

2013

Goovy Breakdown: Composting for WPI

Christopher Bove

Worcester Polytechnic Institute

Antoine Crews

Worcester Polytechnic Institute

Brittany Kyer

Worcester Polytechnic Institute

Samuel Sierra

Worcester Polytechnic Institute

Follow this and additional works at: <http://digitalcommons.wpi.edu/gps-posters>

Recommended Citation

Bove, Christopher; Crews, Antoine; Kyer, Brittany; and Sierra, Samuel, "Goovy Breakdown: Composting for WPI" (2013). *Great Problems Seminar Posters*. 257.

<http://digitalcommons.wpi.edu/gps-posters/257>

This Text is brought to you for free and open access by the Great Problems Seminar at DigitalCommons@WPI. It has been accepted for inclusion in Great Problems Seminar Posters by an authorized administrator of DigitalCommons@WPI. For more information, please contact akgold@wpi.edu.

Groovy Breakdown: Composting for WPI

Christopher Bove (RBE), Antoine Crews (ME), Brittany Kyer (EVE), and Samuel Sierra (ME)
 Advisors: Professor Geoff Pfeifer (HU) and Professor Marja Bakermans (BBT)

Abstract

The goal of this project is to design a composting system for WPI, which can be implemented in two steps.

First, WPI will send organic material to a composting company and later start a campus composting system.

The university can sell excess fertilizer to generate profit, reduce costs of garbage disposal, and meet the standards of the Massachusetts solid waste mandate.

Background

On average, Municipal Solid Waste (MSW) in the US consists of 13.5% yard trimmings and 14.5% food waste. This “waste” is rich in nutrients and minerals but is deposited into landfills. If the material is composted, rich soil is produced that can fertilize crops.

A commercial solid waste ban for Massachusetts beginning in July 2014 requires that companies producing more than one ton of food waste per week must sort their MSW and compost the organic material.

WPI produces approximately 400 lbs. of food waste per day in the cafeteria, and while the uneaten food is sent to a pig farm, WPI must start to compost other buildings’ organic material in the future.

Project Objectives

- Research need for WPI composting on campus
- Identify composting solutions for urban and campus settings
- Design composting system for campus
- Research available grants for school composting system
- Contact sustainability managers for advice

Methods/Process

Researched and identified problems with the disposal of organic materials on campus and current composting systems

Examined disposal methods of food on campus

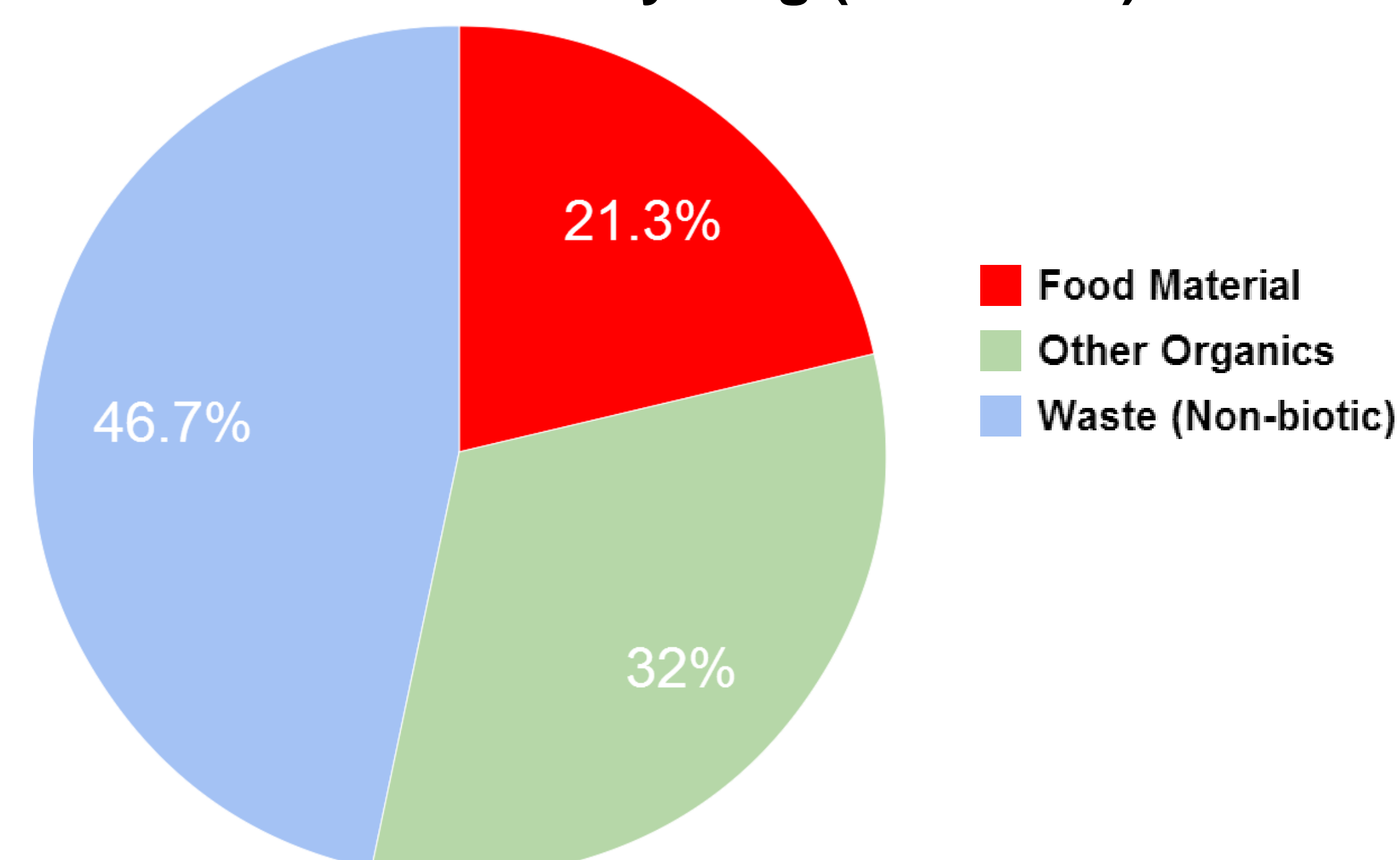
Acquired WPI Green Team waste audit results

Obtained advice from WPI and Worcester State University

Sustainability Managers

Investigated composting system for WPI

U.S. Discards after Recycling (EPA 2011)



Results

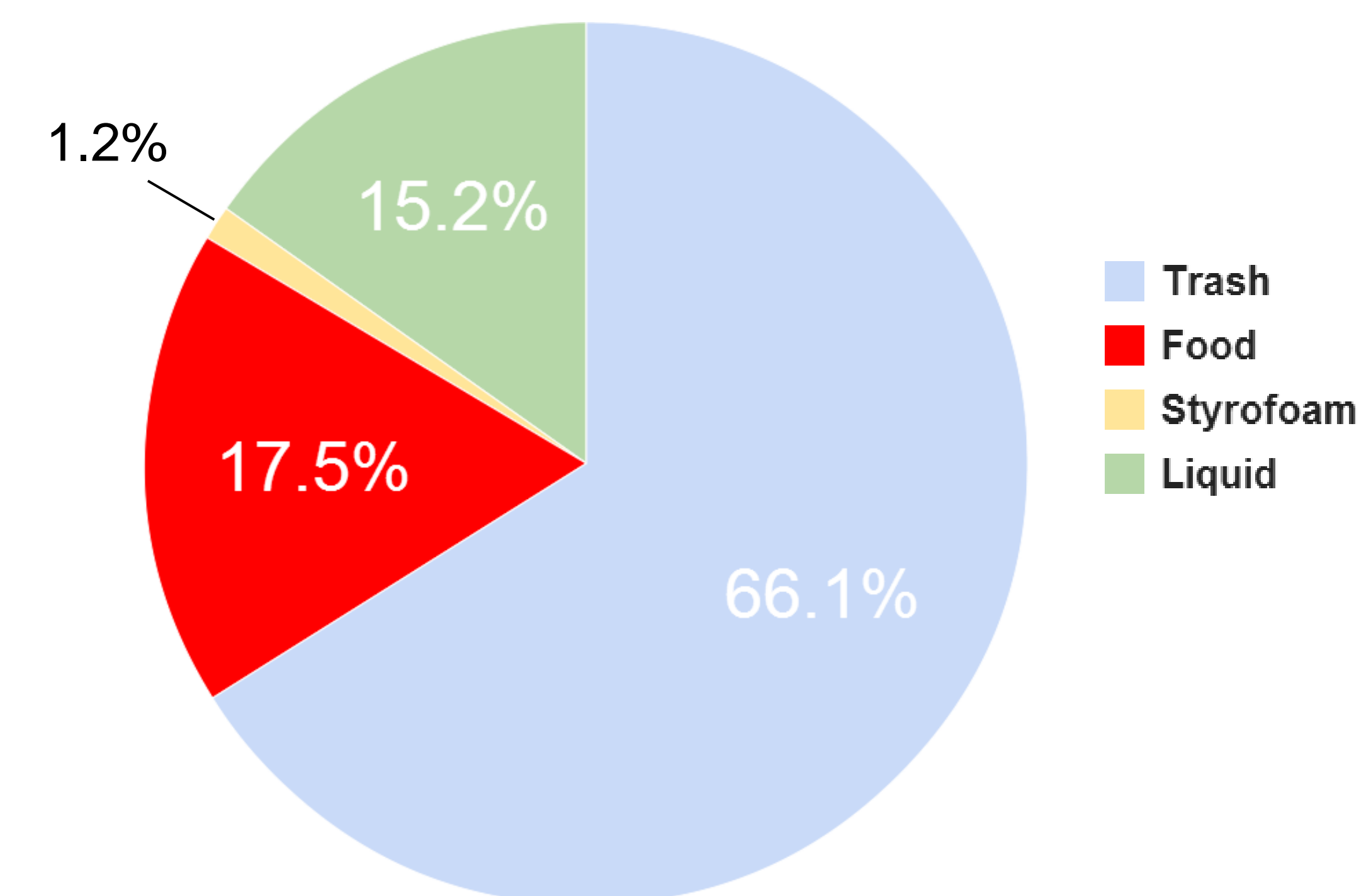
- Composting off campus has a net cost of around \$1,200, based on WSU’s system
- Determined the need for WPI to compost
- Examined current WPI waste management
- Researched compost systems on other campuses

References

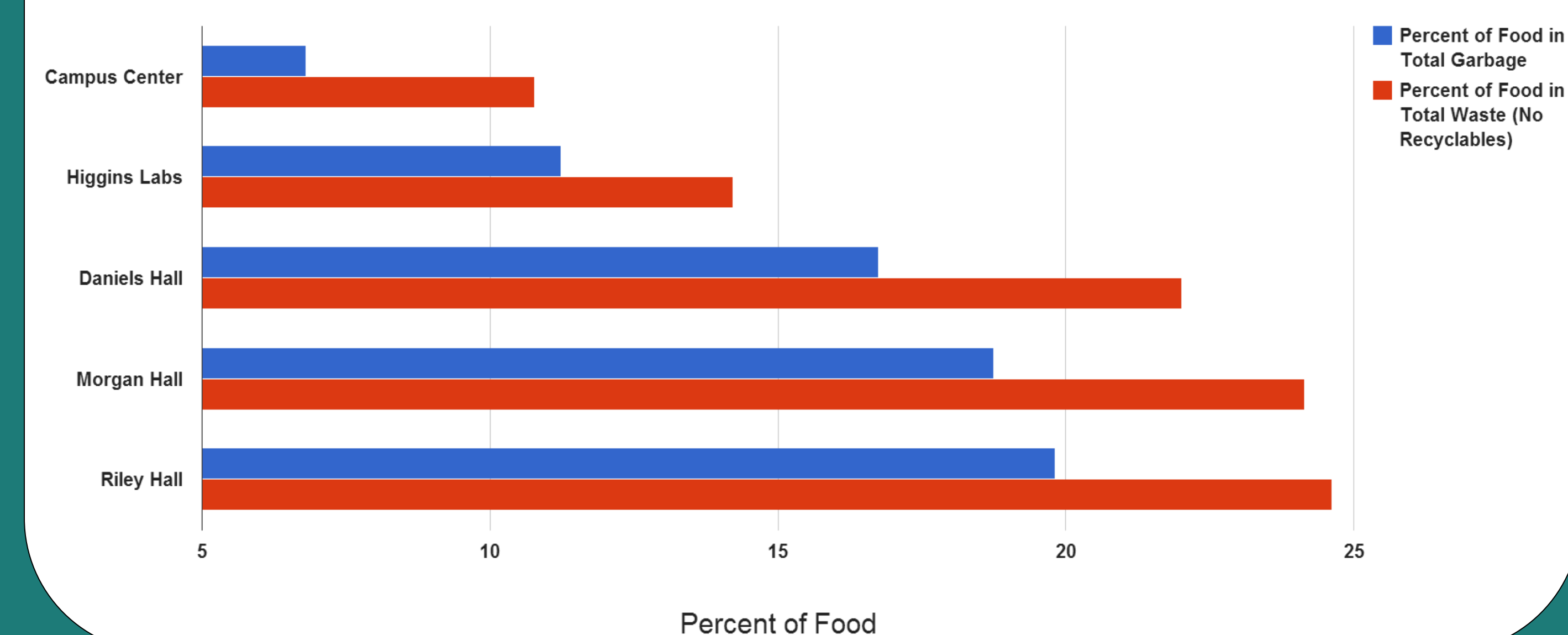
Massachusetts. Massachusetts Department of Environmental Protection. Executive Office of Energy and Environmental Affairs. Massachusetts 2010-2020 Solid Waste Master Plan: Pathway to Zero Waste. Massachusetts Department of Environmental Protection, Apr. 2013. Web. 4 Nov. 2013.
 United States of America. Environmental Protection Agency. Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2011. Washington, D.C.: Environmental Protection Agency, 2013. Print.
 Recycling Organic Waste. Rep. Practical Action, The Schumacher Centre for Technology and Development. n.d. Web. 14 Oct. 2013.
 Anonymous. "Preventing Fly Problems at Zoo Composting Project." *Bicycle* 37.12 (1996): 21. ProQuest. Web. 17 Oct. 2013.
 Natalie Garcia, and Journal Environment Writer. "Bulging Landfill Problem Studied." *The Providence Journal*. C.1. 2008. Print.
 Olivier, Paul A., Dr. "Utilizing Lower Life Forms for the Bioconversion of Putrescent Waste and How This Could Dramatically Reduce Carbon Emissions." Web. 14 Oct. 2013.
 Khaleel, R., K. R. Reddy, and M. R. Overcash. "Changes in soil physical properties due to organic waste applications: A review." *Journal of Environmental Quality* 19.2 (1991): 133-141.
 Williams, Edmund. "What to Compost." *Mad Bioneer*. Mad Bioneer, 08 Mar 2009. Web. 10 Nov. 2013. <http://madbioneer.blogspot.com/2009/03/what-to-compost.html>.
 Smith, Richard M., et al. "Urban domestic gardens (V): relationships between landcover composition, housing and landscape." *Landscape Ecology* 20.2 (2005): 235-253.
 "Waste and Recycling." *Sustainability*. Worcester Polytechnic Institute, n.d. Web. 14 Oct. 2013. <wpi.edu/about/sustainability/materi04.html>.
 WPI Student Green Team. "2013 WPI Waste Stream Audit." (Unpublished).

2013 WPI Waste Stream Audit Results

WPI Discards by Type (Non-Recyclable)



WPI Discards by Building



Conclusion

- WPI needs to develop a sustainable and low cost food scrap composting system on campus
- Capital investment can be secured from state grants
- Fertilizer could be sold to the community or spread on campus gardens
- Maintenance costs can be offset through profit and money saved by diverting material from waste management companies

Acknowledgments

Rebecca Zino, Steven Bandarra, Elizabeth Tomaszewski, Andrea Bourke, Dr. Marja Bakermans, and Dr. Geoffrey Pfeifer