

UNH On-Campus Waste Programs Research, Assessment, and Engagement

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Abstract

In striving to be a more sustainable institution of higher education, the University of New Haven has supported this summer research project to quantitatively and qualitatively examine the state of its waste programs. These programs include solid municipal waste and the university's relatively new single stream recycling program. Benchmarking of waste and single stream recycling disposal on campus for fiscal years 2011, 2012, and 2013 found that UNH had a recycling rate of approximately 8.7% for FY 2011, 9.3% for FY 2012, and 9.4% for FY 2013. The creation and launch of a 23-question anonymous survey garnered more than 500 responses. The on-going analysis of this survey's results is on track to produce a report in the spring of 2014, which will be presented to the university's Facilities Department. A thorough understanding of the programs' current state helps to ensure that improvement strategies will be well-advised, appropriately targeted, and effective. Such groundwork will contribute to the goal of creating a more sustainable campus at the University of New Haven.

Introduction

The University of New Haven (UNH) continues to pursue and attain sustainability goals on campus. These goals address pressing and interrelated social, economic, and environmental issues that UNH, and society at large, increasingly face. This project, conducted over the summer of 2013, supports UNH's goals to:

- Create awareness about waste on campus and design programs to engage students in attitude and behavioral changes that can reduce waste streams and waste volume on campus.
- Create programs that inform students about the environmental, economic, and social impacts of waste streams resulting from campus activities.
- Create programs that lead to collaborations between UNH student, staff, and faculty as well as experiential learning opportunities.

In 2010, a UNH undergraduate student, Kristen Maylott, conducted a UNH waste study as part of her honors thesis. Her study detailed and mapped what occurs with waste after it leaves UNH's campus. Maylott's mapping focused on the municipal solid waste (MSW) and recycling waste streams produced at UNH.

This summer's research project will complete the other half of the waste study by mapping the journey of UNH waste streams, this time focusing on the details of campus waste from initial disposal to the point of campus departure. This campus waste research and mapping will answer the main project question, "How does the waste program at UNH operate, to include program information dissemination to campus members?" The five sub-questions to be answered are:

- How does UNH waste program performance compare with that of other universities?
- How well is the program communicated to UNH campus members?
- What inefficiencies / barriers exist related to user interaction with the campus waste programs?
- What are the predominant attitudes, beliefs, and behaviors of the UNH campus members towards on-campus waste?
- And lastly, what improvements to the campus waste programs will increase the efficacy of user participation and overall program performance?

Understanding the answers to the main project question and five sub-questions will provide the basic measures required to optimally manage and operate the campus waste program, as well as providing a baseline for continual evaluation and improvement. This research was conducted in close coordination with the UNH Facilities Department in order to ensure support of shared staff and administration goals.

Background

The University of New Haven (UNH) is a small private institution of higher education situated in the urban setting of West Haven, Connecticut. UNH offers 75 degree programs to approximately 4,600 undergraduate and 1,800 graduate students (About UNH, 2013). UNH typically has a student population make-up of approximately 40% residents and 60% commuter students (Turner, 2013). Full and part time UNH faculty number nearly 600 and work alongside a staff of approximately 500, the majority of whom are full-time employees. These students, staff, and faculty work and learn on a main campus comprised of 35 buildings, with construction underway on others.

The campus began instituting single stream recycling (SSR) in 2009, switching from a program of sorted recycling for common items such as paper, cardboard, glass, aluminum, plastics, etc. The transition from a sorted recycling program to an SSR program was driven by the campus's waste contractor, All American Waste, which initiated the switch to SSR. All American Waste explained that since UNH's switch to SSR in 2009, the volume of recycling collected from campus had increased due to the relative convenience of SSR, the increased number of recycling bins, as well as the SSR program having allowed for the collection of more types of recyclables (Engravalle, 2013).

Upon the initiation of this research project, the UNH campus was observed to have a variety of different waste and recycling collection receptacles, locations, and signage. In addition to these physical elements of the UNH waste and recycling programs, there is also a UNH Sustainability webpage. The web pages were not found to contain much information about waste and recycling on campus (specifically how, what, where, or why information about campus waste). This research found that the UNH Sustainability webpage could be a good communication tool to collect and share waste program information with the UNH campus community as an initial step towards engaging the campus more effectively on topics and projects related to waste and recycling. Most identified sustainable university campuses share their information about waste programs on similar types of sustainability web pages (www.aashe.org).

Literature Review

A wide range of topics were researched during this project in order to learn how best to evaluate UNH campus waste programs. For instance, the waste and recycling webpages of other universities were visited for comparison with UNH's web-disseminated waste information. Many of the recurrent webpage features were used to inform the design of UNH's new waste and recycling webpages, which are currently undergoing further development.

Initially, the website for AASHE (Association for the Advancement of Sustainability in Higher Education) was utilized to discover more about best practices being carried out at other campuses. In the annually produced Higher Education Sustainability Reviews there were abundant examples of how other universities were engaging their campus members in sustainability initiatives. Additionally, valuable information such as funding opportunities for projects and programs could be found in the AASHE reviews. Such resources from AASHE will continue to be used for this project's continuation.

Then, articles about implementing and evaluating sustainability initiatives at a college campus were reviewed to better understand methods of program assessment and improvement that could be applied to UNH's waste programs. In his article, Rasmussen details nine areas of consideration to take into account when implementing a

sustainability initiative on a university campus. The areas of consideration that were most important to this research project include providing the necessary support for initiatives and viewing the initiative through a symbolic frame. Providing the necessary support includes both financial and stakeholder support, while the symbolic frame considers the publication of initiative goals (and progress toward goals) to inform and engage the campus community (Rasmussen, 2011).

Later, in order to explore and evaluate user interactions with UNH campus waste programs, articles pertaining to survey development and human behavior in relation to recycling and waste were reviewed. In his article, Hart recommends that when soliciting feedback for the purpose of improvement, questions should ask "what was done badly" rather than asking "what was done well." Also, questions should gauge the importance of improvement areas. This will ensure that effort is not put into improving a defect that is of little importance to overall project goals (Hart, 1997).

Lastly, information was reviewed to perform benchmarking of UNH's annual waste generation for a more quantitative understanding of how UNH's waste programs compare with other college campuses. The Sierra Club's annual "Ten Coolest Schools" (Sierra Club, 2013) competition results provided waste and recycling data from 162 colleges and universities, as well as campus population information used for meaningful comparisons.

Methodology

Assessing the current state of the campus waste and recycling programs required investigation of both the physical infrastructure as well as aspects such as user awareness and interaction with the program. The investigation began with the least obscure elements to be understood and reported. These elements include identifying what infrastructure is available and where, as well as how the infrastructure is meant to be used vs. how it is used in practice. Additionally, disseminated information that supports the specifics of infrastructure use was examined.

During the early stages of research, weekly meetings with members of the Facilities Department focused upon mapping the locations of infrastructure and discussing intended vs. actual use of infrastructure by campus members. Issues pertaining to user interactions with the infrastructure and related information dissemination methods were also discussed. The UNH Facilities Department was also able to provide specific data about the amount of MSW (in tons) and recycling (in tons) that the campus has hauled away each fiscal year. This data was used to benchmark UNH waste and recycling disposal against other universities.

In order to benchmark UNH's annual tonnages of MSW and recycling with those from the schools chosen for comparison, a full-time equivalent (FTE) representation was created for part-time staff, faculty, and students. All part-

time staff and faculty were converted to full-time equivalents using the conversion ratio of 1/3. Part-time students who do not reside on campus were also converted to FTE using this ratio. The only part-time campus members who were not converted to an FTE were part-time students who reside on campus.

Assessing the intangible aspects of the campus recycling and waste programs was more difficult. While it is easy enough to determine what is available in the form of waste and recycling receptacles, associated signage, and other disseminated information, it was not so straightforward determining how the users interact with and perceive these and other aspects of the programs. The Facilities Department was able to provide insight into areas of the programs that suffered the most from inefficiencies or miscommunication, but specifics as to why these occurred was less clear.

A survey was developed to better understand attitudes, beliefs, and behaviors of those using the UNH waste programs. The goal was to determine how users interact with the program infrastructure as well as how aware they are of the supporting information that is disseminated. Due to the fact that UNH was not disseminating much information about the specifics of recycling and waste disposal, the survey also had questions about what methods of information dissemination users would prefer. To better understand user interactions with the program, questions were developed to gauge overall user attitudes toward recycling in general, as well as user perception of the UNH programs.

Survey development was based upon literature review and discussion with the UNH Facilities Department about survey goals. Two rounds of draft surveys were sent to campus members who volunteered to provide feedback. The critiques by these volunteers were considered, and the survey was edited as appropriate. Additionally, the final survey version was submitted for review to the UNH IRB office. After analysis, the survey results will be used to understand what information campus members lack as well as preferred dissemination methods. In the meantime, this project worked to provide some basic information to campus members.

Given that there was not any information about the specifics of MSW or recycling on the UNH website, a main webpage for campus waste and recycling was created with support pages for providing more details. On the main webpage, a campus waste map, shown in figure 1, was posted. The map was created as part of this research project in coordination with the UNH Facilities Department to pictorially represent the main outdoor recycling and trash receptacle locations. These receptacles include recycling and trash dumpsters as well as recycling totes. The map creates viewer awareness about the availability of separate dumpsters on campus for recycling and trash. Many of these dumpsters have been found to be misused by students, faculty, and staff due to the fact that they look the same in every aspect except for relatively small labels attached to their front side.

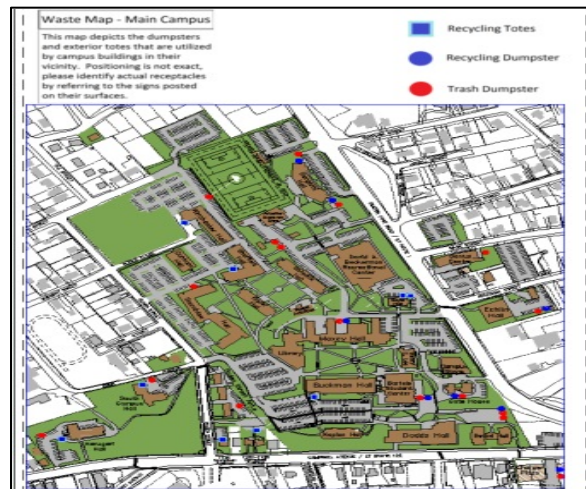


Figure 1: UNH Main Campus Waste Map

The UNH waste map was created by editing a regular campus map in AutoCAD. Once the AutoCAD waste map file was completed, coordination for having the map posted on the newly created UNH waste and recycling program webpage was carried out with the UNH marketing department. The UNH marketing department aided not only in loading the waste map, but also polishing text, photos, and other resources added to the newly created web pages. This text, photos, and other resources provide the necessary information a campus member may require to understand how to participate effectively in the campus waste and recycling programs. Contact information was also provided so that campus members could have unaddressed questions answered by the UNH Facilities Office. Once the survey results have been analyzed and reported to the UNH Facilities Department, the web pages can be updated to highlight some key results of the study.

As a part of this research project, work was also performed to update incorrect, inoperable, or out of date information/links found elsewhere on the UNH sustainability web pages. Keeping the web pages up-to-date helps to convey the importance of sustainability and its related programs on campus, as well as creating and maintaining confidence in the web pages as accurate sources of information.

Results and Discussion

This research project has produced some immediate results as well as initiating work that will continue to produce results in the coming semesters. One of the most important results of this project is the creation of communication and collaboration between different student, faculty, and staff organizations on campus with respect to the waste programs. Additionally, this project connected campus members with off-campus organizations focused upon waste reduction, recycling, and reuse.

One result of this collaboration is that current information has been posted on the UNH Sustainability web pages about the environmental student organizations that are active on campus. Out-of-date information was replaced with current contact information, meeting times and locations, as well as on-going and upcoming events. Additionally, steps were taken to ensure club information will continue to be monitored and updated as necessary.

Student leaders of environmental campus organizations were also invited to participate collaboratively with the UNH Facilities Department and UNH faculty on projects to improve campus recycling and waste programs. Joint projects carried out during the fall 2013 semester included:

- A cardboard capture and recycle event during UNH Move-In Day
- Recycling poster design and placement for dormitories
- Establishing a student recycling committee working to aid UNH Facilities in the collection of information that can help shape solutions to recycling issues within the dormitories
- Launch of UNH membership with the nonprofit organization PLAN, which works with student groups on campus waste reduction programs
- Design of storyboards by a freshman Sustainability Common Course class for a UNH recycling video

A UNH Facilities representative also attended a student organization meeting to engage directly with students about campus waste and recycling issues. Such collaborative work is and will continue to be pivotal to UNH waste and recycling program success. After several joint meetings between UNH students, staff from the UNH Facilities Department, and faculty, action was taken by

Facilities to more clearly distinguish recycling dumpsters from trash dumpsters with better labels.

Other results include the benchmarking of UNH's waste program compared to the Sierra Club's "Top Ten Coolest Schools." Graphs depicting the benchmarking are shown in Figures 2 and 3 below, and are based upon the amount of material UNH disposed as either SSR or MSW in FY 2012. The Facilities Department worked with All American Waste to provide the tonnages of trash and recycling for FY 2011, 2012, and 2013. From this data, it was found that UNH had a recycling rate of approximately 8.7% for FY 2011, 9.3% for FY 2012, and 9.4% for FY 2013. This recycling rate includes only those items recycled in the SSR program. If materials recycled as part of construction /demolition and bulk waste were counted, the recycling rate would be nearly double. Benchmarking of UNH MSW and recycling tonnages compared to the Sierra Club's 'Ten Coolest Schools' revealed, as shown in Figure 2, that UNH had a *tons of MSW to tons of SSR* ratio of 1.0:0.1 for FY 2012. This translates to a 9% recycling rate, as shown in Figure 3. UNH had the lowest recycling rate when compared with the Sierra Club's "Top Ten Coolest Schools," but only trailed the Georgia Institute of Technology by approximately 5%. This benchmarking reveals that both UCONN and UNH have recycling rates under the 26% average statewide rate for Connecticut (combined recycling and compost rates), as reported by the Connecticut Department of Energy and Environmental Protection (DEEP) (CT DEEP, 2013). However, UCONN comes close to this state average rate of recycling with a rate of about 19%, demonstrating that achieving such a recycling rate is feasible for a university operating in the climate of Connecticut's specific laws and regulations as well as state waste infrastructure, markets, and culture.

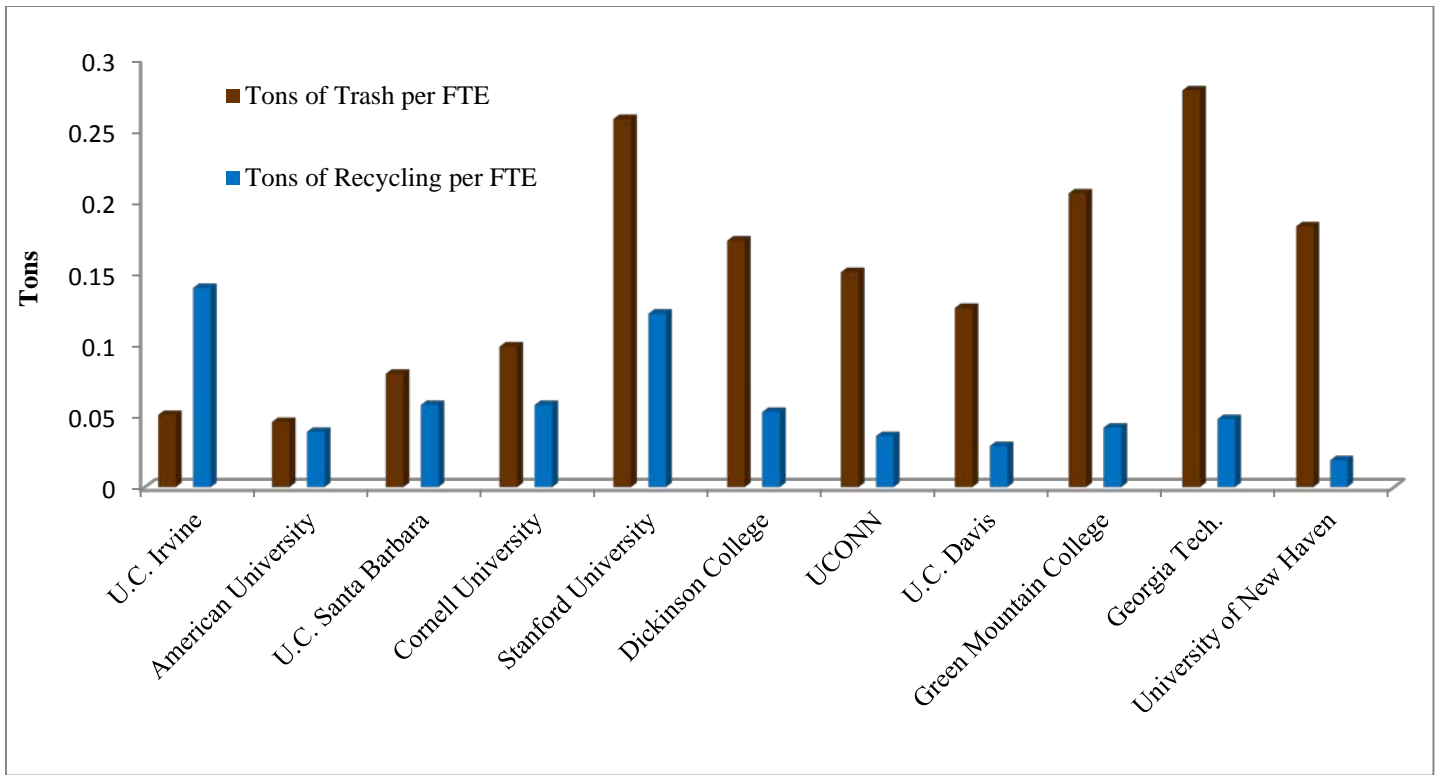


Figure 1: Waste per FTE for the University of New Haven in Comparison with the Sierra Club’s 2013 “Ten Coolest Schools.”

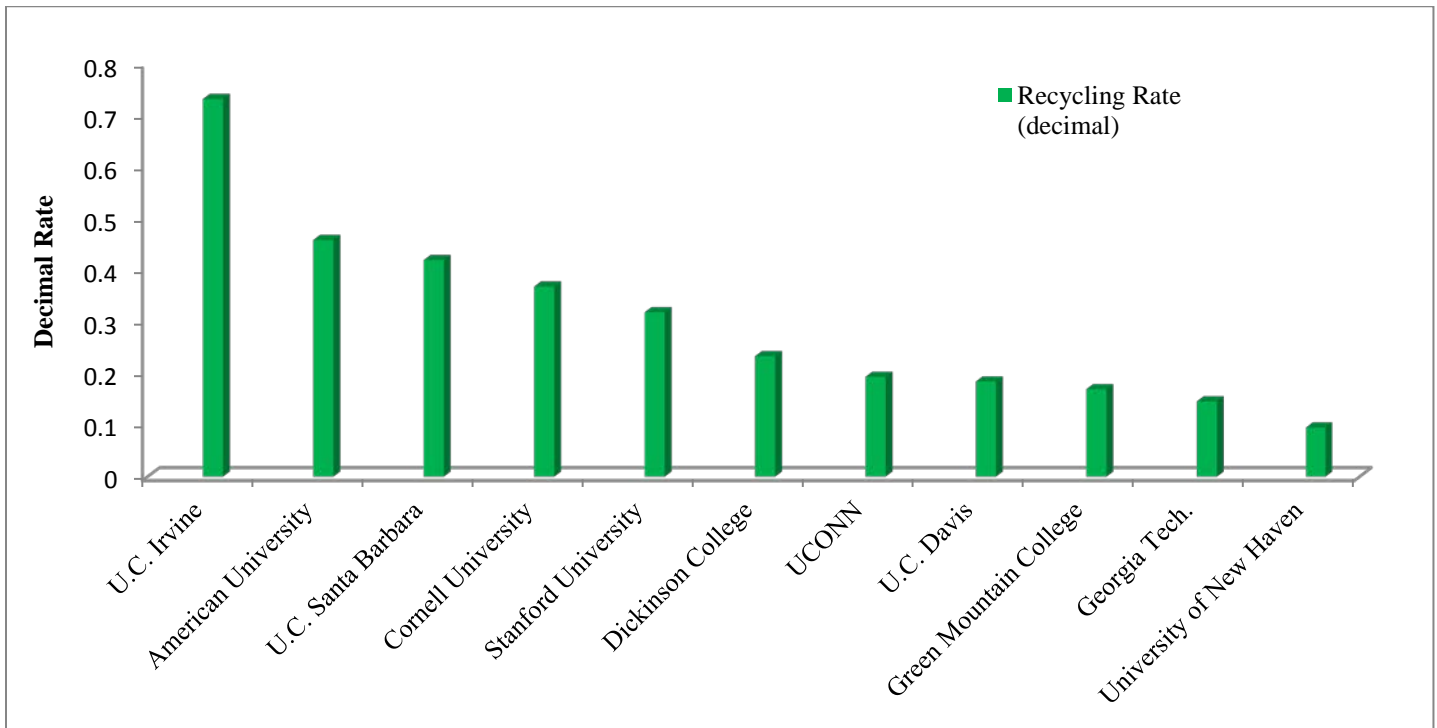


Figure 2: Recycling Rate of the University of New Haven in Comparison with the Sierra Club’s 2013 “Top Ten Coolest Schools.”

The survey created for this project was released to UNH faculty, staff, and students via email. After two weeks, more than 500 survey responses were collected. Statistical analysis of the survey results will be carried out as a continuation of this project, and the final report will provide suggested courses of action for program improvement. Results from the survey will also continue to inform the design of the UNH Waste and Recycling Program webpages that were created during this project. These pages are currently having their content polished by the UNH Marketing Department for publication.

Project Continuation and Recommendations

Due to the in-depth nature of thorough analysis, a separate project has been planned for the spring semester of 2014 in order to create a report based upon the survey results. This report will be presented to the UNH Facilities Department, providing useful information for continuing effective program improvements. Furthermore, the strategy of re-running the same survey again in the future has been discussed. Comparing results of the two survey periods would provide feedback about the effect of any implemented changes to the campus waste programs.

More thorough benchmarking of UNH's sustainability profile is possible with the use of AASHE's STARS tracking software. An annual membership was purchased for AASHE this year, which provides access to some basic STARS software features. These features should be investigated and consideration should be made about investing in the purchase of full software access. It is the recommendation of this project that UNH re-establish its campus-wide Sustainability Committee so that opportunities and projects, such as the use of AASHE's STARS software, can be pursued with vigor and continuity.

Citations

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Biography Jessica Zielinski is a junior majoring in Sustainability Studies at UNH. She plans to enter the field of urban sustainability upon graduation and may pursue graduate studies. Jessica was awarded an EPA Research Fellowship, which will support her research for the next two years, to include a summer internship with the EPA in 2014. She looks forward to working in the coming years to help create more harmony between humanity and their biosphere.

