



## **ZERO WASTE FOOTBALL INITIATIVE: SCOTT STADIUM**

### **Waste Quantification**

Global Sustainability, Fall 2011

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Community Partner: Jess Wanger, UVA Sustainability

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## **ABSTRACT**

The Waste Quantification team set out to provide a rough empirical analysis of the waste flow leaving Scott Stadium on a typical game day. With this information, future Zero-Waste Football initiative teams will be able to make further analyses or create a detailed argument for the benefits and feasibility of shifting the stadium towards zero waste. We began by speaking with experts in the fields of recycling and composting. Sonny Beale at UVA Recycling and Craig Coker, a consultant for various Virginia composting companies, provided us with valuable help on what data would be useful to acquire for our analysis as well as how to acquire it. We ultimately planned on performing a waste audit at the UVA-Duke game, which we believed would be a good representation of an average attendance football game. We contacted Jason Bauman in the UVA Athletics Facilities Department, who along with Eric Dadmun, of the same department, helped us work out the logistics. Eric gave us a tour of the stadium before the game and arranged to meet with us to show us where we could sample trash from on game day and to let us in to the locker room to sample there. Jess Wenger and John Clark at UVA recycling also arranged trash totes for us at the stadium where we could store the trash. On game day we followed a plan of sampling that would pull samples from an accurate cross section of the stadium. We executed this plan, storing trash in the totes during the game and overnight. The next day UVA Recycling moved the totes for us to the UVA Recycling facilities. There we analyzed the samples' contents visually and empirically by mass, and by volume.

This information was then compiled into graphs and charts from which we have drawn conclusions outlined in the body of our Final Report.

## **INTRODUCTION**

In a world where almost all environmental problems (aquifer depletion, resource depletion, a shrinking ozone layer, pollution) stem from over-consumption, everything must be done to reduce the amount and impact of the resulting waste. Our project, Zero-Waste Football, addresses a specific concern with the problem of over-consumption right here at the University of Virginia. When gathering on a periodic basis at college football games, people tend to consume in an especially unsustainable way, utilizing cheap, disposable paper and petroleum products. Under Scott Stadium's current waste program, the garbage resulting from football events is transported from University grounds to nearby landfills after each game. The unsustainable waste program followed by Scott Stadium also has implications in energy use and pollution. The goal of the Zero-Waste Football Initiative is to reduce Scott Stadium's impact on the environment by diverting all waste from landfills through the conversion of what would be trash into compostable or recyclable materials. To do this, we must first have real time data on the waste produced specifically by Scott Stadium to create a solution fitted to its needs. This data will also help us predict the feasibility of such a conversion and ultimately aid in a successful execution of the initiative.

Beyond a basic value for the weight of garbage generated, we originally had little knowledge of its composition. Our team, Waste Quantification, sought to produce this missing yet crucial data. Our goal was to collect the data on the relative percentage of the different components of the waste produced at Scott Stadium. This includes trash and already existing compostables and recyclables. Understanding the components of the waste helps us gauge the amount of landfill waste that could already be composted or recycled and provides us with a profile of the products that must be converted or removed to achieve a Zero-Waste system. The proportions of the different components have financial implications in the conversion to recyclable or compostable products and affect how a new system of recycling and composting will need to be structured on site. In having an in-depth knowledge of the current waste produced at Scott Stadium, the Initiative may determine how viable or successful different courses of action will be, and as a result, better convince the student body, alumni, and administration of the benefits of a Zero Waste Football Program.

## **BODY**

### **Planning**

Before detailing the events of our waste audit, it might be pertinent to explain why we came to the decision to perform a waste audit in the first place. There were not very many alternatives to this option that our group could think of. One option was to simply look at the amounts of waste produced by other stadiums and extrapolate from their data for Scott Stadium. This was a bad idea not only because extrapolating can lead to unrepresentative data but it would also be difficult to find data for many other stadiums. Other options included performing waste audits of smaller events like soccer games but the consensus was that a waste audit of an actual game in Scott Stadium would be the only way to obtain a truly accurate representation of the waste content from U.Va. Football. One more important point to make is that our study cannot cover the entire range of U.Va. Football. If it did, we would have to analyze all of the tailgates, waste from the teams outside of the locker room, and waste from the maintenance of the grass turf.

Original plans looked at performing the audit at both the Georgia Tech game and the North Carolina State game. The Georgia Tech game turned out to be unfeasible because most of our community partners were occupied with the Gameday Challenge that attempted to measure various aspects of our stadium's waste and recycling amounts. Having not been able to use the Georgia Tech game, we did not have enough time to notify the community partners again for the N.C. State game the following Saturday. We were lucky enough to have enough time to plan for the Duke game Saturday November 12th. Our partners were helpful with the logistics of the audit. John Clark, a partner in U.Va. Recycling, was able to gather five plastic toter bins and set them aside for us inside the stadium. Eric Dadmun, an intern in Scott Stadium, offered to give a stadium tour to members of the Zero-Waste Football group on the Friday before the Duke game. Three members attended, including Scott Glassman from our group, Waste Quantification. Eric was very helpful in explaining the setup of trash bins throughout the stadium and the process by which they were removed by event staff. The stadium tour also allowed us to obtain an estimate on the number of trash and recycling bins on all levels of the stadium.

We considered what our ultimate goal was. We needed to find information that would be relevant to Zero-Waste Football in the future, enabling project members to form an affective argument to convince the University to make a change. ZWF can research and plan all that it wants, but UVA and UVA athletics have the power and choice to make a change. They will be bankrolling any efforts to physically change the Stadium's practices. We quickly realized we would need outside experts to help us determine what was important. We spoke with Sonny Beale at UVA Recycling and Craig Coker who consults composting firms around Virginia. Through email correspondence with them, we determined what information could be gleaned from a waste audit and how best to perform the audit. We needed to sample a cross-section of the full stadium and across the game's time period. To that end we determined to pull bags in the following quantities from various sources:

<b>Primary Source</b>	<b>Secondary Source</b>	<b>Time Pulled</b>	<b># of bags</b>
Vendor	Outfront		2
	Behind the Counter		2
	Suites		2
General Trash Cans	Main Concourse	Pre-game	2

		Mid-game	2
		Post-game	2
	Gates	Pre-game	2
		Mid-game	2
		Post-game	2
Football Team	Locker room	TBD by access	TBD by access
	On the field	TBD by access	2
Post-game recycling efforts	Stands	Post-game	2

The viable sources came from correspondence with Jason Bauman at UVA Athletics Facilities and from Craig Coker who was familiar with the Stadium and an expert on composting.

We then thought about what metrics we should acquire from the waste. This information was synthesized from emails with Mr. Coker and Mr. Beale. We needed figures on organic material versus inorganic material. We also looked at the individual break down for further information on recycling. We were originally advised to make weighted measurements on food versus paper for composting. Inorganic material should be divided into glass, metal, plastic, and trash. Glass and metal proved immaterial. What little metal we found was put into the recycling category and was almost entirely from vendor's cans. Glass is not allowed in the stadium and was a non-issue. They recommended we also make visual observations within those categories. Both volume and weight needed to be measured for use by composting companies and recycling.

In summary, the previous paragraphs represent our plan going into the waste audit.

## **Execution**

We were very fortunate that the weather on the day of the Duke game was very nice and the crowd was an estimated 40,000 to 45,000 (capacity is approximately 62,000). This helped with our data because we did not want an overly small or large attendance that would skew the numbers. We arrived at the stadium half an hour before the game so that we could meet Eric Dadmun and see the location of the totes. Also, it was important that we pull trash bags from the main sections of the stadium at the time of kickoff because this is consistent with the schedule of the event staff. Eric had responsibilities to perform throughout the game, but we did make plans to meet him at the end of halftime so that we could have access to the locker room. Once Eric left us, we actually split up ourselves. There was no reason for everyone to follow each other to pull trash bags so we simply assigned each other different areas to cover. All three members went their separate ways collecting bags but all reconvened with Eric after halftime. At the time Eric took us into the locker room, none of us quite realized how fortunate we were to have access to the room and to take away the trash from inside it. John Clark remarked to us the next day that when he had tried to evaluate the trash situation in the locker room, he had been denied access for reasons of "superstition." With Eric, however, we came away with two full bags of the three their for auditing. The second half of the game proceeded

much like the first with everyone pulling bags from separately assigned areas and depositing them in the plastic totes.

The next morning at 6a.m, John Clark and a group from U.Va. Recycling generously transported the five totes from the stadium to the U.Va. Recycling facility off Alderman Road. Our members showed up at 10a.m. with two other volunteers to help sort through the trash. John Clark met us and also supplied all the necessary materials: scale, gloves, tarp, and extra bags. The site for sorting through the trash was the parking lot right next to the U.Va. Recycling building and warehouse. The first task was to measure the total weight of each bag and to record its weight with the title of the location it came from and a time estimate. There was no dispute over this initial approach. The next step however, was not so clear. There were several options although each option rested on the principal that waste would be divided into recyclables, paper, food and trash. One option was to sort through each bag individually and find the sub-weights for all seventeen bags transported from the stadium. This would have been tedious and misleading if, for example, one of the bags happened to have a very high concentration of paper relative to the others. Another option was to open all bags and find the four sub-weights for the lump-sum of waste that was transferred from the stadium. This would not be very helpful because it wouldn't give any insight as to how waste content varied from one section of the stadium to another. The final decision was to group the bags by their original locations in the stadium and in some cases by time pulled, and find the percentages for each location. Most of the bags came from the main concourses, and this location was divided into an early and late sub-category to reflect changes over time during the game. Our separate divisions were locker room, main section, upper level, gates, vendor, bathroom, and recycling. In addition to looking at weight, we also roughly estimated the volumes of each bag before and after sorting. Volume plays an important role in waste disposal, recycling, and composting because of transportation costs. Unfortunately, a visual estimate of volume as a fraction of total bag size was the best method we could come up with.

Once we determined our method, the rest was literally the "dirty work." For each original location of trash (gates, main area, etc.) we opened up four new liners and assigned each one to recyclables, paper, food and trash. Some of us held open the new bags, others bravely rooted through day old stadium waste to filter one type of waste from the rest. A lot of the waste was very easy to classify. For example, an empty plastic Pepsi product is recyclable without a doubt. However, what if the bottle was half full of liquid? Should it remain inside the bottle or be poured out to count as "food?" Our partner who started the ZWF project, Ashley Badesch, was most helpful with answering these kinds of questions. She informed us that a recycling company would record their weight based on whatever was inside a recyclable bottle, therefore we should do the same. She was also very helpful in identifying whether a certain item was recyclable or not. Other "gray" areas we encountered were situations like soaked napkins (paper soaked in "food") or nacho trays with cheese leftover (recyclable with leftover food). Usually we let the food "ride" with whatever item it found. In fact, sometimes we did not need a new food bag; we simply took what was leftover in the stadium bag after recyclables, paper, and trash had been removed.

Once the waste had been sorted, each bag with its own category of waste was measured. The weight of the bags was considered negligible throughout the course of this project. We recorded the weight of all four waste categories for all seven of our locations, even though not every location had all four types of waste. For example, the bathroom trash bag had 100% paper waste. Once we recorded all the categorized weights, our fieldwork was essentially complete. We tied up all our new bags and left them behind, keeping recyclables separate for UVA Recycling. Truth be told, this was nothing more than a project cleanup. However, our small effort to recycle speaks to the entire purpose of this project, a purpose rooted in minimizing waste whether we are at home, at a football game, or doing a class project.

## CONCLUSIONS

### Raw Data

Table 1. General Information on all bags pulled and estimated total waste production for Scott Stadium during the Duke game.

Source		Weight (lbs.)	Volume (fraction of bag full)	Density (lbs/bag)	Time Pulled	Number of Bins	Number of Times Pulled	Average Bag Weight (lbs.)	Calculated Total Weight from Source (lbs.)
Locker Room- Trash bins	1	20.00	1.00	20.00	End Halftime	6	1	18.5	111
	2	17.00	1.00	17.00	End Halftime				
	Total Weight	37.00	2.00	18.50					
Main Area Lower Level- Recycling Bins	1	4.01	0.66	6.08	5:31pm	24	1	3.71	89.04
	2	3.41	0.20	17.05	5:31pm				
	Total Weight	7.42	0.86	8.63					
Main Area Lower Level Early- Trash Bins	1	7.41	0.50	14.82	Early-Game	70	3	7.7	1617
	2	8	0.5	16	Early-Game				
	Total Weight	15.41	1.00	15.41					
Coca Vendor- Trash Bin	1	6.61	1.00	6.61	3rd Quarter	16	1	6.61	105.76
	Total Weight	6.61	1.00	6.61					
Main Area Lower Level Mid- Game- Trash Bins	1	16.80	1.00	16.80	Mid-Game	70	4	8	2240
	2	6.20	0.33	18.79	Mid-Game				
	3	7.60	0.66	11.52	Mid-Game				
	4	3.01	0.25	12.04	Mid-Game				
	5	6.40	1.00	6.40	Mid-Game				
	Total Weight	40.01	3.24	12.35					
Upper Level-	1	3.60	0.33	10.91	After Halftime	20	1	2.6	52



Trash Bins	2	1.60	0.20	8.00	After Halftime				
	Total Weight	5.20	0.53	9.81					
Main Gates- Trash Bins	1	3.20	0.66	4.85	Game Start	8	7	3.6	201.6
	2	4.00	0.50	8.00	4:08pm				
	Total Weight	7.20	0.56	12.80					
Men's Bath- Trash Bin	1	11.21	1.00	11.21					
*bag bigger than normal, very full	Total Weight	11.21	1.00	11.21					
Total Estimated Stadium Waste of the Duke Game (lbs.)			4416.4						

Table 2. Breakdown of waste components and their sources.

Source	Component				Total Weight of Bag(s) (lbs.)
	Food	Paper	Recyclables	Trash	
<b>Locker Room- Trash bins</b>					
Component Weight (lbs.)	2.41	3.40	26.40	5.20	37.41
Percent of total weight of bag	6.44%	9.09%	70.57%	13.90%	
<b>Main Area Lower Level- Recycling Bins</b>					
Component Weight (lbs.)	0	0	6.20	0.40	6.60
Percent of total weight of bag	0%	0%	93.94%	6.06%	
<b>Main Area Lower Level Early- Trash Bins</b>					
Component Weight (lbs.)	8.00	4.40	1.01	2.01	15.42
Percent of total weight of bag	51.88%	28.53%	6.55%	13.04%	
<b>Coca Vendor- Trash Bin</b>					
Component Weight (lbs.)	0	0	5.40	1.20	6.60
Percent of total weight of bag	0%	0%	81.82%	18.18%	
<b>Main Area Lower Level Mid-Game- Trash Bins</b>					
Component Weight (lbs.)	16.20	9.80	8.40	5.20	39.60
Percent of total weight of bag	40.91%	24.75%	21.21%	13.13%	
<b>Upper Level- Trash Bins</b>					
Component Weight (lbs.)	1.20	1.80	1.00	1.20	5.20
Percent of total weight of bag	23.08%	34.62%	19.23%	23.08%	
<b>Main Gates- Trash Bins</b>					
Component Weight (lbs.)	3.40	1.20	1.40	0.80	6.80
Percent of total weight of bag	50.00%	17.65%	20.59%	11.76%	
<b>Bathroom</b>					
Component Weight (lbs.)	0	0	0	11.21	11.21
Percent of total weight of bag	0%	0%	0	100.00%	

Figure 1.

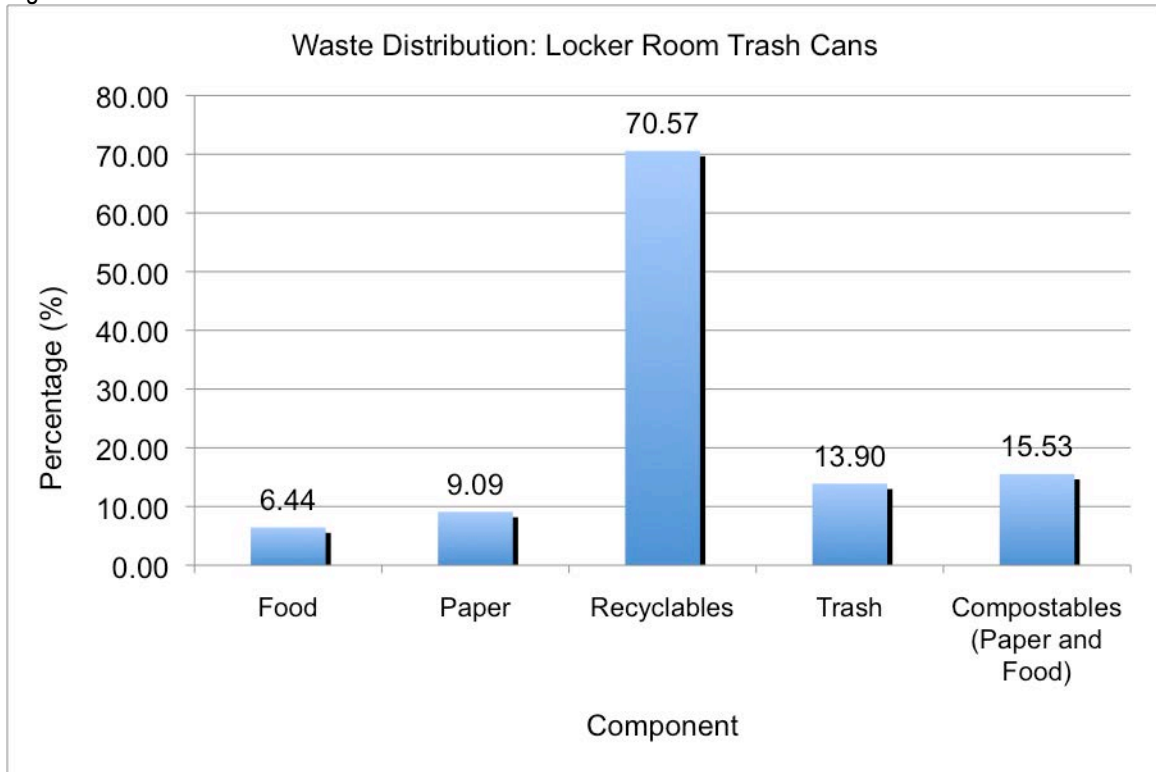


Figure 2.



Figure 3.

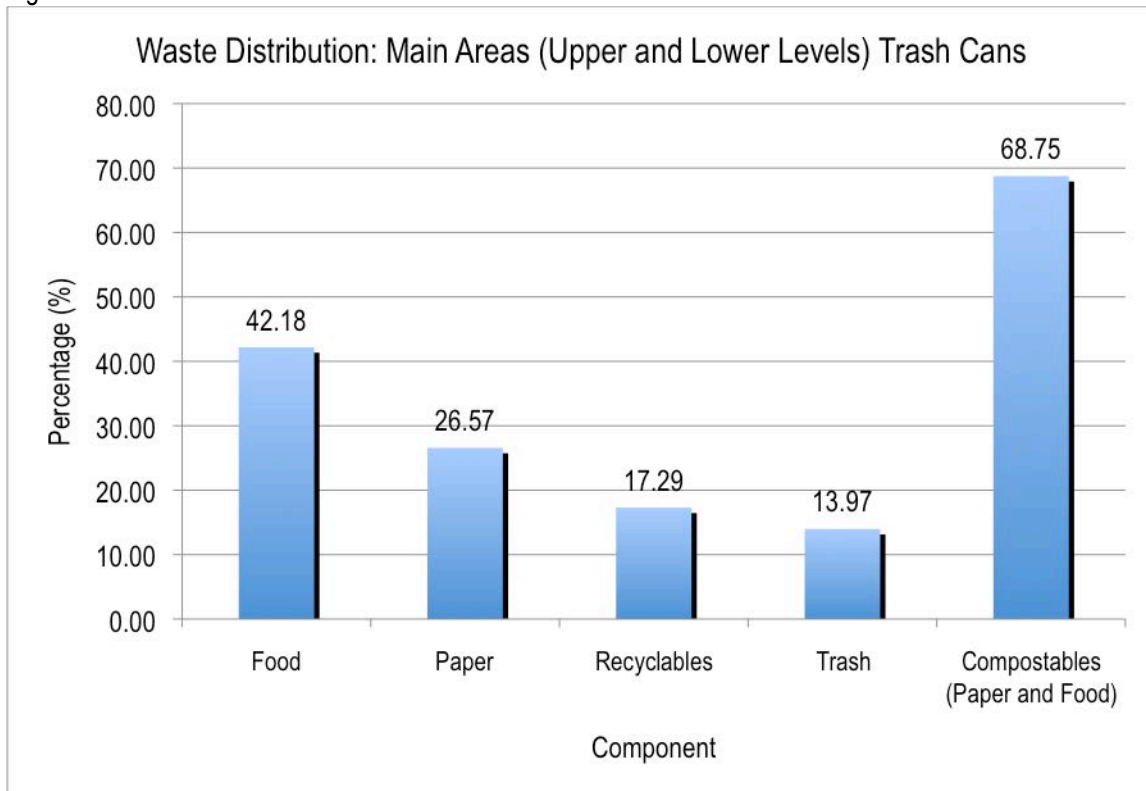


Figure 4.

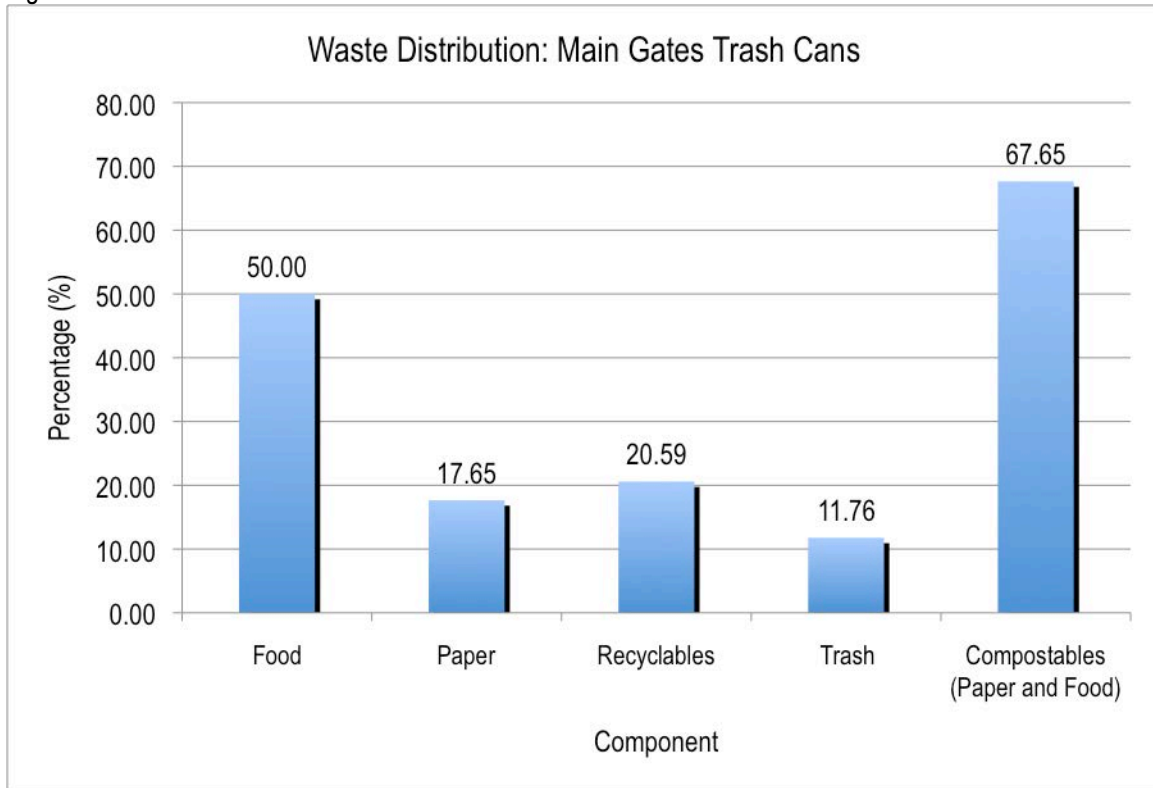


Figure 5.



Figure 6.

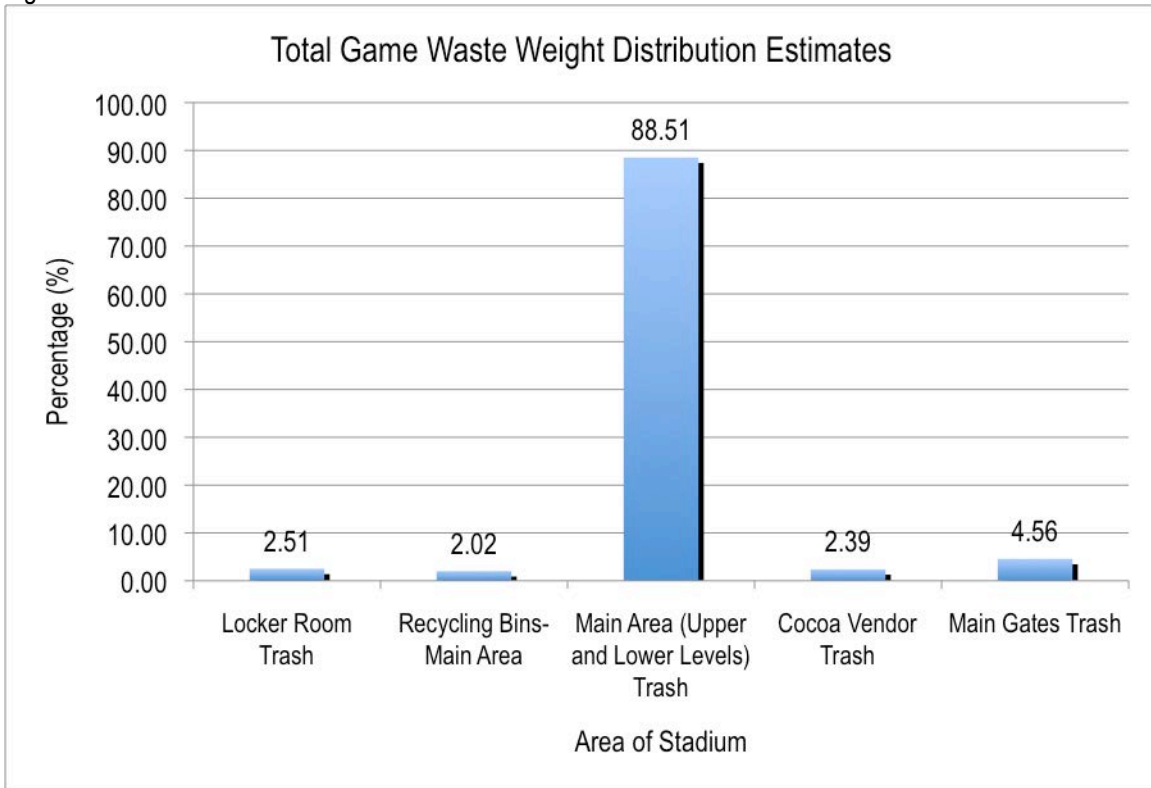
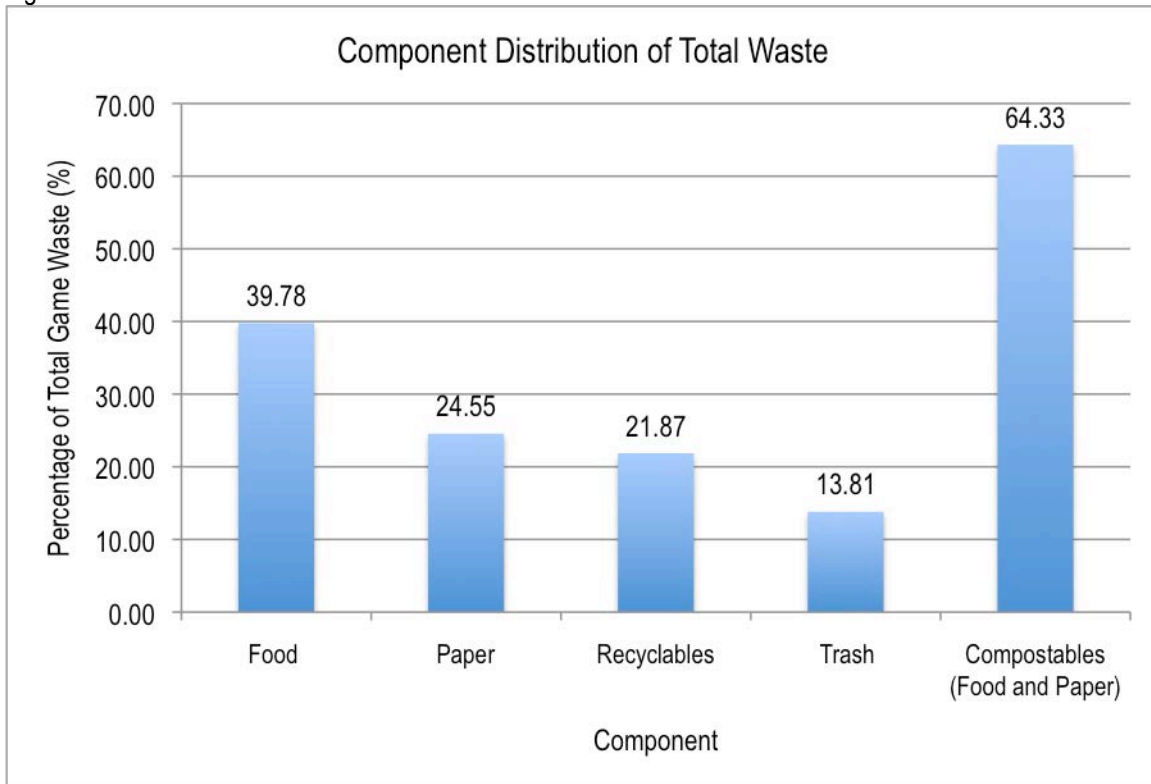


Figure 7.



## Data Analysis

The data presented above may seem to be a bunch of tables, numbers, and bars but they are actually quite telling. In assessing content of trash from Scott Stadium, it is best to first zoom way out and look at the big picture. Your first question is most likely this: How much waste does the stadium produce per game? We do have a number from our sampling and analysis: 4416 pounds. However, this number must be viewed only as an estimate and not an infallible reference. The estimate lies in the fact that not all trash bags are equal and trash bags are not pulled according to an organized timeline throughout the game. Let's move away from the actual number and toward the percentages within the number (see Figure 7). Of the entire body of waste from Scott Stadium during a game, we estimated that only 13.81% of the content was trash. By trash, we mean junk that cannot be recycled or composted with current available methods. Compostables include paper and food waste. This means that the other 86.19% can either be recycled or composted! This is even before considering product conversion where some items that were once considered trash will eventually be counted elsewhere. The 86.17% is the potential landfill diversion that would ensue if Scott Stadium were to employ practices that separated waste into appropriate containers for disposal. This is very close in percentage to the 90% landfill diversion that Folsom Field (University of Colorado at Boulder) achieved through their Waste Initiative.

One of the most glaring, almost contradictory statistics is the fact that the recycling bag (see Figure 2) was not comprised entirely of recyclable materials. It contained six percent trash, meaning somehow or somehow, fans failed to properly dispose of their trash. The recycling bins occur in barrel looking trashcans paired with another barrel designated for trash. Both have signs clearly showing which barrel should receive which material. While we do not like the idea of recyclables ending up in the trash side, we understand that this will not throw off the process of ridding the waste at a landfill. However, disposing of trash in the recycling bin creates a burden of sorting for whoever receives the recycling after the game. This flaw should be one of the first to be addressed in striving for Zero-Waste football.

Another striking statistic is the unusually high content of recyclables for waste from the locker rooms (see Figure 1). The explanation is quite simple: the teams drink lots of fluids from plastic bottles and throw away the bottle and whatever is left in it. While it is not the team's responsibility to actively reduce the waste content of the locker room, facilities management should easily pick up on this trend. If over 70% of the mass of locker room waste (and probably more by volume) is recyclables, then facilities management should have good reason to provide recycling containers for the locker rooms of both teams. Even if the portion of total stadium waste coming from the locker room is only 2.51%, management should still ingrain a principle of waste minimization to the one reason people come to the game: football players.

## **PAST AND FUTURE**

### **Challenges**

From the outset we faced barriers of communication that complicated the process. There were many different organizations involved in the early stages. We communicated with UVA Recycling, UVA Sustainability, UVA Athletics Facilities, as well as local composting services. Through these communications we established a plan, but this was made complicated by the number of contacts we made.

It was difficult to stay on target and to synthesize so many information sources into a plan of action. Further barriers included the bureaucracy within the UVA Athletics Department. This is not to say we faced any great trouble or resistance from the organization which was of great assistance to us, however, our communications were often bounced around from person to person.

Other barriers included being the smallest group with the job that arguably required the most manpower in sorting through trash. We attempted to resolve this by asking for help from peers within the Global Sustainability class. Fortunately, we received some help from Ashley Badesch who originally started ZWF and from friends.

The primary barrier we faced in the process of auditing was that the waste stream of Scott Stadium was not so ideal as we imagined. We faced the following complications that added confusion to our general plan. We have included recommendations for future ZWF initiative members within this framework.

- Trash bags were pulled and replaced by custodians at a faster rate than we expected and were often not even half full when pulled. For this reason it was hard to find full bags which is what we based our plan on.
- The recycling was pulled infrequently and was hardly ever more than  $\frac{1}{4}$  full.
- It was difficult communicating with so many different people from various organizations at the same time. We should have met in person more often with our community partners and collaborators. This may have expedited the process.

### **Mistakes**

- We initially wanted to audit two football games as a way of providing more data with less variability; however, we could not make arrangements in sufficient time. In the future, should ZWF want to perform more audits, performing them on more than one game would be beneficial. This illustrates how crucial it is to begin talking with community partners and collaborators early in the process.
- While it only took us a few hours to sort through the samples and measure their contents, more volunteers would have been helpful. At the least, the foreknowledge that we would have more people helping us would have enabled us to take even more samples. As it were, we filled all of our totes and sampled as much as we could within reason.
- We did not have a camera with us when we sorted the trash. In hindsight one of us should have left and returned with one, but we had volunteers with us from outside of our group and wanted to keep up the momentum. Because we did not have a camera we have no visual aids for documentation and explanation, but more importantly we have only our own written observations for visual analysis of samples.
- Our schedules precluded us from being able to obtain sample's from "post game recycling efforts" of student groups who comb the stands for recyclables after the game. This information would be relevant as part of the Scott Stadium waste stream.



## **Recommendations**

The primary actions we would take differently in the future are the following:

- In order to achieve greater accuracy in our data and remove variability
  - Sample more bags in light of the fact that they are seldom full.
  - Find a more accurate way to perform volumetric analysis than visually.
  - Map out and time stamp the samples we take with greater accuracy. We identified rough times and categorized location in the stadium, but this documentation could have been in greater depth.
  - Sample two games- one well-attended and one little-attended
- Gather more volunteers to make the sorting go faster and enable us to plan on sorting more from the outset.
- Take pictures as a documentation of both process and sample content.

Ultimately, we did not achieve an audit quite so extensive or accurate as we originally planned. We encourage project members in the future to follow our suggestions if another audit is performed.

## **APPENDICES**

### **Bibliography**

Badesch, Ashley; Boegner, Matt. "Zero-Waste Football" 2010. Slide 3. *Microsoft PowerPoint* file

### **Bill of Materials**

We were fortunate to be able to borrow all necessary tools from UVA Recycling. No costs were incurred while performing this waste audit. The following resources were used.

- electronic scale
- gloves
- tarp
- trash toters
- trash bags
- location (UVA Recycling facility)
- Volunteers

### **Relevant Email Correspondence**

The following are excerpts of conversations considered relevant enough to be included:

SENT OCTOBER 5

Mr. Sonny Beale,

My name is Jackson Bewley and I am a student working with the Zero-Waste Football initiative. Our job within the project is to perform a waste audit of Scott Stadium to quantify its waste stream. This information will be used in formulating an argument to present to the Athletics Department and University.

We are beginning to get into the concrete portion of our work and are seeking advice on how to go about this. We believe that the most important information to find is the percent composition of the waste stream broken down by recyclable, compostable food matter, other compostable waste, municipal solid waste, etc. We will calculate this percentage by weight. Our rough plan at the moment is to randomly sample trash receptacles from two separate games. We do not yet know how to sample the waste from the food vendors for example or the waste produced through the activities of the football team. We are waiting to hear from Jason Bauman at Scott Stadium as to how to do this as well as waiting for information from [Craig Croker](#) at Royal Oaks Farm on what is needed to begin a composting plan.

We would appreciate any input you may have as to how we should go about performing our waste audit. We have also heard that a University-wide waste audit is in the works and wondered if that would have any relevance to our own work?

Thank you for your time,

Jackson Bewley

cc: Community Partner Jeff Wenger, TA Thomas Gibbons, and group members Gabrielle Falcon and Scott Glassman

RECEIVED OCTOBER 6

Jackson,

It sounds as if you have covered most of the bases in your research. Sampling materials from the gates from 2 games is a great start. You may also want to check with ARAMARK as they are the primary vending source for the Stadium and other locations. I'm more than happy to sit and discuss / answer question that you may have and share our experiences and findings with you. we have tentatively schedule a complete waste audit with our recycling and waste contractors for the second week in November. This will not involve a home game. There are many components to a home football game; load-in, setup, preparation by vendors, tailgating, the game itself and cleanup afterwards. Mike Stroud may be another contact in you quest to discover the waste / recycling from pre-game through post game from locker rooms and the contractor(s) that clean the facility following the game.

Let me know if you would like to get together sometime to further discuss you part of the project.

"... as we strive to make the UVA and the Health System the most environmentally sound operation in the area."

P Think of the environment, please don't print this e-mail unless you really need to!

Sonny

RECEIVED OCTOBER 20

Jackson,

Please see response below to your questions.

"... as we strive to make the UVA and the Health System the most environmentally sound operation in the area."

P Think of the environment, please don't print this e-mail unless you really need to!

Sonny

**From:** Jackson Bewley [mailto:[rjb2ay@virginia.edu](mailto:rjb2ay@virginia.edu)]

**Sent:** Wednesday, October 19, 2011 2:20 AM

**To:** Beale, Bruce (bcb8s)

**Cc:** Gibbons, Thomas (tsg7ph); Wenger, Jessica (jsw6d); Glassman, Scott (sgg5dg); Falcon, Gabriella (gmf3t)

**Subject:** Re: Zero-Waste Football: Scott Stadium waste audit

Sonny,

Thank you for your response; it was very helpful. We just have a few more questions.

Do you think that there are any particular pieces of information we should go after with our audits? How much waste is collected by contractors and disposed? How much is sent to a reclamation center (i.e. van der Linde Recycling), out of this how much, by volume or weight, is reclaimed for recycling, how much is sent to waste-to-energy; what amount, by volume or weight, goes to land fill?

Or any particular method of sorting trash?

As mentioned above in question 1.

Does any of the waste from the stadium go through UVA recycling at the present?

Yes, we collect cardboard and plastics, metal and glass from each game. Depending on opponent, attendance and weather conditions, we'll collect between 30 and 130 cubic yards for recycling associated with each home football game.

SENT OCTOBER 28

Mr. Beale,

Thank you for your response. We now have a concrete plan we are working with facilities at the Stadium on. We have a list of things we will need to perform the audit and wondered if we could borrow any of them from UVA Recycling since we know that you have performed waste audits in the past. If you have any suggestion on how to get any of these items, we would appreciate it.

- Gloves
- Transportation for waste
- Hose/Water Access
- Tarps
- Scale
- An offsite location

Thanks for your time,

Jackson Bewley

RECEIVED OCTOBER 28

Hey Jackson,

Sorry for the delay - so, I wanted to just email you and the group offline from others. Is any of this about cash?

Looks like Jess and Sonny can hook you all up with what you might need, but keep me in the loop. I don't know anything about a class budget, but if you can't get what you need and might need to purchase something - let me know and I can see what Carla / Phoebe say.

Again, perhaps not what you were getting at with the email and not even sure if it would be possible, but keep me updated.

Thanks,  
Tom

--

Tom Gibbons

UVa - M.Arch Candidate 2013

Master of Environmental Mgmt - Yale University F&ES - 2010

[tsg7ph@virginia.edu](mailto:tsg7ph@virginia.edu)

SENT OCTOBER 20

Mr. Craig Coker,

My name is Scott Glassman and I am a student at UVA working with the Zero-Waste Football initiative. The project goal is to move Scott Stadium toward producing zero non-recyclable, non-compostable waste. Our job within the project is to perform a waste audit of Scott Stadium to quantify its waste stream. This information will be used in formulating an argument to present to the Athletics Department and University.

We are beginning to get into the concrete portion of our work and are seeking advice on how to go about this. We believe that the most important information to find is the percent composition of the waste stream broken down by recyclable, compostable food matter, other compostable waste, municipal solid waste, etc. We will calculate this percentage by weight. Our rough plan at the moment is to randomly sample trash receptacles from two separate football games. We do not yet know how to sample the waste from the food vendors for example or the waste produced through the activities of the football team.

We were given your name as a contact that may be able to help us. If you have time, we would greatly appreciate your input on how to go about our waste audit and more importantly, what information is most significant to composting. If you have time, we would appreciate your input on the following.

- As someone who has worked with a variety of composting operations, what do you think is the most important piece of information that we should gain from the waste audit? ·

- Do we need to know the variety of types of organic material (pizza vs. chicken vs. napkins) or just the quantity? ·

- Do you have any advice or lessons learned from previous waste audits that might aid us in running our audit effectively?

- Do you have any suggestions on how to quantify the waste of the food vendors as compared to the waste items from the fans?

We would appreciate any input you may have as to how we should go about performing our waste audit as well as any contacts who might be beneficial to us.

Thank you for your time,

Scott Glassman

cc: Community Partner Jess Wenger, TA Thomas Gibbons, and group members Gabrielle Falcon and Jackson Bewley

RECEIVED OCTOBER 21

Scott:

I'm happy to help. To answer your questions:

1. what do you think is the most important piece of information that we should gain from the waste audit?

*The average weight in pounds and bulk density (lbs/cf or lbs/cy) of compostables from the entire stadium and from particular points of generation (i.e. suites vs. food service vendors vs. general trashcans scattered about the stadium). This will help a composter know how many and how big the compostables collection containers should be. A procedure for measuring bulk density of compostables is attached.*

2. Do we need to know the variety of types of organic material (pizza vs. chicken vs. napkins) or just the quantity?

*It would be helpful to have visual volume estimates of food scraps vs. paper product wastes on a stadium-wide basis*

3. Do you have any advice or lessons learned from previous waste audits that might aid us in running our audit effectively?

*I have a number of other university solid waste audits in my files and would be happy to forward them if you wish. I believe the best way to do this is to take representative samples of the waste stream, spread the contents out on a tarp, separate the components into various categories (compostable, metals, glass, plastics, trash, etc.) and weigh each component (and the whole).*

4. Do you have any suggestions on how to quantify the waste of the food vendors as compared to the waste items from the fans?

*Sample each major type of food service (i.e. Cavalier Suite Catering (Aramark) for the suites, one pizza vendor, one subs vendor, etc.). Sample "back of house" (food prep area) and "front of house" (serving area).*

I hope this is helpful. Please let me know if you'd like copies of those other university audits. I'll be at the NCSU game tomorrow and will look around while I'm there; if I come up with any other ideas, I'll let you know. If you'll be there and would like to meet before or after the game to discuss your project, that's fine. My wife and I will be in Sec. 122, Row Z, Seats 13 & 14.

Regards,  
Craig

RECEIVED NOVEMBER 11

From Professor Phoebe Crisman to Global Sustainability Class

GS Class- Please see the following request for help on Sunday from one of our workshop teams.

Hello all,

There are going to be three people (Scott Glassman, Gabrielle Falcon, and myself) sorting through a lot of bags of trash on Sunday as part of the Scott Stadium waste audit. If we cannot get any help, it will be a very long day.

We would appreciate any volunteers who could come to UVA Recycling across from O'Hill at 10 am on Sunday morning to help us out. But you are thinking, *trash is gross!* Undeniable. But who knows what treasures we'll find. I call 50% of the cut.

The willing and able can email/call/text us and we can work out the details. Even if you cannot be there at 10, we will probably still be working later when you can be there!

Jackson Bewley  
rjb2ay  
2056139023

## **Acknowledgements**

- Jess Wenger, UVA Sustainability, as our community partner, was helpful in establishing contacts and directing our efforts.
- Sonny Beale, UVA Recycling, advised us on how to perform an audit and what information to pursue.
- Ashley Badesch and Matt Boegner provided the ground work for our project as well as worked with us this semester to make sure everything went according to plan. Ashley personally helped us sort trash.
- Craig Coker, consultant to many local composting firms, made recommendations on what information was necessary to move forward with composting at the stadium.
- John Clark at UVA Recycling moved totes around for us, both to and from the stadium, and met with us the day we sorted trash at UVA Recycling.
- Jason Bauman in UVA athletics helped get us in touch with Eric Dadmun, student intern at UVA Athletics Facilities, and helped with the logistical side within the stadium. Eric Dadmun was with us in the trenches on game day giving us guidance and taking us to the locker room.
- Thomas Gibbons, our Teaching Assistant, kept us on task, the most important job.