

Starting from Scratch

Greening Your Game Day

**The Collegiate Football Sustainable
Materials Management Toolkit**

Version 1.0

This Basic Toolkit was Produced in Collaboration Between:

- Virginia Tech Office of Energy & Sustainability
- A Panel of Technical Experts:
 - Ed von Bleichert, *University of Colorado Boulder*
 - Alec Cooley, *Keep America Beautiful*
 - Dedee DeLongpre Johnston, *Wake Forest*
 - Angie De Soto, *Virginia Tech*
 - Corey Hawkey, *The Ohio State University*
 - Al Matyasovsky, *Penn State*
 - Julie Muir, *PSSI/Stanford Recycling*
 - Seann Sweeney, *AASHE*
 - Ron Vance, *United States Environmental Protection Agency*
- Association for the Advancement of Sustainability in Higher Education (AASHE)
- College and University Recycling Coalition (CURC)
- Keep America Beautiful



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1. Acknowledgements

1.1 The Graduate and Undergraduate Student Research Team

1.1.1 Project Managers

Spring 2011:

Katie Ridgeway, Class of 2012

Fields of Study: Biological Systems Engineering, Green Engineering

Katie Ridgeway is a senior in the Biological Systems Engineering Department. Her studies also include a minor in Green Engineering. She first became involved with the Office of Energy and Sustainability in the spring of 2010. She led a team of five students to complete a Recycling and Waste Assessment of nearly 50 buildings on campus. In the spring of 2011 she was a project manager on another team of students researching best sustainable practices of colleges around the country.

Jennifer Thangavelu, Second Year Graduate Student

Fields of Study: Urban and Regional Planning with thesis development in zero waste planning

Jennifer is in the Master of Urban and Regional Planning program at Virginia Tech. Before coming to Blacksburg, Jennifer spent several years in Washington, DC, researching and writing for think tanks, campaigns, and the federal government. Her academic and career interests focus on the nexus between environmental planning and economic development. Jennifer earned a B.S. in Environmental Science and Management from Indiana University.

Summer & Fall 2011:

Melanie Kwon, Class of 2014

Fields of Study: Architecture, Environmental Policy and Planning

Melanie Kwon is a third-year Architecture student with a minor in Environmental Policy and Planning. Her passion for sustainability started in high school when she was very active in her school's environmental and recycling programs. She became interested in this internship for the opportunity to work on a project that not only influences sustainability at her school, but also at universities throughout the country. Working on this toolkit has given her valuable experience in organizing and completing a project, designed entirely by the intern team. She plans to build a career that continues her passion for sustainability, combined with her love of architecture.

Erica Putman, Class of 2012

Fields of Study: Biological Sciences, Environmental Science

Erica Putman is a senior Biological Science major, Environmental Science minor with a career interest in ecology and conservation marine biology. Her interests include conservation and spreading her interest in sustainability and the environment. She is one of two interns that has worked on this project both semesters and has been looking forward to its completion. Through working on this project, she has learned the importance of waste reduction strategies at events, and has gained a great deal of respect for universities with successful programs. She has also learned leadership and team building skills and has most enjoyed the chance to work on such a talented and diverse interdisciplinary intern team.

1.1.2 Intern Team Members

Spring 2011:

Kathrine Cooke, Class of 2012

Fields of Study: Industrial Systems Engineering, Green Engineering, Business

Kathrine Cooke is a senior in the Grado Department of Industrial and Systems Engineering at Virginia Tech, also working towards her minor in Green Engineering, as well as Business. She became involved with sustainability initiatives in the spring of 2011 as a team member developing the best practices survey and participating in the initial presentation to the EPA. In the summer and Fall of 2011, Kathrine lead another group of interns, as project manager, toward implementing

the determined best practices in Virginia Tech's football program. Kathrine is also the President of the Student Engineers' Abroad Council and an active member in Sigma Kappa Sorority. As graduation approaches, she looks forward to finding a way to combine her Industrial Engineering background and her passion for sustainability.

Josh Dickson, Class of 2011

Fields of Study: Environmental Science, Waste Management

Josh Dickson is studying Environmental Science with a concentration in waste management. This is Josh's fifth year at Virginia Tech and he plans to graduate in the spring of 2011. During his first three years at Tech, Josh was heavily involved with his fraternity – Kappa Sigma. After the dissolution of Kappa Sigma he became interested in becoming involved with Virginia Tech's environmental initiatives. Through the Zero Waste Event team, he looks forward to working with his teammates to design a plan to reduce the amount of waste that is taken to a landfill after football games. For the past three summers, Josh has been an intern at Environmental Quality Resources, a wetland and stream remediation company. Josh was promoted to the position of assistant foreman in the summer of 2010. Upon graduation, Josh hopes to find a job in the environmental science field or waste management field.

Noor Khalidi, Class of 2012

Fields of Study: Economics, Public and Urban Affairs

Noor Khalidi is a junior double majoring in Economics and Public and Urban Affairs with a minor in International Studies. Noor has experience interning with an environmental organization entitled Earthshare as well as an advocacy organization called Americans for Informed Democracy. During the past summer she studied abroad in Nicaragua for a field study focused on sustainable development and renewable energy techniques. Her interests are focused around sustainable international development and environmental economics, largely in the context of the developing world. Above all, she is excited to get working with the Zero Waste Events team on environmentally progressive plans for Virginia Tech.

Thomas Younce, Graduate Student

Field of Study: Environmental Policy and Planning

Thomas Younce graduated from Virginia Tech in 2010 with a degree in Environmental Policy and Planning. Thomas became interested in sustainability issues when he took a class in his freshman year and wanted to pursue a career related to what he had learned. He currently works at the university as a switchboard operator and plans on attending graduate school in the coming year to attain his master's degree in the Urban Regional Planning program.

Summer & Fall 2011:

Kaitlyn Loh, Class of 2011

Field of Study: Environmental Policy and Planning

Kaitlyn Loh is a recent graduate from Virginia Tech with a B.S. in Environmental Policy and Planning and a double minor in Green Engineering and Leadership & Social Change. She was an intern for the OES during Spring 2011 working on the Undergraduate Ambassadors program as well as the Education and Engagement team. She has a career interest in environmental consulting and sustainable design.

Jerod Myers, Class of 2014

Field of Study: Environmental Policy and Planning

Jerod Myers is a sophomore Environmental Policy and Planning major with a minor in Green Engineering. His current interests include sustainable development and environmental design. He plans to pursue a career in which he can promote the responsible use of land and help create sustainable, thriving communities worldwide, with particular focus on developing nations.

Aishwarya Venkat, Class of 2014

Fields of Study: Biological Systems Engineering, French

Aishwarya Venkat is a sophomore pursuing a double major in Biological Systems Engineering and French. Her interests include sustainable, humanitarian engineering in the developing world. She hopes to pursue a career in irrigation engineering or natural resource management, and work on international projects in the future. As an intern who has worked on this project for both semesters, she hopes that zero waste will soon become part and parcel of every university and professional game, and one day become an international priority.

1.2 Technical Experts Panel

1.2.1 Technical Experts Panel Co-Chairs

Angie De Soto

Campus Sustainability Planner and Internship Program Director, Virginia Tech

Angie has been working on sustainability issues for close to five years and has been involved at the campus, local community, state, national, and international levels. Growing up oblivious to the environmental impacts of her actions, a freshman course at Virginia Tech opened her eyes and ignited a passion for sustainability solutions. Angie began by getting involved in a budding student organization and taking a small internship in the spring of 2006. Between 2006 and 2008, she and a handful of other students spearheaded the effort to strengthen the organization from a group of twelve to one of the most powerful student organizations on campus. Her campus efforts shifted to institutionalization in May 2008 when Angie interned with the Energy and Sustainability Committee to craft the Virginia Tech Climate Action Commitment and Sustainability Plan. Since the policy was passed in June 2009, Angie has been focused on effective implementation and tracking of sustainability efforts on campus. In addition to all of her campus work, she has engaged in numerous other professional development activities including participating in COP15 as a youth delegate and being trained on climate change education by The Climate Project. Angie received a B.S. in Environmental Policy and Planning and minor in Political Science from Virginia Tech and will complete a Masters in Natural Resources in May 2012.

Corey Hawkey

Sustainability Coordinator, The Ohio State University

CURC Steering Committee member

Since February 2010, Corey Hawkey has been expanding recycling efforts as well as helping to further Ohio State's efforts in sustainability. He is leading the charge to move Ohio Stadium towards "zero waste" and has developed a "zero waste event service" for campus. Additionally, he is involved with various other programs such as green office certification and residence hall competitions. Previously, Mr. Hawkey served as the first Sustainability Coordinator for the Ohio Board of Regents (OBR) beginning in November 2008. He led the University System of Ohio sustainability efforts, including energy efficiency, green workforce development, and the incorporation of environmental issues in post-secondary curriculum. Before joining OBR in July 2007, Mr. Hawkey worked for national environmental nonprofit organizations in Pittsburgh and New York. He received his B.A. in Political Science from Bowling Green State University and is a Master of Public Administration at the John Glenn School of Public Affairs at The Ohio State University. ¹

1.2.2 Technical Experts Panel Members

Ed von Bleichert

Environmental Operations Manager, University of Colorado Boulder

Alec Cooley

Director of Recycling Programs, Keep America Beautiful

CURC Steering Committee

Alec has worked in the recycling and waste reduction field for nearly 20 years. As Director of Recycling Programs for Keep America Beautiful, he manages several grant programs and coordinates KAB's college programs including collaboration with the College & University Recycling Coalition. Alec has managed the RecycleMania competition in coordination with the RecycleMania Steering Committee since 2007. Prior to working for KAB, he was a program manager for the National Recycling Coalition for three years. Alec began his recycling career as an operations manager for the Arcata Community Recycling Center before spending a decade managing the recycling and solid waste program for Humboldt State University. He is a past board member and president of the California Resource Recovery Association and currently serves on the board of the Carolina Recycling Association.

Dedee DeLongpré Johnston

Director of Sustainability, Wake Forest University

Dedee DeLongpré Johnston serves as Director of Sustainability at Wake Forest University. She previously served as the Director of the Office of Sustainability at the University of Florida. Ms. DeLongpré Johnston has eighteen years of experience in non-profit management in the areas of education, sustainability, and the environment. She serves on the board of the Association for the Advancement of Sustainability in Higher Education. She was featured in the cover story of the October 2008 issue of Sustainability: The Journal of Record. Ms. DeLongpré Johnston co-authored a research article on the importance of the placement of bins in the success of a recycling program (under review) and a book chapter on game day recycling best practices, due to be published by Johns Hopkins Press in 2011.

Al Matyasovsky

Supervisor of Central Support Services, Penn State

Al Matyasovsky has been working for the Operations Department of Penn State's Office of Physical Plant (OPP) since 1984. He has held a variety of positions within the department and currently serves as the Supervisor of Central Support Services. He oversees labor, equipment, and solid waste services. During Mr. Matyasovsky's tenure, Penn State's special event recycling program has received state and national recognition for excellence. As a testament to his program's achievements, the university's seven special event recycling programs have diverted 2,500 tons of waste from the landfill and raised over \$500,000 for philanthropy and scholarships. In addition to his position in OPP, Mr. Matyasovsky is a member of the College and University Recycling Council and several state level environmental councils.¹

Julie Muir

Community Relations Manager, PSSI / Stanford Recycling Center

Julie Muir is the Community Relations Manager with Peninsula Sanitary Service, Inc. (PSSI) and the Stanford Recycling Center. In this position, she has managed the University's Waste Reduction, Recycling, and Composting Program for the last 17 years. She was instrumental in growing the program from 30% diversion from the landfill in 1994 to 64% diversion in 2010 and oversaw the implementation of a student internship program, stadium recycling program, expanded recycling services, the construction and demolition recycling program and food waste collection and composting program. Julie has led over 22 audits of the campus trash to determine what can be done to further reduce waste to landfill and return more material back to industry and entered the University into the RecycleMania contest. She enjoys most working with students and the campus community on waste reduction and educating on the connection between materials management, the economy, and climate change. She continues to lead Stanford University toward a zero waste campus through a rigorous and comprehensive program of waste reduction, reuse, recycling, composting, and sustainable purchasing. In addition, Julie Muir is Immediate Past President of the California Resource Recovery Association, the non-profit statewide recycling association and is a member of the National Recycling Coalition's College and University Recycling Council. Her favorite saying is, "If you are not for Zero Waste, how much waste are you for?"

Seann Sweeney

Membership and Marketing Director, Association for the Advancement of Sustainability in Higher Education

Seann Sweeney is the Membership and Marketing Director for AASHE. Prior to joining AASHE, Seann worked at the Wisconsin School of Business at the University of Wisconsin-Madison in marketing, recruiting and admissions. He worked on integrating the topic of sustainability into the recruiting and marketing efforts for the MBA program at Wisconsin. He also worked at the Sierra Club headquarters (donor development and membership), Colorado State University (development), and two advertising agencies. Seann received a BA in Advertising from Michigan State University and an MBA from the University of San Francisco. Seann lives in Quemado, NM. His interests include renewable energy, environmental economics, college sports, volunteering, traveling, dogs and cycling.

Ron Vance

Office of Resource Conservation and Recovery, US Environmental Protection Agency

Mr. Vance is a technical expert in sustainable materials management and specializes in issues related to colleges and universities, athletics, K-12 schools, and federal government. Mr. Vance is the program coordinator for EPA's Game Day Challenge and WasteWise program. Mr. Vance is also the lead for EPA's involvement with the College and University Recycling Coalition and RecycleMania. Prior to joining EPA, Mr. Vance worked in environmental consulting, environmental education, and state and county environmental agencies. Mr. Vance holds a M.S. in Environmental Science and Management and a B.S. in Biology.

1.3 College and University Survey Respondents

University of North Carolina at Chapel Hill
The Ohio State University
University of Minnesota
University of Virginia
North Carolina State University
University of Tennessee
University of California, Davis
University of Florida
University of Central Florida
Vanderbilt University
Harvard University
Ohio University
Auburn University
Montana State University
Michigan State University
University of Wyoming
Brigham Young University
University of Colorado at Boulder
Iowa Western Community College
Bethany College
Wake Forest University

2. Introduction

2.1 Explanation of this Toolkit and Project Approach

2.1.1 Overview of Toolkit

The “Collegiate Football Sustainable Materials Management Toolkit” was researched by student interns in the Virginia Tech Office of Energy & Sustainability, developed in collaboration with the US EPA and a national panel of technical experts from universities across the nation, and driven forward by CURC, AASHE, and Keep America Beautiful, critical national sustainability organizations. The intent of this document is to provide a framework for developing a game day program from scratch but also a road map for continually improving your existing program. The technical experts panel had representatives from the US EPA, AASHE, CURC, The Ohio State University, Penn State, PSSI/Stanford Recycling, University of Colorado Boulder, and Wake Forest University. Without the support of all parties involved, this toolkit would not have been able to be completed.

This toolkit provides a guide for institutions of higher education to implement or improve collegiate game day recycling and sustainability efforts. It provides an overview of strategies for the implementation and development of a college game day operation. It includes case studies of our Technical Experts Panel participant’s programs and a list of best practices for all areas of game day operations to implement or improve a sustainable materials management program.

A need for this type of toolkit was identified after last year's EPA Game Day Challenge program concluded. Colleges and universities of all sizes requested a comprehensive resource that provided detailed information on how to launch and manage an effective game day program. This project was designed to not only meet that identified need, but do so by allowing students to apply the concepts and skills they've learned in the classroom to real world challenges that exist on most college campuses.

2.1.2 Project Approach

Spring 2011

Knowing that many schools across the country already had strategies for game day waste management, the choice was made to conduct a survey to compile best practices from the schools which were already identified and newly identified best practices into a single report. The objective of this survey was to collect data from schools that had participated in the EPA’s Game Day Challenge, as well as schools with waste management practices that did not participate. The students created a survey, distributed it through the AASHE and Recyc-L listservs and analyzed the data to compile this report. With a foundation in research, this toolkit has started the process for better information collection and streamlining of critical information about effective programs.

Establishing the Technical Experts Panel

As the scope of the survey and report expanded, interest in the project also grew. The students quickly found that other colleges and universities across the nation were interested in contributing to the project. In order to maintain the Virginia Tech core of interns, while simultaneously incorporating the expertise of officials that have years of experience in materials management programs, the Technical Experts Panel (TEP) was created. The TEP is composed of the sustainability and/or recycling coordinators from CU Boulder, Penn State, Ohio State, PSSI/Stanford Recycling, and Wake Forest. Representatives from the US EPA, AASHE, and CURC also participated in the developmental process for this toolkit.

Summer and Fall 2011

The decision was made to create a website, in addition to the content based PDF, outlining how to implement a zero waste program at schools across the nation. Building on the research and work performed during the spring of 2011, the summer 2011 intern group's main goal was to develop a best practices toolkit on zero waste event games. Collaborating with the TEP allowed for the intern group to understand the challenges and successes of each of the case study programs. The toolkit would include case studies of the members of the TEP and an in-depth look into best practices of all areas of game day operations. A PDF form of the toolkit is set to be launched during mid-September to give schools time to look over the information before getting too deep into the football season. The toolkit is then planned to become an interactive website as part of the CURC Resources page.

A longer term partnership is being formed to provide continually improving information in this area and develop a support network for campuses to be able to tackle this type of mega sustainability initiative.

2.2 *What is a "Zero Waste" Program and Why Develop One for Your Stadium?*

A "zero waste" event is an organized program that emphasizes the concepts of reduction, reuse and recycling to limit waste. Smart procurement is also an important part of planning this type of event. A successful zero waste event minimizes the amount of waste produced, reuses as much of the discarded materials as possible (through composting and other methods), and recycles most of the refuse produced, so less waste goes into landfills. More often than not, campuses cannot recycle materials that are currently being purchased. Procurement of recyclable and compostable materials from the start will set your campus up for success.

An average football game produces 50 to 100 tons of waste and releases 188 to 376 metric tons of carbon dioxide into the atmosphere.² Integrating a zero waste program in your collegiate game day operations is an important step towards university sustainability. Not only does it help reduce your institution's carbon footprint, it sends a message to the fans, and ultimately the world, that your university places value on reducing your impact on the environment. With climate change and clean energy becoming increasingly pressing concerns, sustainable materials management at your football games is a huge step toward limiting waste and fostering a sense of individual and collective responsibility among the students, faculty and university community.

Implementing a sustainable materials management program for your stadium is not a simple feat. Existing programs did not form overnight; they took months, sometimes years, of planning and collaboration. It requires collaboration between students, administration, athletics and facilities. However, the outcome is well worth the effort due to the financial and environmental results you will see. The results from the Environmental Protection Agency's (EPA) 2010 Game Day Challenge are proof that these lofty environmental goals are achievable. During the EPA Game Day Challenge 2010, schools with over 2.8 million fans diverted more than 500,000 pounds of waste (equivalent to 250 tons), which prevented nearly 940 metric tons of carbon dioxide from being released.¹

2.3 *History and Development of the EPA Game Day Challenge*

The EPA Game Day Challenge is a friendly competition for colleges and universities to promote waste reduction at their football games and is an initiative of the EPA's [WasteWise program](#)⁴. During the month of October, colleges and universities implement waste reduction programs during a home football game, track and report recycling and waste data. Schools are then scored based on different areas of waste reduction including waste minimization, diversion rate, greenhouse gas reduction, recycling and organics reduction.²

2010 Results:

- 88 schools, over 2.8 million fans
- Diverted more than 500,000 pounds of waste, which prevented nearly 940 metric tons of carbon dioxide from being released

2009 Results³:

- 8 schools participated
- 40,000 pounds of waste were reduced, which reducing greenhouse gas emissions by more than 105 metric tons

WasteWise is a free partnership program that assists its collaborators in meeting their specific goals to reduce and recycle industrial and municipal solid wastes. This program provides a variety of [resources](#) to aid schools in waste reduction during the planning stages of their game day programs. These include webinars, websites and a helpline. The helpline offers access to information specialists trained to answer questions about the Game Day Challenge, including technical questions on how to design and implement a game day waste reduction program. You can contact the WasteWise Helpline at oswwastewise@epa.gov or (800) EPA-WISE. For more information, visit the [EPA Game Day Challenge website](#)

2.4 *Making the Case to Stakeholders*

2.4.1 Explanation of Topic

This section seeks to explain the steps that need to be taken in order to incorporate stakeholders into the Zero Waste game day event. Identifying and engaging stakeholders on your campus early and often in the planning process is a key to success.

2.4.2 Athletics Department

- Your program's success will rely on building a partnership with your Athletics Department
- Perhaps the most difficult stakeholder to convince.
- It is important to remember that the Athletics department has probably been operating the same way for many years, therefore, change will not happen overnight.
- Include Athletics in the planning process. Up to a year before the event, sit down with Athletics to discuss your desired outcome and to ask questions. It is important to involve Athletics stakeholders in the planning process for the game because many of the decisions will directly affect them.
- Have facts prepared beforehand. If Athletics is leery of zero waste game day operations and how it will affect them, remain positive and do not become defensive.
- Give examples of other successful college game day programs and the **positive** outcome of their game day operations. Include facts and statistics to strengthen your argument.
- Aim to work **with**, not against the Athletics department.
- Encouragement: 79.5% of NCAA schools' Athletic departments reacted positively to environmental initiatives.²
- For more information on working with Athletics on sustainable initiatives, review [AASHE's College Athletic Department Sustainability Report Survey](#) or ProGreen Sport's [2010 College Athletic Department Sustainability Survey Results](#).

2.4.3 Administration:

Approaching Administration:

- Ask to meet with administration to discuss/propose the university host a zero waste football game
- Prepare a presentation to introduce the administration to the concept of a zero waste event
- Support your presentation with data and statistics
- Showcase other school's efforts towards sustainable sporting events

- If your school has a Climate Action Plan, or another plan that incorporates sustainability, be sure to include how zero waste game day operations will fit into the plan

2.4.4 Sponsorship

Steps to attaining sponsorship:

- Plan as soon as possible. Large companies often will begin planning sponsorship at least a **year** in advance. If local businesses are involved, they typically need less time (maybe a month or two in advance).
- Know your stuff! Prepare a fact sheet about your game day operations, your success (or intended goals), and how this partnership will benefit them. Be prepared to answer questions.
- **Gathering Facts:**
 - Analyze your event demographic: age, career background, gender, as well as other important information.
 - Have **facts** on HOW the event will potentially benefit the sponsor.
 - Why is the event so important and how can the company contribute to the overall success?
- Create a budget. Figure out how much funding you will need for the event
- Create a sponsorship proposal. The proposal should include **sponsor benefits and deliverables**. Remember you are selling your event to stakeholders. Sponsorship is a two way street - help them by helping you.
- Determine Sponsorship levels: PLATINUM, GOLD, SILVER and BRONZE. If the highest amount of money you require is \$10,000 set that amount at Platinum. Attaching these labels to the company name may encourage higher funding.
- Get personal. Asking for sponsorship can be a very difficult task. The difference between Gold and Bronze sponsorship could mean the difference between a personal phone call and an email. A personal request increases the likelihood of sponsorship.
- Building a strong professional relationship and level of trust with individuals in companies is an important step to getting your foot in the door for sponsorship.
- Return the favor. Once sponsors have been determined, provide them with publicity, let the public know their level of sponsorship, and allow the company to advertise during the event. ¹

3. Campus Case Studies: Analyzing the Technical Experts Panel

Case studies were developed for colleges represented in the Technical Experts Panel (TEP) to give a detailed overview of their game day operations. The TEP is comprised of leading professionals in sustainability and programs that have been recognized nationally for their continual improvement and successes. These case studies detail the history, successes, challenges, and best practices of each institution. They primarily serve as a reference resource so that institutions can learn from others' successes and challenges.

3.1 University of Colorado Boulder

3.2 Penn State

3.3 The Ohio State University

3.4 Wake Forest University

3.1 *University of Colorado Boulder*

Expert Interviewed: Ed von Bleichert; Environmental Operations Manager, CU Boulder

Contact Information: Edward.Vonbleichert@colorado.edu

3.1.1 History and Overview of CU Boulder's Game Day Program

Overview:

- On August 5, 2008, "Ralphie's Green Stampede" zero-waste and carbon-reduction program was announced to the public
- The university set goals to drastically cut waste produced at Folsom Field football stadium and to invest in carbon reduction projects to offset stadium energy use
- The Environmental Protection Agency predicted that Folsom field would be the first major sports stadium to convert game day operations into a zero-waste process
- Mike Bohn, CU Director of Intercollegiate Athletics, pledges to take part in the Greener Venues facilities pledge, sponsored by the EPA
- "We are excited to be national leaders in this key sustainability effort," said Mike Bohn. "Our goal is not simply to be good, or even excellent, but to consistently set the national standard in all that we do. With this initiative, we're really setting a global standard while doing what's right for our fans, our campus community and, at the same time, contributing to our institution's zero-waste vision for the future."¹

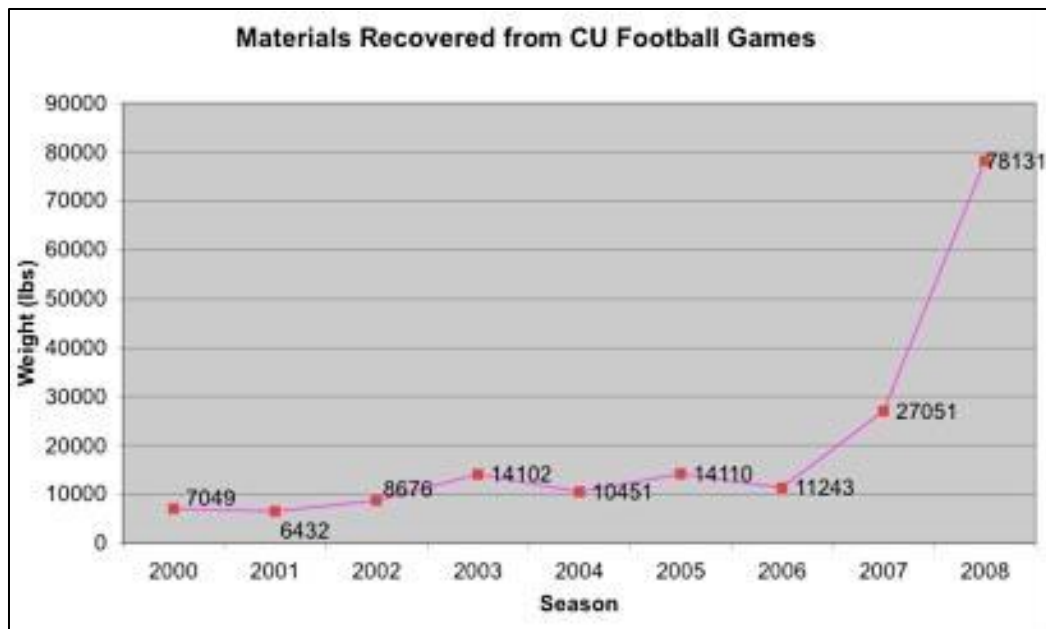
Program Progression:

October 2008: Mid-Season Report

- Enactment of valet bike parking service to promote eco-friendly transport - bikes were kept at a special storage facility on Franklin Field during the game
- Private concession vendor, Centerplate Inc. has converted nearly all food and beverage containers into recyclable or compostable material
- 25 locations within the stadium are monitored by volunteers who help patrons sort waste properly
- Eco-Cycle, a non-profit recycling company, picks up the recyclables after the game is over
- Specialized compaction trucks, purchased by CU's student government, collect compostable materials²
- [White Wave Foods](#) is the primary sponsor behind game day efforts

December 2008: Program Highlights

- Collection of more than 40 tons of recyclables and compostables from football games (199% increase from 2007)
- 80% of all materials generated inside the stadium were kept out of the landfill
- Compost generated from the program was used on the CU Boulder campus for landscaping
- 300 gallons of fry oil, the byproduct of food preparation, was used to fuel university buses
- Public area trash cans were replaced with recycling and composting containers—14 tons of compostable food and biodegradable material were diverted from landfill⁴



Graph shows the drastic increase in salvaged waste from football games held at the stadium⁴

2009: EPA Game Day Challenge Results⁵ by Category and Place

- Diversion Rate (%): 78.02% 1st
- Per Capita Waste Generation (lbs./person): 0.29 3rd
- Gross GHG Reductions (MTCO₂E): 23.6 1st
- Per Capita Recycling (lbs./person): 0.228 2nd
- Per Capita Composting (lbs./person): 0.109 1st

February 2010: Implementation of expanded dual-stream system in campus recycling⁶

- Recycling system was reduced to two streams – papers and containers
- Resulted in drastic reduction in paper contamination
- Technical expert, **Edward Von Bleichert** stated, "Switching to an expanded dual-stream system allows CU to provide campus the convenience of collecting additional materials not only at faculty and staff desks but at all central collection points. We are excited to implement this next phase of the campus zero-waste plan."

Current Program Highlights:⁵

- 80-90% diversion rate of waste from the landfill
- No public trashcans
- 25 zero waste stations managed by personnel
- Concession contract requirements
- 90+% recyclable or compostable packaging
- Portion control, bulk condiments
- Closed-loop composting
- Fry oil refined locally
- High and broad support

Future goals:

- Zero waste in all game day operations

- Attain specific data on the Stadium's energy use⁷

3.1.2 Identified Challenges and Solutions

- **Challenge:** It was difficult to rely on the food vendor (Centerplate) to train temporary workers every Saturday
- **Challenge:** Staff turnover and indifference serve as barriers when working with concessions providers
 - **Solution:** Recognize materials management roles in relevant staff job descriptions and incorporate waste management information while training new employees and staff
- **Challenge:** Difficult to expect the minimum wage workers working concessions to be engaged
- **Challenge:** Collaboration between organizations, volunteers, and staffing poses a significant problem to game day operations, especially with temporary workers. CU has 13 units to coordinate between.
- **Challenge:** Event organizers had to continuously "police" the packaging. Decisions regarding packaging were often made outside the review/approval process. Often, a "rogue package will 'show up' at a game," said Ed. The staff must then attain samples and move upstream to locate the source of the package, remove, or replace the packaging. At the very least, event organizers will file a complaint.
 - **Solution:** All packaging **should** be reviewed and approved. The following criteria were reviewed by the university: cost, availability, minimal use of materials, recyclability, compostability, post consumer content, fair-trade, ISO or similar certification.
- **Challenge:** It is difficult to achieve zero waste. In theory, zero waste is plausible if you change *everything*. CU currently has a 80+% diversion rate at most games and they state that reaching 90% "will be VERY difficult"
- **Challenge:** The amount of energy used specifically at the stadium cannot be obtained.
 - **Solution:** Future efforts will try to separate the stadium's energy use from other athletic facilities. The university continues to purchase carbon offsets and invest in renewable energy to offset energy consumption⁷

3.1.3 Identified Best Practices

- **Inside Stadium:** Dumpsters inside of the stadium were locked to prevent unwanted materials from showing up
- **Tailgating:** Concentrate outreach and educational efforts on the gated lots next to the stadium
- **Personnel:** Keep volunteers in pairs to prevent boredom
- **Concessions:** Maintain constant conversation with concessions provider to attain desired result
- **Concessions:** To ensure cooperation with concessions CU gives a lot of PR to the concessions provider, provides promotional items like signs and banners, provides logo space, and issues press releases and reports that highlight vendor/campus accomplishment
- **Funding:** CU experienced the most success in cost and funding from the support of Whitewave and Toyota sponsorship
- **Funding:** Use the savings from waste reduction/green efforts to fund other money saving/recycling programs
- **Other:** Create and promote a system to report wasteful practices and offer suggestions for waste reduction. Keep track and report progress annually.⁷

3.1.4 Additional Resources

Stadium Statistics

Number of football game visitors per year:	325,000
Number of football games per year:	6
Capacity of the venue:	56,000
Venue Includes:	Stadium, skyboxes, adjacent field house, team center

For information regarding renewable energy purchased to offset stadium energy use:

- **Wind**
 - In April of 2000, the student body decided to increase student fees by one dollar a semester for four years to cover the purchase of renewable, wind energy from Public Service Company of Colorado's Ponnequin wind farm⁸
- **Colorado Carbon Fund and how it works**
 - Event planners use an online calculating system to measure carbon footprint
 - The Carbon Fund then suggests ways the individuals or business can reduce carbon emissions
 - For emissions that cannot be controlled, tax-deductible offsets can be purchased through the organization⁹

3.2 Penn State University

Expert Interviewed: Al Matyasovsky; Supervisor of Central Support Services, Office of Physical Plant at PSU
Contact Information: aem3@psu.edu

3.2.1 History and Overview of Penn State's Game Day Program

Program Progression:

Penn State's Beaver Stadium is the second largest university stadium in the country with a seating capacity of **107,282**. The stadium and parking lots occupy 110 acres and host 110,000 to 150,000 fans at its seven football games per year³. Penn State has made many achievements in working towards zero waste in recent years. Their 13-year-old recycling program diverted **30 tons** of recycling per year in the past; today, their program averages and manages **50 tons of waste per game**⁴. Al Matyasovsky's office oversees day-to-day operation of stadium's recycling program². Additionally:

- New initiative to promote recycling in the stadium's tailgating area helped collect 112 tons of recycling in 2008
- Proceeds from the sale of recycled materials are donated to the local United Way and have raised more than \$54,000 to date

Future Goals:

- Short-term goals:
 - Composting inside of stadium
 - The stadium has purchased bins to compost food waste inside the kitchen and will begin a pilot program
 - University has food composting program that will accept the food collected²
 - Increase student involvement in promoting the recycling program
 - Improve communication and educate fans about how many bags of recyclables have been collected and how much money the program has raised for the United Way
- Long-term goals:
 - Raise stadium's recycling rate from 48.6% to 67%
 - Achieve zero waste - To achieve this goal, Penn State has developed an "exotic plastic" capture program and post-consumer food waste collection, and has developed and patented the ReDi index⁴

3.2.2 Identified Challenges and Solutions

- **Challenge:** Not enough recyclables were being collected through the use of recycling carts placed in the tailgating area. Even though Boy Scout Troops encouraged fans to separate their trash from recyclables, with over 110 acres to cover, the effort was not that effective and trash still ended up on the ground.
 - **Solution:** Student volunteers now circulate through the parking lots handing out translucent blue bags so fans can easily separate their recyclables from trash. The bags themselves are recyclable once the materials inside have been removed and sorted. The stadium is able to send the plastic bags along with other plastic film collected on campus to be recycled into wood/plastic composite lumber. The blue bag effort nearly doubled the volume of materials captured in the tailgating area.²
- **Challenge:** The Centre County Solid Waste Authority requires that Penn State's recyclables have a contamination rate of 3% or less.

- **Solution:** University-wide policy requires participation of faculty, staff and students in its recycling program to ensure compliance with the county’s mandated 3% or less contamination rate. At Beaver Stadium, the first line of defense is promoting source separation through use of blue bags and recycling carts. Once the recyclables are collected from the tailgating area, university waste management staff empties the bags and sorts the materials at the campus recycling center. The county does an additional level of sorting. Penn State has not faltered in meeting the 3% goal during the 13 years of the recycling program.²
- **Challenge:** Managing costs
 - **Solution:** Penn State improved their processes and involved a greater number of volunteers ⁴
- **Challenge:** Communicating expectations
 - **Solution:** Penn State made use of the stadium video board and communicated through ticket packages. They also use students as ambassadors. ⁴

3.2.3 Identified Best Practices²

- **Tailgating:**
 - *Recycling is convenient and easy to locate*
 - 290 blue, 96-gallon wheeled recycling bins are placed throughout stadium grounds with only 42 eight-yard dumpsters
 - Dumpsters have “blue bag” dispensers attached to them so that fans can pick up recycling bags there (2,800 recycling bags and equal number of trash bags available)
 - The top two feet of the brown dumpsters are painted green with the word ‘FREE’ spray painted on to let fans know that they can pick up recycling bags there
 - Designated locations for placement of recycling carts and dumpsters to establish consistency in location so fans know where to expect them
 - 30 A-frames added to dispense clear bags in areas without dumpsters
 - *Penn State’s student club “STATERS” (Students Taking Action to Encourage Recycling)*
 - Launched in 2007, around 15 student volunteers interact with tailgating fans and personally hand out about 2000 recycling “blue bags” before each game
 - Volunteers wear bright colored shirts with recycling messages, reminding fans that recycling not only helps protect the environment, but also contributes to the United Way
 - *Tasks are given to designated staff*
 - Stadium staff members replenish bags when supply is low
 - On Sundays after games, waste management staffers collect filled blue bags from parking lots and bring them to a university-owned recycling center to sort materials (a six-person crew with three trucks takes 4-6 hours)
 - One staff member is responsible for collecting recyclables from the blue carts 3-4 days after a game; recyclables are already sorted
 - Recycling marketer picks up recyclables and sells them to processors; proceeds are donated to the United Way
 - *Tailgating “blue bag” recycling initiative (2008)*
 - Doubled the stadium’s recycling capture by simply scattering the wheeled recycling carts throughout the tailgating area
 - 90% of recyclables captured in the blue bags
 - 1500-4500 bags collected per game
 - 1-1.5 tons of recyclables per game are pulled from blue carts
 - Initiative cost \$9,000 to implement but doubled the stadium’s recycling capture
- **Inside the Stadium:**
 - In 2008, Penn State added 127 recycling bins in concourse areas

- Major recyclables inside the stadium are beverage containers, cardboard packaging from concessions, and leftover program booklets
- 96-gallon stainless steel bins have a 4' x 3' panel for print advertising which will help cover the upfront purchase and maintenance costs for the recycling bins
- Waste management team collects these after games and delivers to recycling facility
- Bins will be shifted to other facilities off-season
- **Education and Outreach:**
 - "Come to the Game, Honor the Name" is the stadium's recycling mantra
 - Fans reminded through PSAs on the video board and in person by student volunteers that participating in the stadium's recycling program embodies Penn State values
 - Fans are reminded that recycling honors the school, keeps grounds clean and costs down, protects the environment, and supports the United Way
- **Tips for Stadiums:**
 - Start with a pilot program to learn what works for the fans and stadium
 - Be located where customers are and make recycling easy
 - Enlist students and other volunteers to hand out bags and promote program
 - Advertise the program and report volumes collected on video board, ads in program, and announcements
 - Thank fans and stakeholders regularly

3.2.4 Frequently Asked Questions⁴

- **What are some things that you would like to improve in your program?**
 - Reducing the costs of cleaning the recycling bags and including compost collection in our collection process
- **What would you identify as your top collegiate game day best practices?**
 - We emphasize in marketed materials that recycling benefits the Centre County United Way
 - Other best practices include providing free recycling and trash bags to our tailgaters and the involvement of our student club "the STATERS"
- **What is most important for colleges planning for their first game day program?**
 - Understanding your waste stream through an audit and knowing the scope of the operations challenge in terms of tonnage and acreage
- **What are your top 5 quick fixes, or small changes, to a game day program that can be implemented in a short time?**
 - All of our processes are designed to be modified: collection, manpower, communication, hauling and partnerships

3.3 The Ohio State University

Expert Interviewed: Corey Hawkey; Sustainability Coordinator, The Ohio State University

Contact Information: hawkey.13@osu.edu



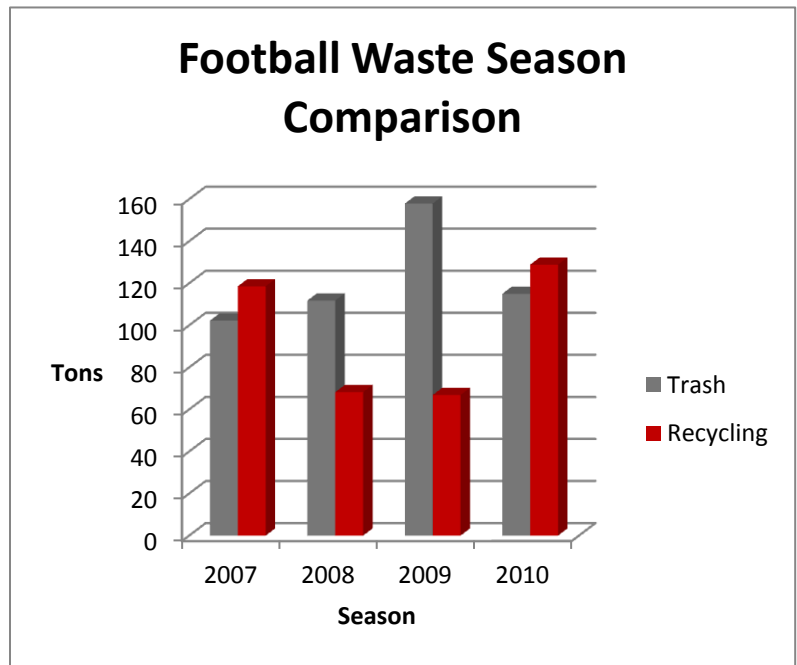
3.3.1 Basic Program Details

- Program's first season: 2007 (zero waste 2011)
- Stadium size: 102,389
- Who is leading the effort: Energy Services and Sustainability and Department of Athletics
- What other organizations are involved: Athletics – Communications, University – Communications, Stadium vendor, waste hauling vendor, Sports Marketing unit
- Estimated upfront costs of program: \$50,000
- How is the program funded: Internal grant and operating budgets
- Total number of waste stations: 75
- Average number of staff needed per game: 10-12 student volunteer leaders, 75 zero waste station attendants, 10 supervisors
- Internal or external material management: External
- Program website: <http://go.osu.edu/zerowaste>

3.3.2 History and Overview of Ohio State's Game Day Program

Program Progression:

- Ohio State started its football recycling efforts in 2007
- Ohio State placed 1st in the 2009 EPA Game Day Challenge (NCAA - Division I - FBS) for diverting 68.5% of waste from the landfill at the Ohio State-Purdue game on October 23, 2010
 - Placed 10th in recycling per capita with 0.317 lbs. per person
 - Placed 1st in every category when compared to other stadiums with a capacity of 100,000 or more
- For the 2010 season, Ohio State diverted 46.4% (51.7 tons) of the waste from the stadium, 58.3% (77.2 tons) from the tailgate lots for an overall rate of 52.8%
- Since 2007, Ohio State has recycled more than 253 tons of trash from football games, with an average recycling rate of 53.6%



Future Goals:

- University goal to divert 40% of the waste stream
- One of the future goals of OSU's Zero Waste project is to achieve a 90% diversion rate or higher by the conclusion of the 2012 season
- Their long-term goal is to have a Zero Waste stadium 365 days a year, which includes events such as weddings and commencement³

3.3.3 Identified Challenges and Solutions

- **Compostable Alternatives:**
 - **Challenge:** A major challenge is finding recyclable or compostable alternatives to every product used in the stadium. That means the plate your pizza is on, the container your nachos are served in, and the bottle of water all have to be considered.
 - **Solution:** Perform an inventory of all the products the stadium uses that are given to fans and determine a suitable alternative: 1) compostable alternative or 2) recyclable alternative. In addition the alternative should be as effective, efficient, and economical as the current product. Ohio State will also work with the Ohio BioProducts Innovation Center to encourage Ohio companies and products to solve some of our issues.
 - **Anecdote:** *"It's a great business for Ohio. We have a strong agricultural economy, and a lot of the material used to make compostable products comes from farmers in Ohio," said Hawkey. "There's a whole component to this in which we're looking for partners to investigate ways that we can use this*

project as not only a model for other universities but also as a model for how to bring down the cost of these products and how to spur the market, all the while supporting Ohio companies and businesses.”

- **Education:**

- **Challenge:** Fans may not understand composting and recycling and will need to be educated to adjust to the new waste containers.
 - **Solution:** Provide signage and volunteers to help direct fans to appropriate containers⁴

- **Compost Facilities:**

- **Challenge:** Compost facilities vary across the country and some areas may find it difficult to find a compost facility or have the ability to start one on campus. Compost Facilities may be venturing into new territories as it relates to stadium compost. They have sensitive programs that need to have contaminant free materials.
 - **Solution:** Work with compost facilities and the research aspects of the university to develop technologies to support these programs

- **Liners for compost waste:**

- **Challenge:** Compost facilities usually do not have the staff resources to rip open bags and prefer to have compostable liners. Unfortunately, compostable liners are thin and expensive.
 - **Solution:** Ohio State is using the same clear liners for compost that they have always used for trash. Stadium staff and concessions are being asked to rip open the bags into to compost dumpsters. The recycling containers are lined with the same clear bag only it has the recycling symbol imprinted all over it (see picture below on the right).



3.3.4 Identified Best Practices

- **Inside the Stadium:**

- During the game the scoreboard illustrates recycling statistics
- Relationship between Department of Athletics – Facilities and Energy Services and Sustainability and level of institutional support
- Integrating the program into the classroom and research areas of the university.
- The branding of the program is clear and easy to identify. The zero waste logo that was developed represents the waste stream of a typical academic building at Ohio State. Ohio State is using the logo to brand the program and other zero waste events on campus so attendees know they are at a zero waste event.

- **Tailgating:**
 - There are two different options provided: 1) bring your own recycling bags or 2) look for the recycling bags provided by the university
 - Designated areas are marked for fans to place recycling bags
 - Relationship with external hauler is very strong – helpful in working together to improve the program
- **General:**
 - The dedicated waste receptacles, manufactured in state from recycled plastics, cost \$145 each and are limited to club, suite and press box areas. Containers on the main concourse will be repainted and repurposed to receive the various forms of waste. In addition, Ohio State will hire temporary game day help to direct traffic at receptacles this season.

Stadium Statistics

Number of visitors per year:	735,000
Number of football games per year:	7
Capacity of the venue:	102,329
Venue Includes:	Stadium, suites

General University Tipping Fees

Landfill Tipping fee: \$53.50 / ton
 Recycling Tipping fee: \$10.00 (clean) co-mingle and \$69/ton for mixed solid waste
 Compost tipping fee: \$0.00 to \$45.00 / ton
 Stadium recycling/compost: hauling managed by outside company
 Compost facility: outside company approximately 20 miles from campus

Zero Waste Containers for Zero Waste Events

Ohio Stadium containers



Zero Waste Event containers



3.4 Wake Forest University

Expert Interviewed: Dedee DeLongpre Johnston; Director, [WFU Office of Sustainability](#)

Contact Information: sustainability@wfu.edu

3.4.1 Basic Program Details

- Program's first season: 2010
- Stadium size: 31,500 permanent seats
- Who is leading the effort: Collaboration between Office of Sustainability and Athletic Department
- What other organizations are involved: Facilities and Campus Services
- Estimated upfront costs of program: \$4,000
- How is the program funded: Office of Sustainability, Athletic Department and sponsorships
- Total number of waste stations: Approximately 275
- Internal or external material management: External

3.4.2 History and Overview of Wake Forest's Game Day Program

Program Progression:

- Wake Forest's game day program debuted on September 2, 2010 and started with a small-scale game against Presbyterian College
- It is a staff-coordinated program with volunteer support for the tailgate collection portion of the program; volunteers are recruited by first-semester Office of Sustainability interns

Inside the Stadium:

- Green can and bottle recycling cans placed around the entrances to the stadium
- Black and Gold bottle collection cans placed within the interior stadium perimeter

Tailgating:

- Tailgaters in the Gold, Blue, Red and Green lots recycled over 1.75 tons of cans and bottles in the first season
- Volunteers distribute retrofitted recycling cans to tailgating tents for collection of cans and bottles
- Smaller tailgating locations receive clear plastic bags for their collection
- Students hand out free program-branded koozies to fans who recycle, as incentives
- The tailgate collection program supplements the existing collection programs inside the stadium concourse and in the luxury suites



Personnel:

- Athletic Department staff members collect all materials from tailgating areas right after kick-off
- Tailgate recycling is mostly run by volunteers from the school
- In the first season, the program rewarded volunteers with a small amount of money based on the number of hours worked. This money was given to a student organization of the volunteer's choice.
 - *Incentive program was unsuccessful*
 - Students signed up as individuals, not as part of clubs for funding purposes
 - Money was not a leverage tool for volunteer recruitment
- Volunteer motivation partially due to Wake Forest culture
 - Motto: *Pro Humanitate*. Very high service ethic
 - Students are very involved in extra-curriculars and do not need another incentive
 - Smaller student population to draw from - approximately 6,000 undergraduate and graduate students
- Office of Sustainability internship program
 - Encourages student leadership and involvement
 - Ensures continuous improvement of the program



Costs and Funding:

- SPARC (Students Promoting Action and Responsibility in the Community) and Sustainability in Action pre-orientation programs retrofitted old push carts no longer used on campus to serve as tailgate collection bins. The unwanted bins were donated by Facilities and Campus Services.
- The popular “Green Team” volunteer t-shirts and “Go Deacs. Go Green.” koozies for the fans were generously co-sponsored by Great Outdoor Provision Company
- Branding and marketing design services were donated by the campus Communications and External Relations Office and the Athletic Department marketing office

Outreach and Education:

- Face-to-face fan education on game days
- Marketing and Social Media
 - “Go Deacs. Go Green.” logo and Wake Forest Recycles logo
 - Appears on all promotional materials related to event for branding and event recognition
 - Game day recycling intern creates a Facebook event each week to spread campus awareness and recruit volunteers “to help set up, clean up and excite and educate the fans”
 - Use a Flickr photo stream to share photos from events
- Volunteer recruitment spreads the outreach message through listservs, website, and weekly emails
- Second season: postcard was mailed out with all season tickets outlining the program. One side featured a branded window cling for tailgate vehicles



Future Goals:

- Continue offering game day recycling not just for football, but also for [soccer](#) and other sports
 - Recycling bins are used throughout all the sports seasons

- Does not end with football, although football has the most fans, and the most tailgaters, which makes it unique
 - There are various summer soccer camps that are held at Wake Forest and the Athletic department makes sure there are recycling bins in the camp areas. A few alumni parents contacted Office of Sustainability to make sure recycling was offered
- Increase the percentage of recyclable materials that are sold in the stadium
 - This is key to limiting the number of items that are trashed
- Long-term goal: compost the waste that comes out of the stadium
- In the short term: take a few samples from each game, do a basic waste audit to see what constitutes the waste stream
- Integrating sorting and recycling into personnel contracts for post-game cleanup

3.4.3 Identified Challenges and Solutions

Education:

- **Challenges:**
 - Failure to practice proper recycling habits in social settings involving alcohol
 - Fans come from various counties with different recycling options
 - Bulk beverage dispensers at student tailgates perpetuates the need for cups
 - While the omnipresent red and blue drinking cups are non-recyclable, the clear, plastic cups marked “No.1” or “No.2” are recyclable
- **Solutions:**
 - Simple signage on bins
 - Promotion through Athletics and important university officials
 - Encourage involvement through listserv e-mails and correspondence
 - Provide recyclable cups for on-campus events
 - Encourage proper recycling behaviors with receptacles themselves
 - Wake Forest’s recycling bins have small circular holes that can only accommodate cylindrical objects like bottles, cans, etc.

Students not receptive to recycling:

- **Challenges:**
 - Students do not seem as receptive as staff, faculty, alumni and visiting fans to collection of uncontaminated materials
 - *“There is an inverse relationship between the amount of alcohol consumed, and ability, or the willingness to do the right thing. In tailgating areas on most Division 1 campuses, people are consuming alcohol. In these scenarios, doing the right thing is not always a priority.”*
- **Solutions:**
 - Encourage students to tell other students to recycle
 - Students are already part of the tailgaters’ social circles
 - Has worked in the past with fraternities and sororities
 - *“Need to build key relationships. When students see their peers that they know willing to take a few hours out of their Saturday, they’re encouraged to support them”*
 - Faculty-sponsored incentives like extra credit are probably **not** a good motivating factor
 - “Students care more about their peers”
 - Social pressures are more influential than academic pressures
 - “Most students are high-performing, and they don’t get a lot of time off. This is their chance to blow off steam, and they don’t want to think about academics either”
 - If feasible, engage alumni in rewarding students that recycle at tailgates

- At Wake Forest, “alumni are the strongest proponents of the program”
- Get Green Team to make more presentations to major school organizations about importance of recycling

Losing momentum:

- **Challenge:** Sea of red and blue drinking cups that littered the student lot after the first game was a “disheartening sight”
- **Solutions:**
 - One step at a time
 - *“When you’re trying on new things in your life, it’s never helpful to go from 0 to 60 in a day,” Ms. Johnston advises. She encourages members of the university and surrounding communities to “tackle the little bits in a personal, impactful way, fitting together the pieces of a sustainable lifestyle.”*
 - Set higher and more ambitious goals for program success
 - Get more interns, volunteers and community members involved
 - Ensure steady progress and learning curve

Convincing Athletics to participate in the program:

- **Challenge:**
 - During the first season, Athletics was a little hesitant to pay for the program
- **Solutions:**
 - *“Sometimes you just have to do it once, find a way to pay for it and show everyone that it will be a success.”*
 - *“Ultimately, Athletics needs to take sustained ownership of the program and the Office of Sustainability should be a partner, providing volunteer support.”*

Personnel:

- **Challenge:**
 - Cleanup staff can see the collection work as “additional” labor
 - Since recycling responsibilities are not written into post-game collection contracts, Wake Forest cannot enforce recycling yet
- **Solutions:**
 - Rather than creating additional work for employees, integrate the cleanup work into the work that staff is already doing
 - Integrate sorting into contracts that are up for bids
 - *“Make the people feel like they’re doing their job, but doing it differently; rather than doing two jobs. The work cannot be seen as an add-on, it must be a way of doing the existing work.”*
 - Appreciate and be sympathetic to the staff
 - Take them to lunch or honor their contributions in publications or at meetings
 - When concessions contracts are coming to bid, get language into their RFPs about sustainable materials management
- **Challenge:** Getting volunteers to sign up for all the shifts. It is hardest to get a hardcore dedicated group for the final pre-kick off shift.

- **Solution:** Interns have to work even harder to recruit equal number of volunteers for all three shifts

Getting attention from national marketing companies:

- **Challenge:** Framing the opportunity for increased sponsorships from companies.
- **Solutions:**
 - Most major marketing groups that secure sponsorships understand the value to potential sponsors. The university can help frame the appeal to make it as closely aligned with corporate sponsors' existing priorities as possible.

3.4.4 Identified Best Practices

Personnel:

- Build personal relationships, both among the staff that is helping with recycling, as well as with the recyclers and tailgaters
- "Helps influence behavior change through relationships"

Outreach:

- Consider branding the program before the event
 - Wake Forest provided season ticket holders with a new mailing and window cling. It included "10 steps for successful recycling"
- During the event
 - Giving fans and recyclers promotional items that will remind them of the program. For example, Wake Forest provides koozies printed with "Go Deacs. Go Green." logo
 - Label all the recycling bins inside the stadium and in the tailgating areas with simple signage
 - Implement a campus green team corps in which all branches of the university are represented
 - Campus green team network is made up of departmental captains
 - Identifies point people in each department to communicate about and implement "greening" of the campus
 - Integrates sustainability seamlessly into the larger university plan

Tailgate Areas:

- Recycling receptacles
 - Most recycling bins were retrofitted
 - *"When the first hundred were being retired from the campus inventory, [the game day recycling team] took them in and turned them into our recycling bins"*
 - Now whenever more bins are being retired, they are added to the game day recycling inventory
- Managing the volunteers
 - Volunteers sign up by shift
 - Assigned to a tailgate lot or stadium perimeter coverage within shifts
 - Helps create continuous flow of volunteers
 - Use a main tent as headquarters
 - Hydration station, gloves, supplies, and hand sanitizer available

3.4.5 Tips for First-Time Zero Waste Projects

- Be willing to do most of the work yourself the first year. Make it successful so stakeholders can see what is possible.
- Be ready to leave your ego at the door. The project has to be about the greater good.
- It helps if you have already launched a similar program at another university
 - If possible, start talking to officials from other universities with successful zero waste programs as a partnership/mentorship.
- Find your key resources
 - Get together a team of all the key players from various departments
 - Also find out who could potentially derail or offset the program. Include them on the planning team.
 - Seek out other perspectives so your plan can meet as many potential obstacles as possible.
 - Sustained stakeholder involvement increases support over time.

3.4.6 Additional Resources

- [Office of Sustainability](#)
- [RecycleMania results](#)
- [AASHE STARS scorecard for Wake Forest University](#)

4. Game Day Logistics – Common and Best Practices

This section provides the best practices for game day operations, separated by areas of interest. These are the practices used by 21 schools with successful programs that completed the National Assessment of Collegiate Football Game Day Sustainability Efforts survey created by the Virginia Tech intern team in April 2011. These sections outline the most common practices of those schools, as well as their most successful practices in their programs. Percentages are given for some questions – this is the percentage of respondents that selected this option. These tips can be used for programs that are still in the planning stages and successful programs looking for ways to improve.

4.1 Inside the Stadium

4.2 Tailgating

4.3 Costs and Funding

4.4 Personnel

4.5 Concessionaires

4.6 Outreach and Education

4.7 Goals and Measuring Success

4.8 Materials Management Program Timeline

4.1 Inside the Stadium

4.1.1 Explanation of Topic

This section focuses on measures taken inside the stadium where concessions are often sold, such as drinks within the stands (often in plastic cups) and food and drinks near the gates. Because this is primarily where fans are, it is a prime location for advertisement and outreach.

4.1.2 Common Practices

This section contains the most common practices of schools that completed the survey on zero waste game day operations. The answers are based on 21 schools with successful programs (*see Acknowledgements section for list of schools that participated*).

General:

- What game-day materials management practices are used inside your stadium?
 - Recycling: 100%
 - Composting: 43%
 - Energy Conservation: 14%
 - Water Conservation: 14%
- Does the timing of games within the season and/or throughout the day affect your materials?
 - Yes: 57%
 - No: 14%
 - *Weather affects what is sold at concessions: water and soda (in plastic bottles or aluminum cans) are sold more when it is warm. When the weather is cold, coffee and hot chocolate (in Styrofoam cups) are sold more. Plastic and aluminum are more easily recoverable than Styrofoam, so programs are likely to recover more materials in warmer weather than in cooler weather.*

Recycling:

- Please estimate the ratio of trash bins to dedicated recoverable material bins inside your stadium.
 - Significantly more trash than recoverable material bins: 29%
 - Slightly more trash than recoverable material bins: 21%
 - Equal trash and recoverable material bins: 21%
- How are recycling bins placed for use inside the stadium?
 - Placed next to every trash bin: 36%
 - Placed only at high traffic areas: 29%
- How are recyclable materials from inside the stadium sorted?
 - Personnel sort through material in RECYCLING bins before it is sent to materials recovery facility (MRF) to reduce contamination: 21%
 - Personnel sort through material in TRASH bins before it is sent to materials recovery facility (MRF) to reduce contamination: 14%
 - The MRF where our material goes sorts through the TRASH to recover recyclable materials: 14%

Composting:

- How are composting bins placed for use inside the stadium?
 - We do not place any bins for composting: 57%
 - Composting bins are placed only at high traffic areas: 7%
 - Composting bins are NOT strategically placed and are placed in the SAME location every game: 7%
- How are compostable materials from inside the stadium sorted?
 - Personnel sort through material in COMPOSTING bins before it is sent to the composting facility to reduce contamination levels: 7%
 - Personnel sort through material in the TRASH bins to recover compostable material: 7%
- How is the risk of material contamination reduced inside the stadium?
 - Signs in material collection areas provide instructions for correct material separation: 64%
 - Personnel staff collection locations: 29%
 - Personnel walk through aisles to monitor activity and answer fan questions: 21%

4.1.3 Best Practices

This section contains the best practices for waste reduction inside the stadium at game days according to survey results, Technical Experts Panel, and additional research.

- Listen to and learn from the Athletics Department's facilities crew. They know these facilities the best and can help you understand what practices might be most effective.
- Learn about the needs of the facility managers
 - **Listen and value their input**
 - Learn the processes they go by
 - Collaboratively plan
 - Help find them funding
- Place recycling and compost receptacles next to every trash receptacle
 - Schools reported that making sure each trash can is clearly labeled and looks different is helpful (different colors works well)
 - Mature programs may eliminate trashcans all together; however, these schools have had many previous football games with successful material management practices and fans know what to expect
 - Lock the trash receptacles so no unwanted material shows up
- Station recycling and compost receptacles at many different locations
 - Make it convenient for fans to recycle
 - Co-location (stationing all bins in the same location) is a great method for comprehensive materials management
- Place volunteer/staff at each receptacle station
 - This allows volunteers to interact with and show fans proper waste placement
 - Signs are not good enough alone and may be ignored. Many people do understand or care about paying attention to signs. Some fans may be too intoxicated to notice.
- Have a post-game sweep for recyclables and compostables
 - Post game sweeps can recover materials that account for a significant amount of the overall trash. It is important that these materials are disposed of properly are hand-sorted.

- Have personnel sweep the stadium seating area for recyclables prior to collecting trash. This helps to attain a very high recovery rate with very low contamination.
- Visual inspection and manual sorting of materials, if needed, is very important to recovering recyclable or compostable materials.
- Communicate with vendors to control all incoming materials
 - Control materials sold by concessionaire, food stands and giveaways
 - Form partnerships with concessionaires to be able to recover all cardboard, compost prep waste and place instructional signs by the vendors
 - Have behind-the-counter recyclable or compostable materials and place recycling containers throughout the vendor areas
- Constantly remind fans to recycle through advertising and announcements
 - Show videos on the scoreboard of athletes asking fans to recycle
 - Station MANY signs throughout stadium reminding fans to recycle
- Use dirty Material Recovery Facility (MRF) system, if available.
 - Single stream dirty MRF systems separate recyclables and compostables from trash at the facility. This eliminates the need for volunteers to watch bins, the need to sort trash, spending money on extra bins and is extremely helpful to reaching the waste reduction percent goal.
 - This is a good alternative method for starting out if you have a minimal budget and if you're below a 40% recycling rate
- Involve the marketing and communication arms of the athletics department
 - They understand their fans
 - Utilize their branding in marketing materials to tie your program into their overarching message

4.1.4 Challenges

Personnel:

- Personnel may not be educated or trained about recycling and composting
 - *Solution:* Have a brief training for volunteer groups on the same day right before the game. It is better to train at least the day before so that all questions can be answered.
- Staff hired by outside companies to remove recyclables after games will sometimes collect recyclable materials and dispose of them as trash.
 - *Solution:* Instead of hiring outside companies, have large student groups (such as Greek organizations looking for service hours or environmental groups), volunteers, and school staff carry out a post-game sweep for recoverable materials.
- Contractors may not follow the instructions to pick up recycling, place into clear liners and then put in the recycling containers
 - *Solution:* Communicate with contractor to ensure you know where recoverable materials are going.

Recycling:

- Having trained personnel next to all of the recycling bins to help fans sort appropriately
- Grouping bins into only one "recycling station" may be difficult to access and may be an inconvenience to fans
 - *Solution:* Have a recycling bin next to each trash can when at all possible. If there are not enough recycling bins, minimize the number of trash bins to find a better ratio.
- Limited number of recycling containers

- Improper labeling of bins and limited advertisement which does not allow people to make an educated choice for best waste diversion practices
 - *Solution:* Make bins stand out and differ from trash cans, such as differentiating bin colors or using bins with restrictive openings.
- Using recycling containers/collection on very busy concourses, gates and outside the stadium
- Fans discarding their waste in the stands
 - *Solution:* Have a post game pick up where volunteers collect left over recycling materials

Concessions:

- Not working with vendors to ensure all products are recyclable or compostable
- Difficult to expect food vendors to train temporary workers every week

4.1.5 Examples from Successful Programs

Penn State:

- Penn State began collecting beverage containers inside the stadium in 2008, added 127 recycling bins in the concourse areas
- 96-gallon stainless steel bins have a 4' x 3' panel for print advertising which will help cover the upfront purchase and maintenance costs for the recycling bins
- Bins will be relocated to other facilities in the football off-season
- Leftover program booklets and cardboard packaging from concessions is also collected
- Waste management team collects these after games and delivers to recycling facility
- Inside stadium, major recyclables are beverage containers, cardboard and program booklets

4.2 Tailgating

4.2.1 Explanation of Topic

This section focuses on the measures taken in tailgating areas that are located on school property.

4.2.2 Common Practices

This section contains the most common practices of schools that completed the survey on zero waste game day operations. The answers are based on 21 schools with successful programs (*see Acknowledgements section for list of schools that participated*).

- Listen to and learn from the Athletics Department's facilities crew. They know these facilities the best and can help you understand what might be the most effective practices.
- How are efforts in the tailgating lots primarily organized?
 - By the sustainability office or equivalent and/or facilities management
- What materials management strategies are used at current tailgating sites?
 - Most schools have recycling efforts only. Few schools have composting efforts in tailgating areas.
 - Since tailgating areas primarily contain waste brought in from elsewhere, instead of influencing the types of materials generated as waste, the best strategy is to promote recycling and composting and ensure ease in participation.
- How are recycling bins placed for use in tailgating areas?
 - Normal numbers of outdoor recycling bins are increased for game day
- How are recycling bags distributed to individual tailgating groups?
 - Personnel walk through the tailgating areas to distribute bags and engage fans
- How is the risk of material contamination reduced in tailgating areas?
 - Personnel walk through tailgating areas to monitor activity and answer fans' questions

4.2.3 Best Practices

This section contain the best practices for reducing waste at tailgating sites according to survey results, Technical Experts Panel and additional research.

- Make sure compost and recycling bins are clearly labeled.
 - Use recycling bins with restrictive openings
 - Use clear, eye catching signage so that bins are unmistakably labeled for recycling and composting
 - Clear bags with wire frames are a popular choice because they have a clear bag that shows what is inside. A best practice is also to make sure the lid says "plastic bottles/aluminum cans" and has restrictive openings.
- Keep recycling and composting receptacles in the same place every game
 - This reminds fans that recycling practices are for the long-term as opposed to one game. Over time, fans may participate that did not before as they grow accustomed to the idea of sorting their recycling and compost from their trash.

- Place recycling bins next to each trashcan
 - This makes bins available and convenient and ensures ease of participation
- Have personnel engage fans directly and pass out bags for recycling and composting
 - Fans enjoy the interaction with the excited and engaging students. Volunteers can talk to tailgaters and encourage them to bring items that are recyclable. Fans seem to recycle more consistently when there is a personal effort made.
 - VIP and Season ticket holders will come to expect recycling bags
 - The recycling bags allow fans to sort and recycle at their own tailgate. This ensures ease of participation.
 - Telling fans directly what is acceptable to put into the bags will reduce contamination.
- Have personnel wear matching shirts that stand out
 - Ensures that fans can recognize personnel and contact them if they need any assistance or have questions
 - Bright and distinctively colored t-shirts adds a safety element to the program – shirts make volunteers more visible to those driving in the lots and decreases the amount of vehicle and pedestrian accidents
 - Increases the perception of a structured event and therefore increases participation as well as awareness while reinforcing the message
- Concentrate outreach in lots next to stadium
 - These lots are usually reserved for season ticket holders which typically have larger tailgates which produce more waste
 - Season ticket holders will come to expect materials management efforts
- Providing incentives to fans for participating
 - Fans can be encouraged to participate in recycling or composting by handing out free items like buttons, stickers, koozies, t-shirts, etc.
- Coordinate a post game clean up of the parking lots to keep recyclables from being thrown away
- Work to develop programs that reduce efforts in other areas
 - For example: If you put out more recycling containers and have more education there will be less litter – therefore reducing operations costs for clean up. Furthermore, install containers that are easier to collect and more efficient - easy to empty cans, large dumpsters that are labor-reduced or labor-limited.

4.2.4 Challenges

Lack of Support:

- Having little to no restrictions on items brought to tailgating areas makes material separation more difficult. It is difficult to get people to bring more recyclable materials and use the right dumpsters.
- Apathetic fans in tailgating areas are less likely to follow material separation requirements
 - *Solution:* Continue waste management practices every year or at all games. Fans will come to expect materials management efforts, making them more likely to participate.
- If fans take their recycling bags straight to recycling areas or bins, personnel are unable to check or sort the items the tailgaters put in their bags.
 - *Solution:* Use clear bags that personnel pick up after tailgaters go to the game. The personnel can then sort the bag if necessary.

- If the fans are only given one bag, it may be used for trash instead. Also, if it rains, recycling bags are used for rain ponchos.
 - *Solution:* Explain to tailgaters what the bags are for and ask if they would like to use it for recycling. This way the plastic bags can be saved for tailgaters that actually plan on using it.

Personnel:

- Personnel may be unwilling to walk through tailgating areas or to monitor recycling practices in tailgating areas. Uneducated personnel will not be helpful in educating fans about recycling and composting.
 - *Solution:* See the Personnel section, section 4.4
- Sometimes there are just too few personnel recruited to reach all tailgating areas.
 - *Solution:* Work on the outreach program. See the Personnel section for recruiting ideas.

Lack of Convenience:

- Having bins in areas too far from tailgaters or in decentralized locations. People should not have to walk too far away from their sites to recycle.
 - *Solution:* Give recycling bags directly to the tailgaters.

Using Recycling Bins Only:

- NEVER place a recycle bin without a trash bin beside it, or the recycling bin will be used for trash.
- Improperly Labeled Bins lead to confusion and contamination

4.2.5 Examples from Successful Programs

- See Penn State and Wake Forest Case Studies

4.3 Costs and Funding

4.3.1 Explanation of Topic

This section focuses on the best measures that were used for managing costs and funding associated with game day materials management.

4.3.2 Common Practices

This section contains the most common practices of schools that completed the survey on zero waste game day operations. The answers are based on 21 schools with successful programs (*see Acknowledgements section for list of schools that participated*).

- Compared with the cost of football games where no materials management practices were used, the cost of football games that have employed materials management practices has been:
 - Equally expensive: 60%
 - More expensive: 30%
 - Less expensive: 10%
 - *While some schools reported their game day programs were more expensive, 70% of schools who knew the cost of their program reported the cost to be equally or less expensive.*
- What factors, if any, have made game day programs more expensive?
 - Depending on the type of recycling program the cost may be more than an alternative. For example, single stream sorting is more expensive in comparison to a more expensive infrastructure for segregated service and additional collections. In general, game day programs should lessen tipping costs for trash due to the diversion of materials into the less expensive recycling streams. In some cases additional labor costs may contribute to a more expensive game day program due to practices that require extra staffing to monitor progress throughout the game.
- What best describes your school's spending on game day materials management over time?
 - More expensive in earlier seasons, with significant up-front capital costs: 63%
 - About the same from year to year: 25%
 - Less expensive in earlier seasons and more expensive in later ones: 13%
- How have the costs of football games with materials management practices affected your school's ability or willingness to continue with these practices?
 - Costs did not decrease willingness or ability to continue use of practices: 82%
 - Negatively affected: costs outweighed the benefits: 10%
 - Positively affected: reduced costs encouraged continued use of practices: 10%
 - *The vast majority of schools believe the costs of their programs did not outweigh the benefits. Use this when making your case to stakeholders!*
- What is the primary funding source used to plan and implement game day material management costs?
 - Athletics department budget: 75%
 - Facilities management budget: 17%
- What other significant funding sources are used to cover costs?
 - Facilities management budget: 37%
 - Office of Sustainability budget: 26%
 - Athletics department budget: 26%
 - Corporate sponsorship: 22%

- | | |
|---|-----|
| ○ Donations: | 11% |
| ○ Sales of recyclable and/or compostable materials: | 10% |
| ○ Central School tipping fund: | 0% |
| ○ Profits from fundraisers held for this purpose: | 0% |

4.3.3 Best Practices

Costs:

- There may not be a need to pay volunteers
 - If more energy is focused on recruitment and outreach, there may not be a need to pay volunteers.
 - This alleviates the burden of paying for an incentive to participate, particularly if student clubs are involved.
 - Make sure that unpaid volunteers are well trained and willing to put in the work (see the Personnel section).
- Total tipping costs reduced due to reduction in trash stream and diversion into less expensive recycling streams

Funding:

- Support from stakeholders for funding
 - College/University Administration, Athletics Department, or Office of Sustainability (or equivalent) can be main sources of funding. *See the Making Your Case to Stakeholders section 4.8.*
- Fundraisers facilitated by contributing organizations
 - Get related organizations (such as Environmental groups) to participate in the planning process of your game day program.
- Sponsorships
 - Attaining corporate sponsors or other organizations to fund bins and labor.
- Offset costs
 - Sell recovered recyclables or compostables.
 - Reduce the stadium's energy consumption to save thousands of dollars.

4.3.4 Challenges

Dependence on Volunteers:

- Although volunteers may initially cut labor costs, it may be difficult to hold volunteers accountable for not showing up and/or performing duties.
- Retaining enthusiastic volunteers throughout the season is difficult.

Cheap Landfill Rates:

- It is difficult to convince stakeholders to pay more to haul recoverable materials if landfill rates are lower than the tipping fees of recycling streams

Fear of Significant Up-front Costs:

- As with many environmental initiatives, there is a fear that the costs of the program will be too high and that the costs will greatly outweigh the benefits.
 - *Solution:* Focus on fundraising before convincing stakeholders to invest in the program. Have a detailed budget plan and be prepared for a debate about the costs of the program.

Obtaining Sponsorship:

- Few know where to begin when searching for corporate sponsorship.

4.3.5 Examples from Successful Programs

- CU Boulder's Whitewave and Toyota Sponsorships
 - Used savings from waste reduction and green efforts to fund other money saving/recycling programs
- Penn State
 - Tailgating "blue bag" initiative cost \$9,000 to implement but doubled the stadium's recycling capture
 - Tipping fees for waste at \$70/ton, recycling costs \$5 unbagged and \$15 bagged/ton provides a clear financial incentive to reduce volume of waste sent to landfill
 - Cut cost of cleanup by an average of 40% per game
 - 96-gallon stainless steel bins have a 4' x 3' panel for print advertising which will help cover the upfront purchase and maintenance costs for the recycling bins
- Wake Forest
 - Partnership with Great Outdoor Provision Company for volunteer t-shirts and drink koozies

4.4 Personnel

4.4.1 Explanation of Topic

This section details the best ways to staff the game day material management programs for the stadium and tailgating areas.

4.4.2 Common Practices

This section contains the most common practices of schools that completed the survey on zero waste game day operations. The answers are based on 21 schools with successful programs (*see Acknowledgements section for full list of schools that participated*).

- Approximately how many personnel are needed to carry out materials management duties INSIDE THE STADIUM per game?
 - Smaller stadiums: 5-15 personnel
 - Larger stadiums: 30-60 personnel
- If applicable, approximately how many personnel are needed to carry out materials management duties in TAILGATING AREAS per game?
 - Smaller stadiums: 12-30 personnel
 - Larger stadiums: 40-50 personnel
 - *Schools typically had a greater number of personnel working in the tailgate areas. However, attendance of tailgating personnel decreased depending on weather (especially wind, mud, or storms), and the time of day.*
- What campus organizations are involved in planning and/or implementation of game day materials management practices?
 - Facilities Management: 93%
 - Athletics Department: 86%
 - Student Organization(s): 71%
 - *Facilities, Athletics, and Student Organizations are typically all involved in the implementation of game day material management practices.*
- How are your materials management efforts INSIDE THE STADIUM primarily staffed?
 - Paid employees: 57%
 - Temp workers or contractors: 29%
 - Volunteers/unpaid labor: 0%
- How are your materials management efforts in TAILGATING AREAS on school property primarily staffed?
 - Volunteers/unpaid labor: 43%
 - Paid employees: 29%
 - *It is important to note that paid employees are utilized more inside the stadium, and volunteers or unpaid labor are utilized more in the tailgating areas.*
- If you use volunteers to assist with game day materials management efforts, what duties do they perform?
 - BEFORE GAME: distribute recycling and/or composting bags: 64%
 - DURING GAME: hand out informational or instructional literature and engage fans: 43%
 - *The largest percentage of personnel duties include distribution of recycling bags and engaging fans.*

- From what sources do you recruit volunteers to help with game day materials management efforts?
 - GROUPS: Student clubs: 79%
 - INDIVIDUALS: Students voluntarily seeking community service: 64%
- What incentives, if any, have you used to recruit volunteers?
 - Free t-shirts, buttons or other merchandise: 79%
 - Approved opportunity for community service hours fulfillment: 50%
 - *Only 7% of schools surveyed do not offer volunteers incentives of any kind.*

4.4.3 Best Practices

This section contains the best practices for using personnel at game days according to survey results, Technical Experts Panel and additional research.

- Paying and training employees
 - This ensures that the staff has incentive to work and be productive
 - Training personnel decreases contamination
- Recruiting student groups
 - Recruit groups rather than individuals so that organizations are responsible for coordinating their volunteers
 - Focus on groups with similar views (e.g., environmental groups) that would be enthusiastic about the program
 - Coordinate competitions between Greek and/or other organizations for number of volunteers, better seating at football games, bragging rights, or other incentives
 - Allow students to earn money for their club or organization. This can decrease costs by paying a club a sum of money, rather than paying individuals
- Use the same personnel for each game, if possible
 - Training new staff for each game can be inefficient and may be costly in terms of use of time
 - If different people staff each game, training must be provided each time. Using the same personnel each game ensures that the workers understand the practices and they could help evaluate and develop ways to improve the existing program.
- Empower and reward students
 - Train students to become leaders by coordinating programs
 - Offer incentives like T-shirts, food, buttons or other merchandise for participating
 - Show volunteers meaningful results from previous games to show the importance of the program, providing outreach to volunteers that wish to make a difference
- Use supervisors to coordinate volunteers and education efforts
 - Have supervisors or managers of the program meet to discuss actions needed during the games
 - Information reiterated by the supervisors is very strong and will ensure that the staff are engaged and carry out tasks
- Allow volunteers to work in pairs
 - This keeps volunteers from getting bored. Volunteers seem to have more fun with friends and are more likely to volunteer at another football game.

4.4.3 Challenges

Lack of Communication:

- A few schools had problems with collaboration and/or communication
 - Trying to communicate and make decisions between multiple departments made reaching a consensus difficult. Some departments placed other priorities above recycling and waste management and may not be supportive of new ideas.

Dependence on Volunteers:

- Dependence on volunteers or unpaid staff may result in unreliable work
 - Unpaid staff may not be as devoted to the work. It is harder to get volunteers to sort out recycling or pick up compost.
 - It is an added stress to hope that volunteers show up on game day. If volunteers don't show up, the duties are left to the coordinators who already have a full workload.
 - Better outreach is needed to recruit more volunteers.
- Dependence on paid staff
 - Paid staff may not care about recycling or may not be present until hours after the game is over.
 - It is difficult to have paid staff on weekends due to overtime issues

4.5 Concessionaires

4.5.1 Explanation of Topic

This section details the best measures on how to work with schools' concessionaires to improve their game day materials management.

4.5.2 Common Practices

This section contains the most common practices of schools that completed the survey on zero waste game day operations. The answers are based on 21 schools with successful programs (*see Acknowledgements section for full list of schools that participated*).

- Are your stadium concessions provided by your school's own dining services or by an external vendor?
 - External vendor: 78%
 - School's own dining services: 11%
- Has your school attempted to work with your concessions provider to improve game day materials management?
 - Yes: 78%
 - No: 22%
- How did your school approach concessions and what specific changes were sought?
 - Ensuring that all containers, including souvenir cups fit into recycling containers
 - Keeping a good working relationship and having constant conversation with concessions
- What barriers did your school encounter in seeking changes?
 - Challenges with training concessions staff: 67%
 - Lock-in effect of existing contract provides vendor with little incentive to change: 22%
 - Terms of the existing contract restrict vendor's ability to change: 17%
 - Disagreement among school offices or departments on whether to seek change: 11%
- How satisfied are you with the materials management efforts of your school's concessions provider? If your school approached the provider about reducing waste, please base this rating on the provider's subsequent performance.
 - Undecided: 39%
 - Dissatisfied: 33%

4.5.3 Best Practices

This section contains the best practices for meeting goals and measuring success at game days according to survey results, Technical Experts Panel and additional research.

- Start with small, simple changes (take on what your program can handle)
 - First switch to using recyclable cups
 - Flatten cardboard and put it into bins in the back of house

- Control and monitor what enters the waste stream
 - Monitor what materials are entering and produced by concessions
 - Switch to using as many recyclable or compostable materials as possible
 - Encourage and prompt volunteers who staff concessions to sort the material and separate out the recyclable and compostable materials. Make sure staff is well trained.
- Continue relationship building with concessionaires
 - Working with concessionaires to improve waste management has been a constant struggle for game day programs. Be aware of this when planning for your program.
 - Keep an open dialog; learn the concessionaire's constraints, concerns and issues. Listen and develop viable solutions.
 - Many respondents mentioned that a good working relationship and communication are key
 - Meeting with supervisors and concessions staff to emphasize that sorting materials is high on the priority list
 - In addition, cooperation by concessionaires can be accomplished by a change in contract language
 - *Example: CU Boulder's Ed von Bleichert explains, "We were the first Division 1 stadium to go zero waste; the Governor gave us an award and we won the first game day challenge by a wide margin. We gave concessions lots of PR in the beginning, and we gave concessions all the credit. Now they are on the team, but problems are still abounding due to staff turnover and indifference."*
- Change contract language to require concessionaires to use compostable or recyclable materials. This might be difficult to accomplish in the short term, but should be a long term goal.
- Relationship with Athletics department
 - It is difficult to ask for further changes in concessions' practices without a relationship with the Athletics department.
 - Athletics will have to embrace zero waste ideals and create mandates that require concessionaires to comply with certain material management guidelines.
- Provide cardboard only dumpsters for boxes
 - This is useful because cardboard is a commonly used and disposed of material for concessionaires.
- Provide composting and recycling bins for back of house operations
 - This is useful because it provides a sustainable outlet for uneaten food, food scraps, and recyclable food packaging that are typically thrown away.

4.5.4 Challenges

Personnel:

- Not collaborating and communicating with staff at every game. Expecting staff to be engaged and properly separating recoverable materials from trash.
 - *Solution:* Keep an open dialog. Meet with concessions staff regularly and speak to them about the importance of sorting materials properly. Listen to their concerns and develop viable solutions.

Costs and Funding:

- Resistance toward potential profit loss from recycling and composting programs
 - *Solution:* Future studies of cost-benefit analysis may help alleviate this issue if it is found that recycling and composting actually offset costs in the long run.

General:

- Forced to go through Athletics department to enact change with concessions
- More difficult to recycle certain types of plastic or other materials used in concession stands
- Contract restrictions give vendors little or no incentive to change
 - *Solution:* Lock-in effect with contract language changes to require certain types of materials to be used inside the stadium. These changes will help you better control the material stream.

4.6 Outreach and Education

4.6.1 Explanation of Topic

This section focuses on the strategies to garner support and spur enthusiasm among students, faculty, alumni and the general public about sustainable game day materials management.

4.6.2 Common Practices

This section contains the most common practices of schools that completed the survey on zero waste game day operations. The answers are based on 21 schools with successful programs (*see Acknowledgements section for full list of schools that participated*).

- How does your school use social and conventional media to get the word out about your program?
 - Flyers or signs: 70%
 - School newspaper articles or advertisements: 64%
 - Announcing the program on the school's athletic website: 36%
 - Many also used social media, like Facebook or Flickr, or their own website to get the word out:
 - Ex: Wake Forest creates [Facebook events](#) for each home game
 - Ex: [Stanford's](#) game day guidelines
 - Ex: CU Boulder's recycling [website](#)
- How does your school advertise during the zero waste game?
 - Scoreboard message: 79%
 - *Example:* Penn State: Fans reminded through PSAs on the video board and in person by student volunteers that participating in the stadium's recycling program embodies Penn State values.
- How does your school interact with the university alumni association?
 - Alumni-specific flyers, pamphlets or magazines: 36%
- Few schools (14%) also have a green mascot or a signature element to engage fans.
 - *Example:* CU Boulder's "Ralphie's Green Stampede" zero waste and carbon-reduction program. The university set goals drastically cut waste produced at Folsom Field football stadium and to invest in carbon reduction projects to offset stadium energy use. For emissions that cannot be controlled, tax-deductible offsets can be purchased through the organization.
 - *Example:* Penn State: In 2007, launched new effort with the student club STATERs (Students Taking Action To Encourage Recycling) distributing blue plastic bags to tailgating fans to collect their recyclables. About 15 student volunteers mingle with fans before games to personally hand out ~2000 blue recycling bags. "Come to the Game, Honor the Name" is the stadium's recycling mantra.
 - Wake Forest: "Go Deacs, Go Green" logo and Wake Forest Recycles logo
- In over 86% of schools, personnel walk through tailgating areas explaining recycling program to fans
- Over 72% of schools use some or extensive signage to explain what is accepted on bins in tailgate lots
 - About 50% of schools talk about the background and importance of reducing waste
 - About 71% of schools give instructions on correct material separation process

4.6.3 Best Practices

Outreach:

- Engage the city/town community in the planning and implementation process.
 - [CU Boulder](#): Leftover food saved for food programs for disadvantaged populations
 - [Penn State](#): Sale of recyclables raised more than \$54,000 for the United Way
- Involve the alumni and student communities
 - Set up information booth, or table during/before the game itself
- Allow students to help shape the game day recycling program
 - [Wake Forest](#) and [Penn State have](#) internship programs with their Office of Sustainability that help plan all the recycling events
- Give students incentives for participating in the program
 - [CU Boulder](#): Enactment of valet bike parking service to promote eco-friendly transport. Bikes were kept at a special storage facility on Franklin field during the game
 - Wake Forest gives out free koozies
- Utilize corporate sponsorship for radio, TV and scoreboard advertisements
 - Use funds obtained from corporate sponsors to pay for more expensive advertisements
 - Do this before, during and after the game
- Utilize the Top 5 best places to advertise
 - School newspaper, scoreboard, school's athletic website, Facebook social media outlets and school listservs
- Use a logo/motto to encourage recycling
 - Once program takes off, it will become a familiar rally cry to the community

Education:

- Encourage one-on-one conversations between volunteers and fans – by making it personal this helps to establish a more sustainable tailgating culture on campus
- Keep instructions and signage concise
 - Use adequate and simple directions
 - If there are too many words people may not take the time to read it
 - Simple instructions are effective in changing behaviors when it comes to getting fans to sort their trash and put into the recycling receptacles as opposed to the trash can

4.6.4 Challenges

- Recruiting and retaining enough volunteers to be in the lots communicating with fans on game day
- Flyers can be wasteful and do not have a target audience
 - *Solution:* Use flyers sparingly, and reach out via other means, especially online. Facebook/social media outlets, school/athletic websites and school newspapers are great places to advertise and promote the game

- No access to or too expensive scoreboard announcements and/or videos
 - *Solution:* Getting on the scoreboard or athletic website can be a challenge, but if you work with the athletic department, they may run ads for free on radio announcements and email interested parties
 - *Solution:* Reach out for corporate assistance or sponsorship
- Complicated or extensive signage!
 - *Solution:* Just give your audience the essentials. Remember, you do not want to confuse or bore your audience.
- Sending too many e-mails
 - *Solution:* Send weekly reminders in the 2-3 weeks leading up to the game, *but do not spam* attendees before. Facebook can help with that: instead of sending e-mails, you can post pertinent updates/announcements.
- Lack of internal and/or contracted staff training: they mostly end up classifying all waste collected as “trash” and do not recycle.
 - *Solution:* Training is key
 - *Solution:* Use volunteers to collect and recycle as much of the trash after the game is over
 - *Solution:* Consider working recycling tasks into employee/corporate contracts

4.7 Goals and Measuring Success

4.7.1 Explanation of Topic

This section focuses on the goals each school set and how they established metrics to measure their success in a zero waste game day program.

4.7.2 Common Practices

This section contains the most common practices of schools that completed the survey on zero waste game day operations. The answers are based on 21 schools with successful programs (*see Acknowledgements section for full list of schools that participated*).

- How do schools establish goals for waste management programs?
 - Schools decide different percentage reductions, based on their stadium size. This goal is usually increased year to year.
 - Many schools reported their goal was ultimately to achieve zero waste. Some schools did not have specific waste reduction goals; their goal was simply to continually reduce waste.
- How do schools measure the success of their programs?
 - Success was based on diversion rates, collected weights and cost changes in relation to their reduction goals, tipping fee costs and labor costs.
 - A baseline must be established that can be used to track progress – best way to do this is a waste stream audit and detailed data on what materials were captured and where. At each game in every season, the amount of landfill waste, recyclables and compost waste generated by the stadium should be measured. That data is then used to calculate the diversion rates. The data is compared from game to game and year-to-year to account for improvements and to prepare recommendations for the following year.
- How successful are schools at meeting their goals?
 - We considered the game day to be successful/very successful 56%
 - *None of the 21 schools considered the game day to be unsuccessful or very unsuccessful*
- How are measurements of weights or volumes of materials collected obtained?
 - Using measurements from contracted hauler
 - Using in-house measurements

4.7.3 Best Practices

This section contains the best practices for meeting goals and measuring success at game days according to survey results, Technical Experts Panel and additional research.

- Conduct a baseline study of what materials are being generated and where
- Establish a measurement system that works for your campus and stick to it. This way, you are always measuring materials in the same way each year and it will help you better track progress over time.
- Measure everything in-house on campus
 - Have staff monitor the weighing and measuring of the larger dumpsters, and personally weigh the smaller carts used to collect the recyclables and compostables.

- Use scale weights for roll-offs and dedicated compaction trucks for trash and recycling tonnage
 - This is to improve accuracy when measuring success
 - Have actual weights regularly received after each game
- Use dumpster locks to keep scavenging controlled
 - Recyclables (e.g. aluminum cans) may get scavenged for their nickel deposits
- Convert waste weights to volumes
 - This more accurately represents the impact of programs because cans and bottles are some of the lightest items in the trash

4.7.4 Challenges

Accuracy:

- It is sometimes difficult to obtain accurate measurements from contracted dealers
- It is difficult to determine the zones (e.g. specific dumpsters or diversion points) from which materials should be collected and measured

4.8 Materials Management Program Timeline

4.8.1 Explanation of Topic

This section outlines general steps to plan a zero waste event or program. It is important to start small and grow your program incrementally. Set yourself up for success by tackling what is feasible, measuring and tracking progress and then setting goals for the following season.

4.8.2 Timeline

One Year before the scheduled/designated "Zero Waste Game"	<ul style="list-style-type: none">• Start talking to the Athletics department about the zero waste game as soon as the football season ends.• Involve Athletics stakeholders in the planning process for the game.• Look into material recovery systems that are available, and find a cost-efficient company to build a partnership with.• Start networking with major stakeholders across campus, and pitching the idea to generate interest in zero waste.• Begin writing grant proposals to the administration or the Office of Sustainability (or equivalent) to fund the program.• Start negotiating with major corporate sponsors to sponsor your zero waste event (or certain aspects of it).
Six months before	<ul style="list-style-type: none">• Start thinking about the personnel you need to run this event. If paid employees are needed, consult with administration to decide how many additional people will then need to be hired for cleanup.• Decide which game of the season will be your zero waste game!• Designate employee/volunteer recycling training and instructions.• Request concessionaries to sell compostable food and packaging.
Three months before	<ul style="list-style-type: none">• Begin advertising to increase awareness of event and to start recruiting volunteers• Engage environmental clubs or eco-minded individuals to help with making flyers promoting the event. Also look into video promotions.• Procure recycling bins and bags
Two months before	<ul style="list-style-type: none">• Contact the campus student newspaper for coverage of the event. They can be crucial in increasing attendance at the game and can do a post-game assessment afterwards.• Contact alumni newsletter/events and spread the word!• Find local companies to sponsor shirts, fliers or other smaller expenses.• Arrange partnerships with local food banks to collect remaining food.• Set approximate and ambitious goal for the amount of waste you want to divert.
One month before	<ul style="list-style-type: none">• Start recruiting volunteers to help with cleanup. Send e-mails out to environmental and Greek organizations to get started.

One week before	<ul style="list-style-type: none"> • Make sure volunteers are trained, have their shirts (or other identification), and know exactly where they are supposed to be during/before the game.
Game Day	<ul style="list-style-type: none"> • Be on site and prepared for what might come up • Take notes about how everything is going, what could have gone better and aspects you would like to change next year
Post Game	<ul style="list-style-type: none"> • Revisit notes taken on game day and arrange a debrief meeting with volunteer coordinators and other main parties involved to reflect on how the event went • Take a critical look at the past year of planning. Determine what needs to change for the next season - how different approaches can be improved, what worked, what did not work, etc. • Form your event planning committee and determine your plan of action on how to improve your program for next season

5. Appendices

5.1 Best Practices List by Game Day Logistics Section

5.1.1 Inside the Stadium Best Practices

- Listen to and learn from the Athletics Department's facilities crew. They know these facilities the best and can help you understand what might be most effective.
- Learn about the needs of the facility managers
 - **Listen and value their input**
 - Learn the processes they go by
 - Collaboratively plan
 - Help find them funding
- Place recycling and compost receptacles next to every trash receptacle
 - Schools reported that making sure each trash can is clearly labeled and looks different is helpful (different colors works well)
 - Mature programs may eliminate trashcans all together; however, these schools have had many previous waste managed football games and fans know what to expect
 - Lock the trash receptacles so no unwanted material shows up
- Station recycling and compost receptacles at many different locations
 - Make it convenient for fans to recycle
 - Co-location (stationing all bins in the same location) is a great method for comprehensive materials management
- Place volunteer/staff at each receptacle station
 - This allows volunteers to interact with and show fans proper waste placement
 - Signs are not good enough alone and may be ignored. Many people do understand or care about paying attention to signs. Some fans may be too intoxicated to notice.
- Have a post-game sweep for recyclables and compostables
 - Post game sweeps can recover materials that account for a significant amount of the overall trash. It is important that these materials are disposed of properly are hand sorted.
 - Have personnel sweep the stadium seating area for recyclables prior to collecting trash. This helps to attain a very high recovery rate with very low contamination.
 - Visual inspection and manual sorting of materials, if needed, is very important to recovering recyclable or compostable materials.
- Communicate with vendors to control all incoming materials
 - Control materials sold by concessionaire, food stands and giveaways
 - Form partnerships with concessionaires to be able to recover all cardboard, compost prep waste and place instructional signs by the vendors
 - Have behind-the-counter recyclable or compostable materials and place recycling containers throughout the vendor areas
- Constantly remind fans to recycle through advertising and announcements
 - Show videos on the scoreboard of athletes asking fans to recycle
 - Station MANY signs throughout stadium reminding fans to recycle
- Use dirty Material Recovery Facility (MRF) system, if available.
 - Single stream dirty MRF systems separate recyclables and compostables from trash at the facility. This eliminates the need for volunteers to watch bins, the need to sort trash, spending money on extra bins and is extremely helpful to reaching the waste reduction percent goal.
 - This is a good alternative method for starting out if you have a minimal budget and if you are below a 40% recycling rate
- Involve the marketing and communication arms of the athletics department

5.1.2 Tailgating Best Practices

- Make sure compost and recycling bins are clearly labeled.
 - Use recycling bins with restrictive openings
 - Use clear, eye catching signage so that bins are unmistakably labeled for recycling and composting
 - Clear bags with wire frames are a popular choice because they have a clear bag that shows what is inside. A best practice is also to make sure the lid says "plastic bottles/aluminum cans" and has restrictive openings.
- Keep recycling and composting receptacles in the same place every game
 - This reminds fans that recycling practices are for the long-term as opposed to one game. Over time, fans may participate that did not before as they grow accustomed to the idea of sorting their recycling and compost from their trash.
- Place recycling bins next to each trashcan
 - This makes bins available and convenient and ensures ease of participation
- Have personnel engage fans directly and pass out bags for recycling and composting
 - Fans enjoy the interaction with the excited and engaging students. Volunteers can talk to tailgaters and encourage them to bring items that are recyclable. Fans seem to recycle more consistently when there is a personal effort made.
 - VIP and Season ticket holders will come to expect recycling bags
 - The recycling bags allow fans to sort and recycle at their own tailgate. This ensures ease of participation.
 - Telling fans directly what is acceptable to put into the bags will reduce contamination.
- Have personnel wear matching shirts that stand out
 - This ensures that fans can recognize personnel and contact them if they need any assistance or have questions
 - This also increases the perception of a structured event and therefore increases participation and awareness and reinforces the message
- Concentrate outreach in lots next to stadium
 - These lots are usually reserved for season ticket holders which typically have larger tailgates which produce more waste
 - Season ticket holders will come to expect materials management efforts
- Providing incentives to fans for participating
 - Fans can be encouraged to participate in recycling or composting by handing out free items like buttons, stickers, koozies, t-shirts, etc.
- Coordinate a post game clean up of the parking lots to keep recyclables from being thrown away
- Work to develop programs that reduce efforts in other areas
 - For example: If you put out more recycling containers and have more education there will be less litter – therefore reducing operations costs for clean up. Furthermore, install containers that are easier to collect and more efficient - easy to empty cans, large dumpsters that are labor-reduced or labor-limited.

5.1.3 Costs and Funding Best Practices

Costs:

- There may not be a need to pay volunteers
 - If more energy is focused on recruitment and outreach, there may not be a need to pay volunteers.
 - This alleviates the burden of paying for an incentive to participate, particularly if student clubs are involved.
 - Make sure that unpaid volunteers are well trained and willing to put in the work (see the Personnel section).

- Total tipping costs reduced due to reduction in trash stream and diversion into less expensive recycling streams

Funding:

- Support from stakeholders for funding
 - College/University Administration, Athletics Department, or Office of Sustainability (or equivalent) can be main sources of funding. *See the Making Your Case to Stakeholders section 4.8.*
- Fundraisers facilitated by contributing organizations
 - Get related organizations (such as Environmental groups) to participate in the planning process of your game day program.
- Sponsorships
 - Attaining corporate sponsors or other organizations to fund bins and labor.
- Offset costs
 - Sell recovered recyclables or compostables.
 - Reduce the stadium's energy consumption to save thousands of dollars.

5.1.4 Personnel Best Practices

- Paying and training employees
 - This ensures that the staff has incentive to work and be productive
 - Training personnel decreases contamination
- Recruiting student groups
 - Recruit groups rather than individuals so that organizations are responsible for coordinating their volunteers
 - Focus on groups with similar views (e.g., environmental groups) that would be enthusiastic about the program
 - Coordinate competitions between Greek and/or other organizations for number of volunteers, better seating at football games, bragging rights, or other incentives
 - Allow students to earn money for their club or organization. This can decrease costs by paying a club a sum of money, rather than paying individuals
- Use the same personnel for each game, if possible
 - Training new staff for each game can be inefficient and may be costly in terms of use of time
 - If different people staff each game, training must be provided each time. Using the same personnel each game ensures that the workers understand the practices and they could help evaluate and develop ways to improve the existing program.
- Empower and reward students
 - Train students to become leaders by coordinating programs
 - Offer incentives like T-shirts, food, buttons, or other merchandise for participating
 - Show volunteers meaningful results from previous games to show the importance of the program, providing outreach to volunteers that wish to make a difference
- Use supervisors to coordinate volunteers and education efforts
 - Have supervisors or managers of the program meet to discuss actions needed during the games
 - Information reiterated by the supervisors is very strong and will ensure that the staff are engaged and carry out tasks
- Allow volunteers to work in pairs
 - This keeps volunteers from getting bored. Volunteers seem to have more fun with friends and are more likely to volunteer at another football game.

5.1.5 Concessionaires Best Practices

- Start with small, simple changes (take on what your program can handle)

- First switch to using recyclable cups
- Flatten cardboard and put it into bins in the back of house
- Control and monitor what enters the waste stream
 - Monitor what materials are entering and produced by concessions
 - Switch to using as many recyclable or compostable materials as possible
 - Encourage and prompt volunteers who staff concessions to sort the material and separate out the recyclable and compostable materials. Make sure staff is well trained.
- Continue relationship building with concessionaires
 - Working with concessionaires to improve waste management has been a constant struggle for game day programs. Be aware of this when planning for your program.
 - Keep an open dialog; learn the concessionaire's constraints, concerns and issues. Listen and develop viable solutions.
 - Many mentioned that a good working relationship and communication are key
 - Meeting with supervisors and concessions staff to emphasize that sorting materials is high on the priority list
 - In addition, cooperation by concessionaires can be accomplished by a change in contract language
 - *Example: CU Boulder: "We were the first Division 1 stadium to go zero waste; the Governor gave us an award and we won the first game day challenge by a wide margin. We gave concessions lots of PR in the beginning, and we gave concessions all the credit. Now they are on the team, but problems are still abounding due to staff turnover and indifference" (Ed von Bleichert).*
- Change contract language to require concessionaires to use compostable or recyclable materials. This might be difficult to accomplish in the short term, but should be a long term goal.
- Relationship with Athletics department
 - It is difficult to ask for further changes in concessions' practices without a relationship with Athletics.
 - Athletics will have to embrace zero waste ideals and create mandates that require concessionaires to comply with certain material management guidelines.
- Provide cardboard only dumpsters for boxes
 - This is useful because cardboard is a commonly used and disposed of material for concessionaires.
- Provide composting and recycling bins for back of house operations
 - This is useful because it provides a sustainable outlet for uneaten food, food scraps, and recyclable food packaging that are typically thrown away.

5.1.6 Outreach and Education Best Practices

Outreach:

- Engage the city/town community in the planning and implementation process.
 - [CU Boulder](#): Leftover food saved for food programs for disadvantaged populations
 - [Penn State](#): Sale of recyclables raised more than \$54,000 for the United Way
- Involve the alumni and student communities
 - Set up information booth, or table during/before the game itself
- Allow students to help shape the game day recycling program
 - [Wake Forest](#) and [Penn State](#) have internship programs with their Office of Sustainability that help plan all the recycling events
- Give students incentives for participating in the program
 - [CU Boulder](#): Enactment of valet bike parking service to promote eco-friendly transport. Bikes were kept at a special storage facility on Franklin field during the game
 - Wake Forest gives out free koozies
- Utilize corporate sponsorship for radio, TV and scoreboard advertisements
 - Use funds obtained from corporate sponsors to pay for more expensive advertisements
 - Do this before, after, and during the game

- Utilize the Top 5 best places to advertise
 - School newspaper, scoreboard, school's athletic website, Facebook / social media outlets, and school listservs
- Use a logo/motto to encourage recycling
 - Once program takes off, it will become a familiar rally cry

Education:

- Encourage one-on-one conversations between volunteers and fans – making it personal helps to establish a more sustainable tailgating culture on campus
- Keep instructions and signage concise
 - Use adequate and simple directions
 - If there are too many words people may not take the time to read it
 - Simple instructions are effective in changing behaviors when it comes to getting fans to sort their trash and put into the recycling receptacles as opposed to the trash can

5.1.7 Goals and Measuring Success Best Practices

- Conduct a baseline study of what materials are being generated and where
- Establish a measurement system that works for your campus and stick to it. This way, you are always measuring materials in the same way each year and it will help you better track progress over time.
- Measure everything in-house on campus
 - Have staff monitor the weighing and measuring of the larger dumpsters, and personally weigh the smaller carts used to collect the recyclables and compostables.
- Use scale weights for roll-offs and dedicated compaction trucks for trash and recycling tonnage
 - This is to improve accuracy when measuring success
 - Have actual weights regularly received after each game
- Use dumpster locks to keep scavenging controlled
 - Recyclables (e.g. aluminum cans) may get scavenged for their nickel deposits
- Convert waste weights to volumes
 - This more accurately represents the impact of programs because cans and bottles are some of the lightest items in the trash

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