# Chapter 2: Residence Life Waste Management

## 2.1 Introduction

This chapter focuses on waste management in Residence Life at Chapman University. The chapter includes three individual projects that share a common goal: to improve recycling knowledge and awareness to form sustainable, environmentally friendly habits among students in Residence Life. This goal is based off of Chapman University's mission "To provide personalized education of distinction that leads to inquiring, ethical and productive lives as global citizens." As stakeholders on a planet with finite resources, all members of Chapman University should assume moral responsibility for the products that can be recycled and should question the sale and use of those items that must be sent to a landfill.

The data for this chapter comes from three waste audits carried out on Henley Hall and the Davis Apartments. Analyzing the trash and recycling content in the residence halls allows researchers from the Environmental Science and Policy Capstone Course to determine what items are most commonly misplaced, and how to tailor educational efforts to reduce landfill-bound waste, and increase recycling.

### 2.1.1 U.S. Waste Trends

The U.S. Environmental Protection Agency defines waste, or municipal solid waste (MSW), to be comprised of various items that are commonly thrown away after being used (EPA, 2013). According to the EPA's 2013 MSW Report, Americans generated about 254 million tons of waste (***Appendix, Figure 2.A.1***) and recycled/composted more than 87 million tons of this material, equivalent to a 34.3% recycling rate (***Appendix, Figure 2.A.2***) (EPA, 2013). On average, U.S. citizens recycled and composted 1.51 pounds of their individual daily waste generation of 4.43 pounds per day (EPA, 2013). However, disposal of generated waste in landfills decreased from 89 percent in 1980 to under 53 percent of MSW in 2013 (EPA, 2013). With future projections of world population growth, economic growth and energy and material consumption continuing to rise, efficient waste management will prove vital to meeting society's growing demands.

### 2.1.2 Waste management practices in higher education campus housing

Colleges and Universities across the country are stepping up to take responsibility for the amount of waste they generate. International recycling competitions like Recyclemania compare recycling rates on a per-capita basis across campuses. Other schools like UC Davis, are attempting to reach zero-waste by 2020, while schools like the University of Oregon, provide resources for zero-waste classrooms, and host zero waste events. The University of Texas, Austin designates a recycling committee for each residence hall to create signage and improve

recycling efforts. Other universities like the University of North Carolina at Chapel Hill provide thorough online resources for what can be recycled and where to recycle certain items in residence halls. While not every best practice can be implemented at Chapman University, it is important to examine what has been successful for other institutions.

## 2.2 History of Sustainability and Waste Management at Chapman

### 2.2.1 Overview

In recent years, Chapman University has experienced a culture shift towards becoming a more sustainable campus. However, major improvements in sustainability have been prioritized to main campus over Residence Life. Previous attempts to encourage sustainable habits in Residence Life such as the Recyclemania competition, and placement of recycling bins in dorm rooms, have been met with limited success. These preliminary efforts are on the right path, but they have yet to be implemented to their full potential, something this chapter addresses. As with any activity, an individual cannot successfully participate in the program without the proper knowledge and tools. This chapter's analysis of waste disposal behavior in Residence Life includes recommendations that will promote more sustainable habits by giving students the tools and educational materials they need to properly dispose of waste.

### 2.2.2 Past accomplishments

The increased offering of environmentally themed courses, as well as the introduction of the Environmental Science and Policy degree and the Environmental Science and Environmental Studies minors spurred awareness of sustainability issues among faculty, staff, and students, and created demand for sustainable practices to be implemented on campus as well as in Residence Life. However, awareness of these issues has not translated into a significant habitual behavior change. Most of the students living in Chapman's on-campus housing are freshman and the majority have had limited exposure to these courses or relevant sustainable concepts. Therefore, their knowledge of waste reduction stems from their previous living experiences. Although there have been attempts to promote sustainable waste management over the years, figuring out how to change habitual behavior of the students is the key to developing a sustainable campus culture (see **Chapter 1** for further discussion on sustainable behavior change).

Chapman University has made strides towards increasing sustainable practices over the past decade. For example, Karen Swift was hired as Chapman's first Environmental Health and Safety Manager in 2005, Chapman received a grant from the City of Orange in 2006 to buy and place small blue recycling bins in classes and offices, and the Faculty Environmental Committee was formed in 2007. Subsequently, this committee carried out an extensive campus-wide audit from 2008-09 and placed over 900 small recycling bins in classrooms and offices after determining that there was a need for the bins on campus. Additionally, the Environmental

Science and Policy major was formed in 2009 and Mackenzie Crigger was hired as the new Sustainability Manager in 2011. During 2011 and into 2012, she oversaw the implementation of eight water bottle refill stations around campus, the first of which was placed in the Henley Residence Hall basement. Additional sustainability efforts included a Recyclemania competition among residence halls, the implementation of dual trash and recycling bins in Argyros Forum, and the placement of Big Belly solar compactors around campus. This chapter aims to provide options for the continuation of sustainable innovation, especially in Residence Life.

## 2.3 Current Status

### 2.3.1 Waste Audit in Henley Hall Residence Life

The first waste audit of Residence Life waste occurred in early March, 2016 in Henley Hall. Residents of Henley Hall dispose of waste in one of two trash rooms located on each floor. Waste rooms are equipped with six 30-gallon waste bins, three for recycling, and three for waste. Prior to the waste audit, educational signage was limited and varied by floor. After conducting the first audit, the variety and quantity of items in trash and recycling bins were recorded to determine the level of waste disposal knowledge of freshmen residents. This was an important step in determining the best way to craft informational material for the target population of freshmen. Based on the composition of the collected trash and recycling, the research group decided to focus education on five items: Plastic Bottles, Paper Cups, Paper, Cardboard, and Plastic Utensils. These items were selected because all except for paper cups can be recycled, and there are simple solutions to reduce consumption of each item, or even better, replace with reusable equivalents. Researchers analyzed waste audit data to determine percentage of items in the trash by count ***(Figure 2.1)***, total counts of focus items in the trash and recycling on all four floors (***Figure 2.2***), and the potential diversion rate by floor (***Figure 2.3)***. Floor by floor comparisons were also made to determine if educational materials had any impact on the presence of focus items in the trash (***Figures 2.4-2.7***)

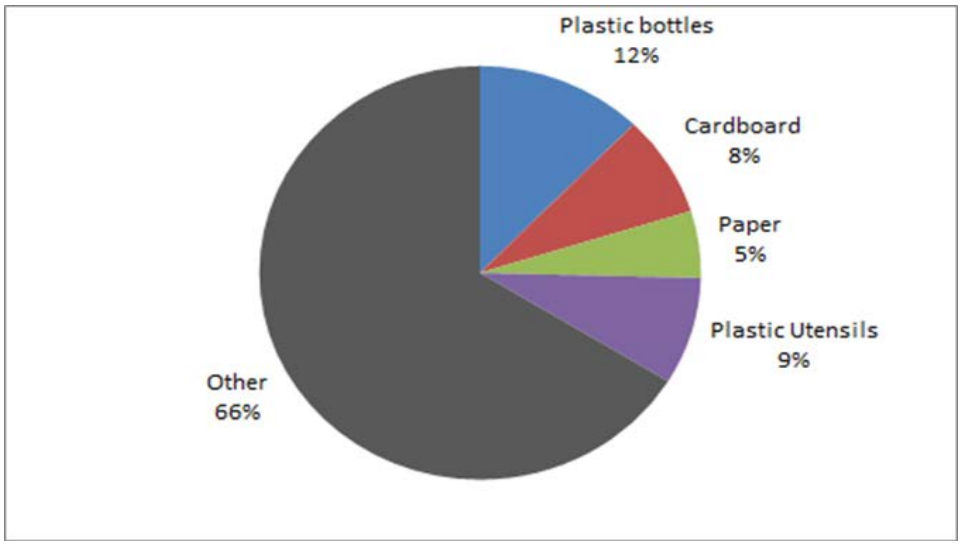


***Figure 2.1**. The composition of waste collected during the initial audit in Henley Hall from the fourth floor. The four focus items portrayed can all be recycled, and would greatly increase the diversion rate. The "other" category is the rest of the trash that was a mix of trash and recyclables, excluding the four focus items. Therefore, the amount of recycling in the trash is slightly larger than portrayed. Percentages are by count, not by weight.*

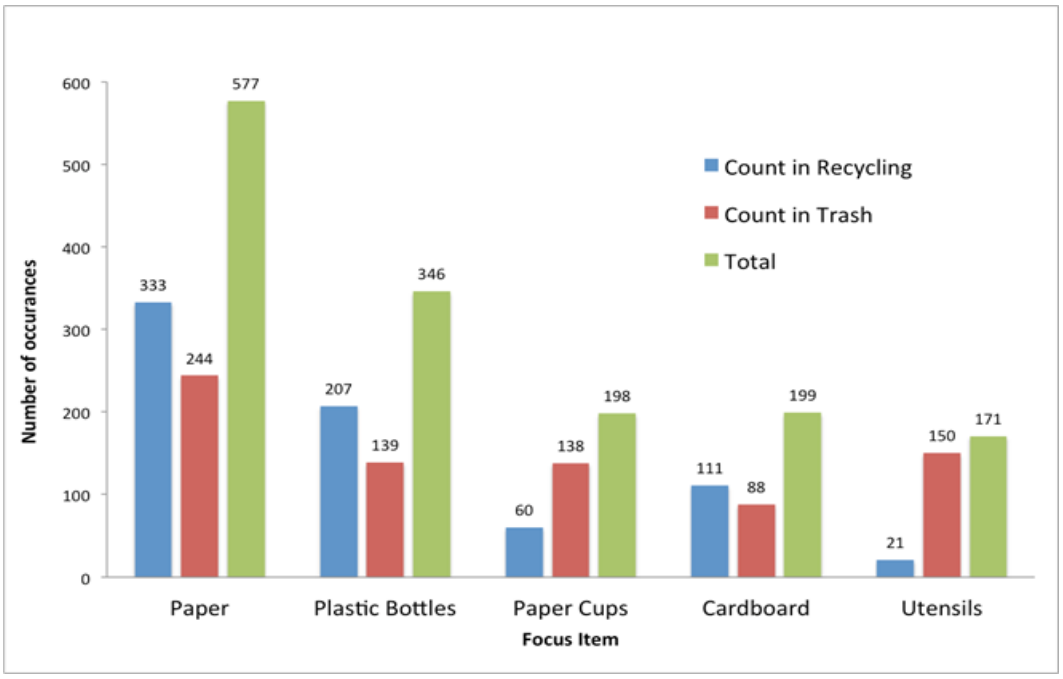


***Figure 2.2** Raw count of focus items after waste audit of Henley Hall. These items were found most often throughout the audit.*

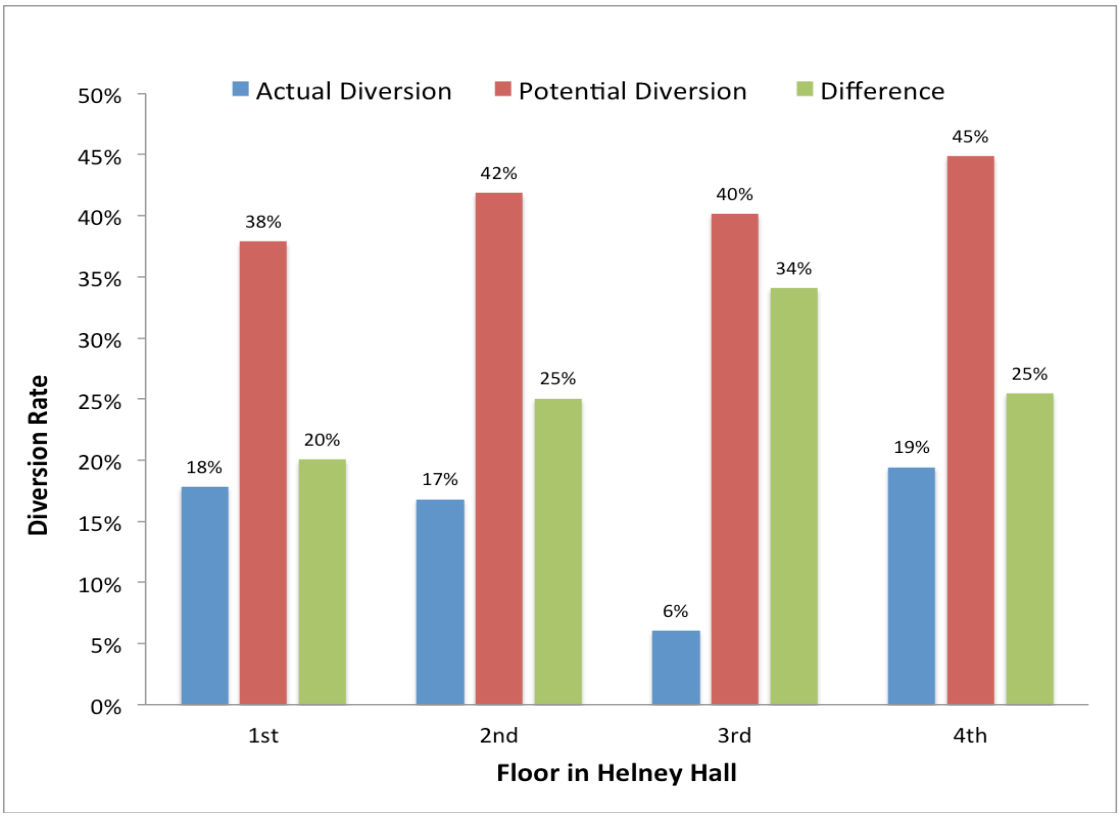


***Figure 2.3*** *Potential and Actual Diversion Rates by Weight by Floor in Henley Hall. Each floor could have increased diversion of recyclable materials from a landfill to a recycling facility by 20 percent.*

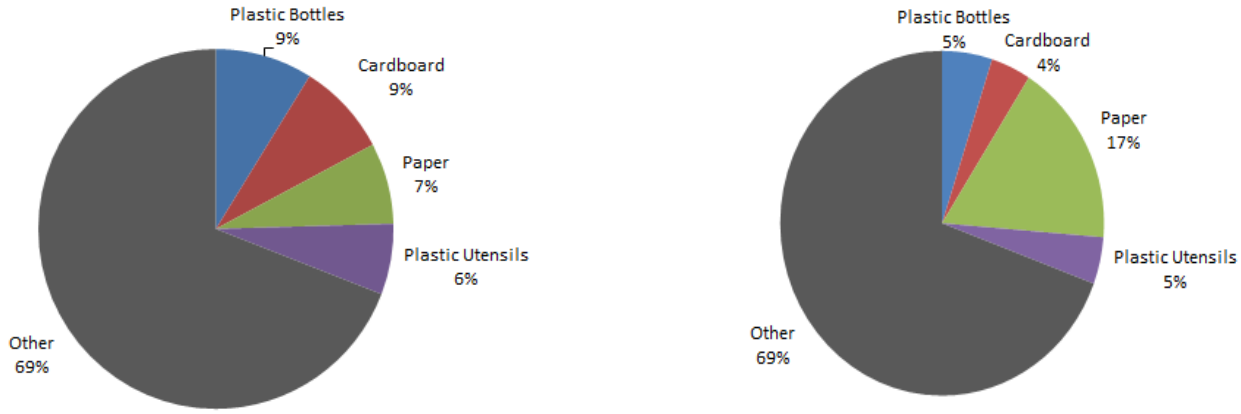


***Figure 2.4*** *First floor before and after educational treatment (posters hung in trash room above bins)*

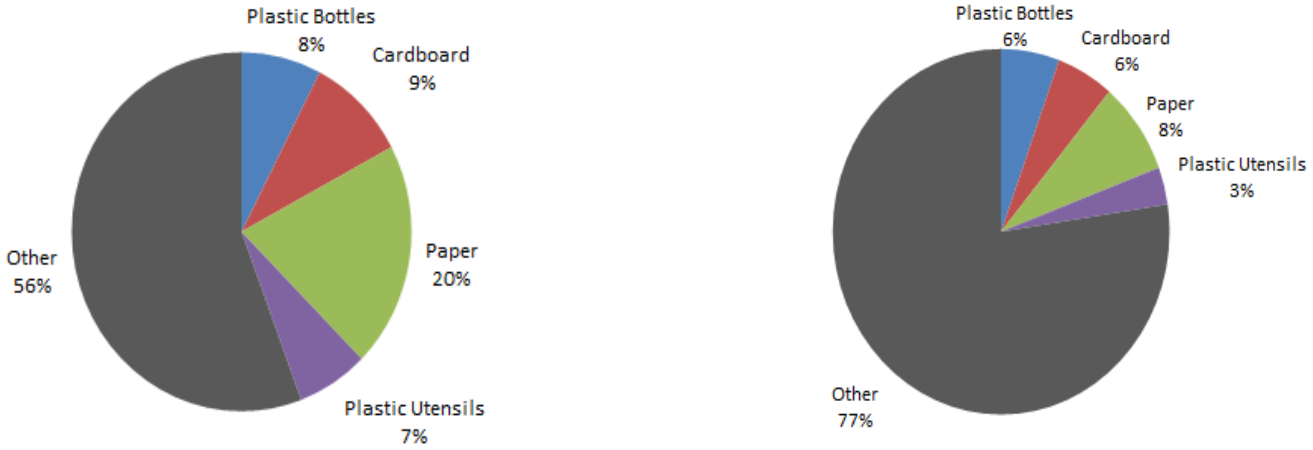


***Figure 2.5*** *Second floor before and after educational treatment (recycling flyer handed out and emailed).*

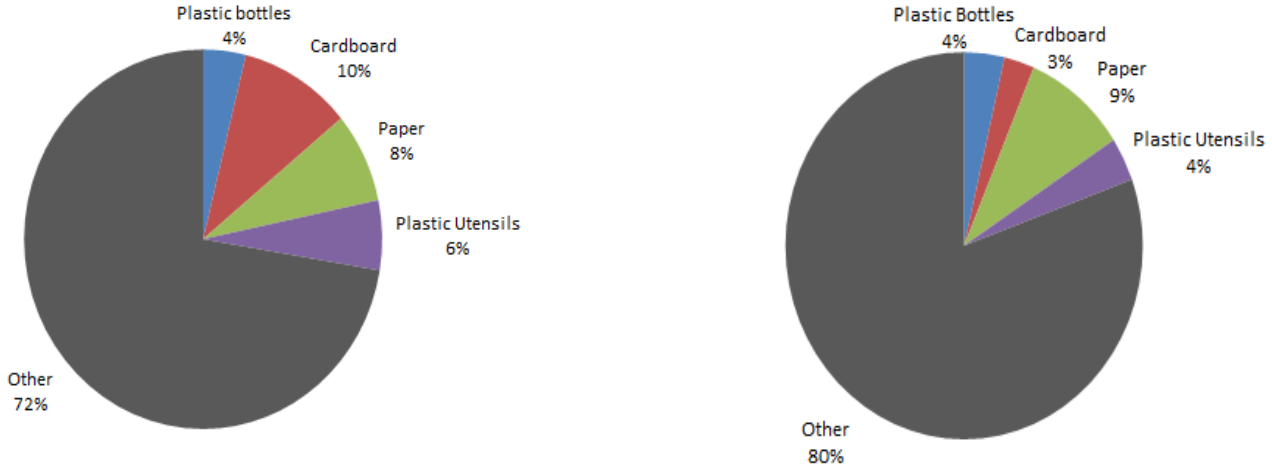


***Figure 2.6*** *Third floor before and after educational treatment (none/control floor).*

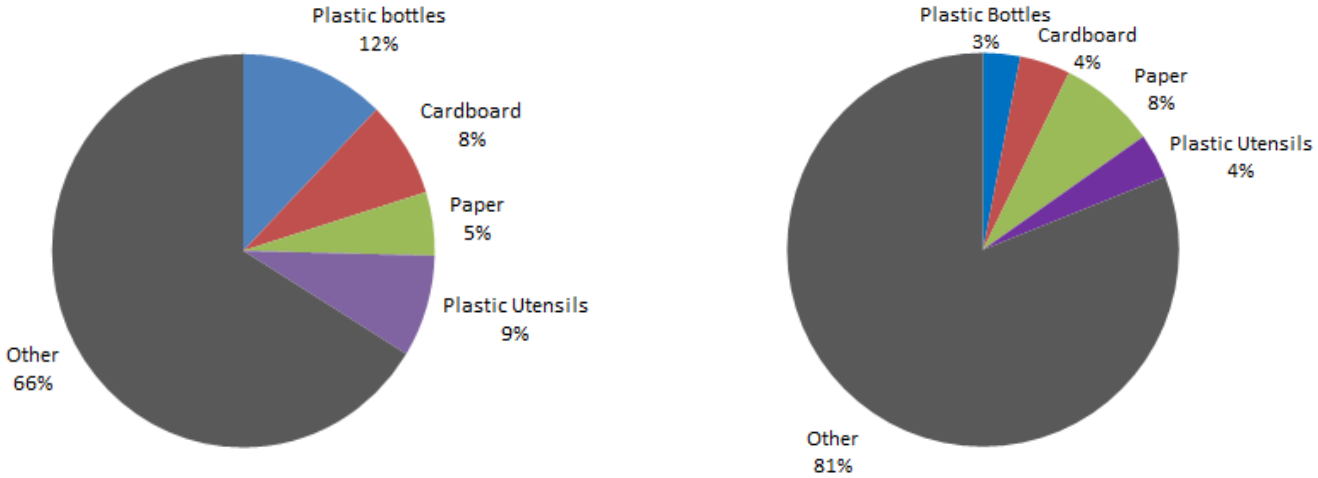


***Figure 2.7*** *Fourth floor before and after educational treatment (none/control floor).*

Researchers in the Environmental Science and Policy Capstone course visited Henley Hall after Spring break and decided to develop three different educational methods to test on residents. On the first floor, posters outlining proper disposal of focus items were placed in the trash rooms above the bins. On the second floor, each room was sent the same poster outlining proper disposal of the focus items, as well as an email of the same poster. The third and fourth floors were "control" groups, so they received no educational materials. Students were given one month to adjust to the information so that researchers could compare "before" and "after" recycling and trash disposal practices to determine if the educational materials may have affected disposal practices. [1] The ultimate goal was to improve the diversion rate and increase the base level of proper waste disposal knowledge among the first year residents. Another major goal was to begin a discussion on recycling and create conscious students who inspire their friends and roommates to care about waste management.

The second waste audit of Henley Hall did not support the hypothesis that floors that received educational materials would have lower percentages of recyclable focus items in the trash than control floors. In fact, the trash from the third and fourth floors contained the lowest percent of recyclable focus items even though they received no educational materials. However, each floor did reduce the percentage of recyclable focus items in the trash from before to after the education campaign. This may be due to low number of trials and not a trend, or it may be that students took note of the signs and emails and either consciously or subconsciously recycled those items properly better than before. More frequent analysis of trash and recycling is necessary to tease out the distinction between random results and observable trend.

### 2.3.2 Waste Audit of Davis Hall Residence Life

The second waste audit was of the Davis Apartments in Residence Life. These apartment style living spaces can have either one or two bedrooms, a kitchen, and a living room. Waste and recycling is collected in outdoor dumpsters in the parking lot adjacent to the buildings with one dumpster for waste, and one for recycling, as opposed to the individual trash rooms in each hall as seen in Henley Hall. Student researchers collected waste from the Davis Hall dumpsters over a 48-hour period to compare results with the previous waste audit in Henley. Researchers believed that apartment style living, would produce different waste products when compared to the first year residence hall. For example, Davis Hall residents have kitchens, so there could be an increased amount food and compostable waste.

In the Davis Hall waste audit, researchers found less sorting of materials, more food items, and less disposable goods like paper plates, utensils etc. What was most noticeable was a lack of any sorting. Waste was unbagged and paper products thrown in with uneaten food items, while the recycling dumpster was almost empty. When trash bags were investigated,

there was a combination of waste and recyclable goods in the same bag. This signifies a lack of education in apartment style Residence Life, which may be harder to address compared to students in first year Residence Life halls because there is very limited space for educational signage and habits of waste disposal have already been internalized.

***Figure 2.8*** *Beginning stages of sorting waste into categories.*


***Figure 2.9*** *Example of food waste found during the Davis Hall waste audit.*

## 2.4 Concluding Assessment

### 2.4.1 Areas where Chapman is doing well

Currently in Chapman University Residence Life, recycling bins are provided to every room within the residence halls. This provides the opportunity for students to recycle in their rooms and see their diversion from landfills. Similarly, some Resident Advisors have taken it upon themselves to create their own signs and educational components to inform their residents of the benefits of recycling. In order to address the different needs of students in various residence halls, it is necessary to understand the waste each living style creates.

### 2.4.2 Areas in which to improve

While each room is supposed to contain a recycling bin, anecdotal evidence and interviews proves that many rooms have lost their bins. More importantly, there is no uniform waste management program in Residence Life. Even though each room is provided with the tools to sort their waste, the residents lack the knowledge on how to sort their trash correctly. With the continued use of the educational tools used in our study, students in Residence Life in the upcoming years will become more sustainable citizens.

### 2.4.3 Existing gaps in knowledge

It is currently unknown how much total waste Chapman University produces annually. Chapman's waste provider, CR&R, does not pick up Chapman's waste exclusively, the University's trash is collected alongside the rest of the surrounding community. In order to determine the effectiveness of educational programs on waste reduction, the University must first know how much waste it produces annually in Residence Life. This data would help the University set overall waste management goals and set targets for reduction of annual waste production. Waste audits will continue to be helpful data gathering activities to support assumptions on how much waste the average student living in Residence Life produces.

## 2.5 Recommendations

### 2.5.1 Easy

- Print laminated custom posters picturing specific items that belong in the trash and recycling, and display in the individual trash rooms in Resident Life.
- Send an email that contains a specific targeted item list to residents so they are able view it whenever they have questions. Overtime, the list of items will be added to once an improvement is seen in habitual behavior through future waste audits.

### 2.5.2 Moderate

- Sustainability training incorporated into the first two weeks of the semester in which Resident Advisors meet with their residents to discuss recycling and trash disposal and answer any questions residents may have about the subject.
- Distribution of various educational materials such as posters and stickers.
- Purchase and place shadowboxes in the trash rooms that display actual examples of trash and recyclables. The specific brand name items displayed in the shadow boxes would be those that are most commonly found in the waste audits.
- The continuation of the Recyclemania competition between the residence halls to incentivize students to acknowledge the impacts of their behavior and increase their knowledge of the benefits of recycling. During this event, future researchers and volunteers collect trash by hall and audit weekly for six weeks to determine a champion recycling residence hall.

### 2.5.3 Challenging

- Place a blue recycling bin with a sticker or poster outlining what items can be placed in the recycling bins in each room of the Residence Halls. Students will be fined if the bin is missing at the end of the semester.
- Waste audits, organized by floor, carried out once a month with an incentive for the floor with the best-sorted waste.
- Give each student a reusable water bottle and food container during move in to encourage the use of reusables in place of disposal items
- Replace dumpster style waste collection with sorting options such as paper, plastic, glass, food waste, and landfill.

### 2.5.4 Future areas of research

At Chapman University, recycling and sustainability efforts have spiked in the past decade, but there is always room for improvement through educational/awareness campaigns to maintain student interest. A floor-by-floor audit of the residence halls had never been done, so it was illuminating to see how students disposed of their waste and to what extent they did so properly. The continuation of trash audits in the residence halls to determine the effectiveness of educational methods, is vital to the future success of waste reduction and diversion rate goals. If possible, a collaboration with CR&R to capture data on Chapman's waste, specifically how much is sent to a landfill, and how much is recycled will also strengthen future research. The results of the waste audit were instrumental to creating helpful recycling and waste disposal educational materials. Future Environmental Science and Policy students as well as resident advisors and directors, will be able to use the educational materials and information gained by this year’s efforts to determine how to maximize the benefits of

educational materials as means of altering student habits and fostering a sustainable culture in Residence Life.

## 2.6 Contacts

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## 2.7 References


2013 Chapman University Environmental Audit Survey. (2013). Orange, California.

(2013). 2013 U.S. EPA MSW Report. U.S. EPA.

The University of Texas at Austin, Division of Housing and Food Service, Sustainability, Sustainability Initiatives. Updated September 2015, Accessed on 5/1/16. http://www.utexas.edu/student/housing/?site=16&scode=0&id=1901#recycle

University of California, Davis, Sustainable 2nd Century, Campus Progress: Waste, Aiming for Zero Waste. Accessed on 5/1/16 http://sustainability.ucdavis.edu/progress/waste_reduction/#aiming

University of Oregon Zero Waste Program. Updated 7/8/13, Accessed on 5/1/16 http://zerowaste.uoregon.edu


## 2.8 Appendix

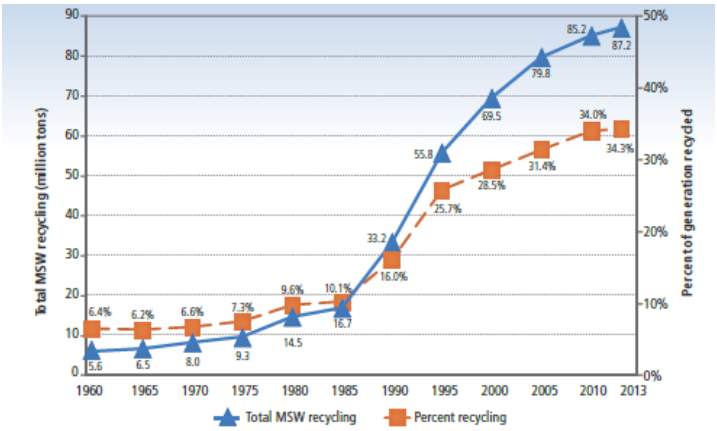


***Figure 2.A.1:*** *MSW recycling rate in the U.S., 1960-2013. The percent of MSW recycled (represented in orange) increased 53% from 1980 to 2013. Source: EPA MSW Report, 2013.*

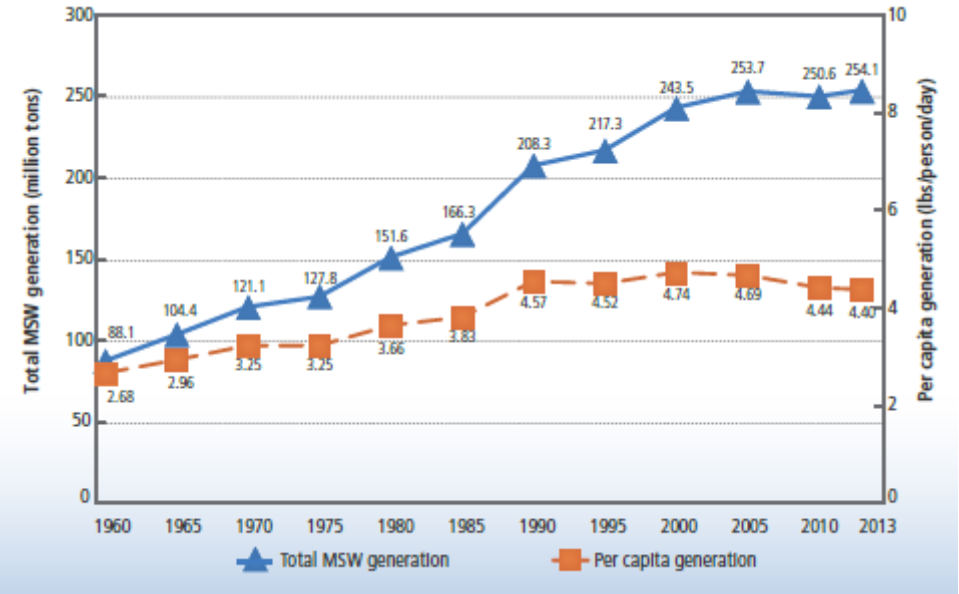


***Figure 2.A.2:*** *MSW generation rates, 1960-2013. The total MSW generated has increased overall due to the increase in human population. Per Capita, MSW generation has stayed more consistent as sustainable waste management practices have become more frequently practiced.*
*Source: EPA MSW Report, 2013.*