and students), and community colleges recycled 44 pounds of recyclables per person. Universities disposed of 206 pounds per person, and community colleges disposed of 140 pounds per person.

Material	Tons
<i>Total Material Generated</i>	<i>56,501</i>
Traditional Recyclables	9,029
Other Recyclables	11,640
Donated Goods	159
Disposed Waste	35,673

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. Only 37 percent of reporting schools included information about recycling on webpages, and only a quarter of reporting schools used social media to promote recycling. DEACS encourages public recycling systems to budget about \$1 for every potential recycler under its purview.
- 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. The Division of Environmental Assistance and Customer Service encourages colleges to measure their tonnage of donations to better estimate their waste reduction progress.

- 5) **Peer-to-peer collaboration** – A key objective for DEACS is to foster inter-organizational collaboration for colleges and universities. One may face a challenging recycling problem; yet, another may have already solved a similar obstacle. 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 \(https://deq.nc.gov/conservation/recycling/state-agencies\)](https://deq.nc.gov/conservation/recycling/state-agencies), or visiting the CRC [website \(https://www.cra-recycle.org/cracouncils/crc/\)](https://www.cra-recycle.org/cracouncils/crc/).