



## Abstract

The Biggest Reducer program was developed, with a grant from the NOAA Climate Steward Education Project, to educate students about the growing problem of food-related waste and incite them to take action to reduce waste production during their daily lunches. Through recording of weekly waste production and an in-school assembly on waste reduction practices, the program aimed at a 15% waste reduction post-education. After a week of data collection and one random spot check, a 50% waste reduction was seen overall. The program materials are available online for replication.

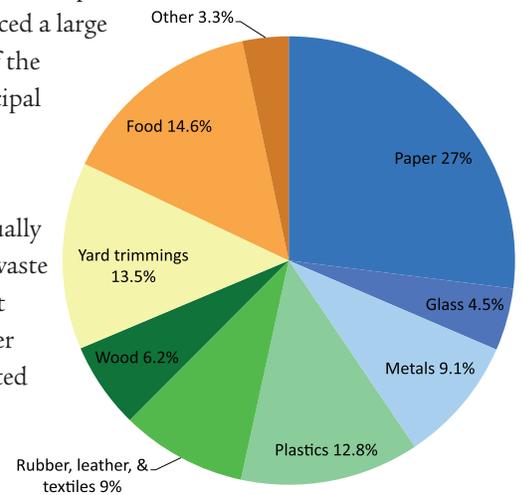
## Introduction

Unnecessary packaging and food waste plague our everyday lives. In 2013, Americans generated 254 million tons of municipal solid waste (Figure 1). The EPA estimates that an individual school lunch produces an average of 67 pounds of trash per year<sup>1</sup>. Through observation of school fieldtrips and summer camps, the staff at Riverwalk Nature Center in Rockledge, Florida noticed a large amount of prepackaged food with excess plastic and cardboard containers. Much of the packaging was plastic films and bags which cannot be recycled by most municipal recycling centers. Some of the waste was unnecessary packaging such as cardboard sleeves surrounding plastic containers.

The largest problem of food related waste might not be the food containers but actually the food itself. It is estimated that 30-40% of food produced is thrown away<sup>2</sup>. Food waste comprises around 15% of our waste stream, second only to paper<sup>3</sup>. If just half of that yearly waste was anaerobically digested, it would generate enough electricity to power over 2.5 million homes for a year<sup>4</sup>, or roughly the entire state of Nevada. It is estimated that in the US 3,000 pounds of food is wasted every second<sup>5</sup>. That is enough food wasted in one day to feed the states of California and Florida combined.

## The Biggest Reducer Was Born

In order to shed light on this issue, a pilot program, The Biggest Reducer, (Figure 2) to teach about the issue of food related debris was devised and tested on children attending Marine Biology Camp at Riverwalk: A Family Park. Children were given reusable Wrap-N-Mat sandwich wraps and tips on how to reduce waste. Changes were seen in the children’s lunch packing habits throughout the week. Some even continued these changes in behavior when they returned the following year. After



**Figure 1.** Total Municipal Solid Waste Generation (by Material), 2013, 254 Million Tons (before recycling)

Source: EPA



**Figure 2** (above left). Biggest Reducer Logo



**Figure 3** (above right). Students at Ralph Williams Elementary weighing waste produced during one lunch period



**Figure 4.** Student reducing plastic bags by using the Wrap-N-Mat given during program

seeing positive results with just a small amount of education, a decision to expand the program to reach a broader audience was made. Funding of \$2,000 was found through the NOAA Climate Stewards Education Project. A formal presentation was developed to be used in school assemblies and was offered to schools to cover up to 500 students.

A local school teacher was

consulted during the development to ensure school standards were being met through the program.

Upon the initial release three schools signed up to be involved in the program, Ralph Williams Elementary, Imagine School at West Melbourne, and Palm Bay Elementary. A workshop was held to familiarize the participating teachers with the program, insure they knew their responsibilities, and provide them with the supplies needed. Each teacher was provided with a digital hanging scale, data sheets, and a parent letter. Access to the digital copies of the data sheets and parent letter as well as the assembly presentation and supplemental materials was provided through Google Docs. The schools provided trash bags and waste receptacles (Figure 3).

Each classroom was then tasked with dividing out their lunch waste into three categories: recyclables, organic food waste (compostables), and trash. The weight of each category was taken daily and recorded on a weekly data sheet which was reported via a Google Form. The students were given no insight as to why they were measuring their waste for the week. On the final day of their first weigh week, a school assembly was held with the participating classes using the Biggest Reducer program. This program was shared via Prezi, which is accessible for any facility to use. The presentation teaches the principles of waste reduction including how to create a zero waste lunch and ways to expand waste reduction to a community level such as food donation programs and anaerobic food digestion facilities. All participating students were then given a Wrap-N-Mat reusable sandwich wrap to replace at least one disposable plastic bag (Figure 4).

A parent letter was sent home explaining the program's purpose and providing waste reduction suggestions and tips. Students were encouraged to practice their new waste reduction skills while they continued recording their waste the following week. This was then compared to the first week to see the amount of waste reduced. To tell if students were maintaining the waste reduction principles over time, they were then given a follow-up spot check on a randomly selected day several weeks after their initial participation. The spot check day was weighted at 50% of the overall reduction comparison due to the importance of continuing waste reduction practices beyond when they knew they were being monitored.

## Results

While the majority of classes saw an overall reduction of waste of up to 54% on the second week, surprisingly two of the classes had an increase in waste, with one as high as 72% (Figure 5). The teacher of Class 1 with a 26% increase attributed this to several less popular menu items being served during that week. The data suggests this is true as Class 1 saw a 642% increase in food waste from week one to two. Interestingly, the same class was the only class to reduce its trash by 100% with zero pounds of trash the second week; however, they increased their recyclables by 142%. When compared with the spot check day, Class 1 still maintained zero pounds of trash and had a reduction of 72% recyclables and 67% food waste. Class 3 with a 72% overall increase from week one to two, surprisingly showed a negligible increase in food waste but had a 226% increase in recyclables and a 318% increase in trash from week one to two. They improved considerably by their spot check with an 84% decrease in recyclables, 99% decrease in food waste, and 86% decrease in trash as compared to week 1. Overall an average of 50% waste reduction was seen between all the classes with an average daily reduction of 2246 pounds of waste. The EPA estimates one pound of waste produces 0.94 pounds of CO<sub>2</sub>; therefore, it can be estimated that 2111 pounds of CO<sub>2</sub> was reduced daily.

The category makeup of the waste changed after the educational presentation as well (Figure 6). Before the Biggest Reducer program was implemented, 60% of the waste was trash. After the presentation, the percentage of trash dropped to around 50%. A slight increase in recycling was seen, though due to the light weight nature of most recyclable materials the actual volume may have been more. Teachers reported that the students were most surprised to see the amount of food that was thrown away with their lunch.

## Biggest Reducer Resources

### Biggest Reducer Presentation

Prezi presentation teaching waste reduction principals created by Brevard County Parks & Recreation: [http://prezi.com/3lyacobtnd4z/?utm\\_campaign=share&utm\\_medium=copy](http://prezi.com/3lyacobtnd4z/?utm_campaign=share&utm_medium=copy)

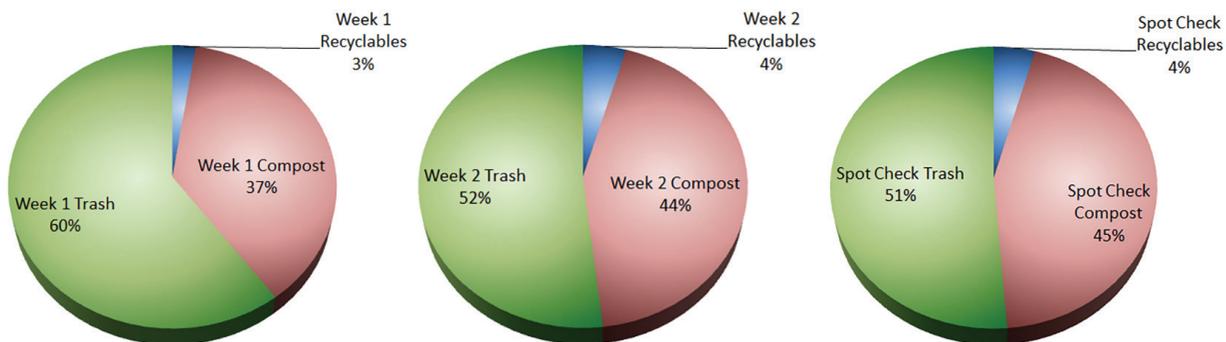
### Biggest Reducer Resources

Biggest Reducer Data Sheets and Parent Support Letter created by Brevard County Parks & Recreation as well as supplemental materials: <https://goo.gl/bAZI5Q>



**Figure 5 (above).** Percentage of waste reduced between five classes participating in the Biggest Reducer

**Figure 6 (below).** Percentage of waste by category compared by week and random spot check day



## Conclusion

When planning The Biggest Reducer, it was hypothesized that at least a 15% reduction in overall waste would be seen. The program was considered a resounding success when over three times that goal was reached. Since concluding The Biggest Reducer, new schools have asked to participate in

## About the Author

**Brandon Smith** is the Environmental Program Supervisor for Brevard County Parks and Recreation at Riverwalk Nature Center in Rockledge, FL. For 15 years, he has taught and designed environmental education programs mainly focused on the Indian River Lagoon estuary. He has served on the boards of the Florida Marine Science Educators Association, Space Coast Science Education Alliance, Sea Turtle Preservation Society, and Friends of the Carr Refuge. He has also had an active role in the National Network for Ocean and Climate Change Interpretation, NOAA Climate Stewards Education Project, and the Florida Master Naturalist Program. He has a Bachelor's degree in Marine Biology from the Florida Institute of Technology in Melbourne, Florida. Brandon can be reached at [brandon.smith@brevardparks.com](mailto:brandon.smith@brevardparks.com).

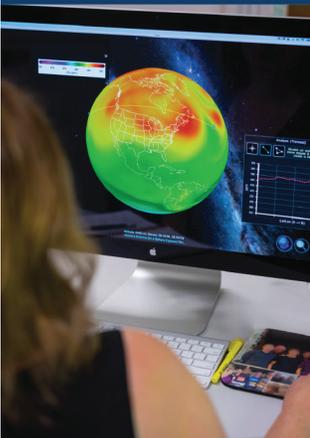
the program the following year. The program was also presented at the 2015 Florida Marine Science Educators Association annual conference. All the resources were shared with a packed session allowing them to implement it at their own facilities.

## References

- <sup>1</sup> Solid Waste and Emergency Response (5305W) EPA-530-H-05-002 <http://www3.epa.gov/epawaste/education/lunch.htm> (Accessed November 18, 2015)
- <sup>2</sup> United States Department of Agriculture. US Food Waste Challenge FAQ's. <http://www.usda.gov/oce/foodwaste/faqs.htm> (Accessed November 18, 2015)
- <sup>3</sup> Environmental Protection Agency. Municipal Solid Waste <http://www3.epa.gov/epawaste/nonhaz/municipal/> (Accessed November 18, 2015)
- <sup>4</sup> United States Environmental Protection Agency. Turning Food Waste into Energy at the East Bay Municipal Utility District (EBMUD). <http://www3.epa.gov/region9/waste/features/foodtoenergy/index.html> (Accessed November 18, 2015)
- <sup>5</sup> Environmental Protection Agency. Food Waste Management Cost Calculator Webinar <http://www3.epa.gov/region5/waste/solidwaste/compost/pdfs/foodwaste-newman-201006-landfilldata.pdf> (Accessed November 18, 2015)

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