INTRODUCTION

Zero Waste aims to minimize waste and resource consumption in order to conserve energy, mitigate climate change, reduce water usage, prevent accumulation of toxic materials, and minimize ecosystem destruction (Environmental Protection Agency). This independent study aims to achieve a Zero Waste lifestyle at the Macalester EcoHouse by ensuring that all waste produced or consumed ultimately is being recycled, re-used, or composted in some way, hence eliminating most potential waste destined for landfill. As the Spring 2012 semester progresses, the house will attempt to eliminate as many sources of landfill waste as possible. By tracking the trash produced in the house qualitatively and quantitatively each week, this study will strategize through write-ups the progress and challenges of waste reduction. The study ended on April 26th, 2012. Therefore, this data does not account for waste thrown away when students moved out.

METHODS

- Monitoring food/general waste by sorting trash into the categories listed below.
- Categories: waste (destined for landfill, cannot be recycled, reused, or composted), plastics (1 & 2), plastics (5), glass, cartons, aluminum, tin, office paper, paperboard, cardboard.
- Collecting data by weighing each category of trash weekly to watch for trends over the semester.
- Finalizing the results in a formal write-up that can used to further Zero Waste research at Macalester College and/or as a referenced for future EcoHouse residents and the community.

MATERIALS

Rapala® 25 kg Fish Weight

Four different trash bins

Compost Containers

Paper and pencil
RESULTS

Throughout the semester, data was collected weekly both qualitatively and qualitatively. Materials were listed under each category to observe patterns in types and weight of waste. All materials were observed and weighed in their respective categories. The following items were gradually reduced:

- Plastic food bags (i.e. carrot, rice, pasta, cracker, and nut bags) were reduced by buying in bulk.
- Chip, candy, ice cream packaging was reduced.
- Take out coffee cups were reduced.
- Take out containers from restaurants were reduced.
- Plastic milk cartons were replaced with paper cartons.
- Tea bags were replaced with loose leaf tea in bulk/paper tea bags that could be recycled.
- Meat was bought sparingly.
- Junk mail was reduced by online banking, unsubscribing to paper publications, and contacting customer care services about stopping catalogs that we consistently found in the mail.

The following items were gradually eliminated:

- Juice plastic bottles were eliminated.
- Yogurt containers were eliminated.
- Tofu containers were eliminated.
- Paper towels were eliminated.

The following items were consistently found in the waste each week and were not reduced or eliminated:

- Cheese plastic wrap
- Granola wrappers
- Medicine containers
- Daily contact disposable cases
- Shipping material
- Raisin came in small bags that were not eliminated.

The weight (in kilograms) of landfill waste increased from January 26th to February 13th. This could be for numerous reasons including but not limited to:

- the waste brought from home was gradually thrown away
- the move in process produced waste over the first few weeks of the semester
- residents were becoming acclimated to sustainable shopping and living routines

After February 13th, landfill waste was decreased to the lowest level of 0.20 kg (the week of March 2nd). This decrease could have been because:

- conversations about reducing waste were facilitated at communal dinners
- there were intentional changes in shopping habits
- more time was spent out of the house as the semester became busier
From March 1\textsuperscript{st} until April 26\textsuperscript{th}, the amount of waste fluctuated consistently. Overall, the trend showed a decrease in waste produced during this time period with the lowest weight of waste at 18 kg on March 22\textsuperscript{nd} and April 12\textsuperscript{th}. Weeks of larger amounts of waste could have been for the following reasons:

- Broken ceramic bowls affected the weight of the waste dramatically.
- The project becoming less of a priority throughout the semester.
- Residents became increasingly busy with academic work and less time was spent at home/devoted less time to the house.
- Less intentional communal time was set aside where waste could be discussed.

However, overall habits established at the beginning of the semester such as buying in bulk, bringing reusable containers (to store, coffee shops, and out to eat) were generally upheld.

**Recyclables**
The weight of recyclables also gradually decreased over the course of three months presumably for similar reasons.

### Bathroom waste
In the second half of the semester, bathroom waste was weighed. During the first half of the semester, bathroom waste was not weighed to respect the privacy of other residents. However, halfway throughout the semester it was decided that this would be useful data to collect. Bathroom waste was weighed separately beginning March 8\textsuperscript{th} to see how much waste and what waste was being produced in the bathroom. Personal care packaging such as tampon waste, shampoo/lotion bottles, toothpaste and deodorant containers, disposable contact containers, and floss were sorted in the garbage. The weight of the bathroom waste fluctuated from week to week. Most weight came from feminine care products such as tampons and pads.

<table>
<thead>
<tr>
<th>Date</th>
<th>Kilograms of Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-Mar</td>
<td>0.31</td>
</tr>
<tr>
<td>15-Mar</td>
<td>0.09</td>
</tr>
<tr>
<td>22-Mar</td>
<td>0.08</td>
</tr>
<tr>
<td>29-Mar</td>
<td>0.09</td>
</tr>
<tr>
<td>5-Apr</td>
<td>0.3</td>
</tr>
<tr>
<td>12-Apr</td>
<td>0.5</td>
</tr>
<tr>
<td>19-Apr</td>
<td>0.6</td>
</tr>
<tr>
<td>26-Apr</td>
<td>0.3</td>
</tr>
</tbody>
</table>

**ANALYSIS**

In 2008, the average amount of waste generated by each person in America per day was 4.5 pounds. 1.1 pounds of that was recycled, and 0.4 pounds, including yard waste, was sent to composting. In total, 24.3% of waste was recycled, 8.9% was composted, and 66.8% was sent to a landfill or incinerated (Clean Air Council). At the EcoHouse, an average of 13% of the total amount of recyclables and waste was sent to the landfill. An average amount of 0.29 pounds of waste/recyclables was produced by each person living in the house per day (4.21 pounds less than the national average).

**RECOMMENDATIONS**

1. There was much less discussion about waste reduction throughout the semester between the residents in the house than expected presumably due to the busy schedules and the limited formal initiative to start discussion on my own part. Therefore, recommendations for greater community building in future zero waste projects include:

- Meeting with residents of the house to present this data on a regular basis.
• After some data is collected, determining what items can be easily eliminated, what items can be reduced, and what items will continue to be purchased.
• Discussing on a regular basis the resident’s feelings about the project.
• Setting concrete goals to reach each week with an understanding that we are all doing the best we can to be sustainable in this space.
• Posting the results each week in the house (i.e. on the fridge) or sending out data to residents so they can remain involved.
• Attaching friendly reminders to shopping bags about how to reduce packaging while shopping.

2. In this study, compost was not weighed due to the need to carry out the compost daily which proved too difficult to measure on a consistent basis. Given more time or a more smell-proof compost container to put in the kitchen, weighing the compost would have given a more complete calculation on the amount of waste produced. I recommend purchasing a small postage scale to go by the compost. Having a clipboard and table with instructions would make it easier for residents taking out the compost to quickly weigh the contents before taking it to the outdoor compost bin.

3. I recommend obtaining three basic, trash bins (~10 gallons) with a hole punched into the side to make weighing waste with the fish hook easier. I also recommend designating a “recycling and waste center” where the three bins (with labels/instructions) and a compost bin can be easily accessed.

ADDITIONAL RESOURCES

Mac Free Swap
An online forum where Macalester community members’ possessions go from trash to treasure. You can list unwanted items and obtain the free supplies listed by other Macalester community members and college departments. Log onto 1600 Grand and click on the Mac and Beyond tab.

Twin Cities Free Market
The Twin Cities Free Market is an absolute gold mine for getting rid of things and finding things for free. This is a project through Eureka Recycling, which manages the recycling program for St. Paul, Anoka and Washington County residents.

Feminine Care Products
An estimated 12 billion feminine hygiene products are dumped into the North American environment each year. I list some alternatives here. If you prefer to use tampons, you can use a Diva Cup. The up front cost is more ($40-50) but one Diva Cup will last you at least one whole year and you will save a lot of money compared to using tampons. The average box of 18 tampons will cost about $7. Say you need a minimum of 3/day for a week every month that means you will need 14 boxes of tampons which will cost you $98/year. The feminine hygiene product Diva Cup will cost you half as much. Although the Diva Cup is made from silicone, it is phthalate-free, latex-free, plastic-free and BPA-free. Another option is the brand called The Keeper. If you’re more into pads, check out Reusable Pads with the fun name, Party in my Pants.

Art Scraps
ArtScraps (http://www.artstart.org/artscraps-reuse-store/) is an innovative concept that combines waste management with art making! In a unique partnership with businesses and
manufacturers, ArtScraps collects scraps, overstock, factory rejects, and other items normally destined for the landfill. It is located at 1459 St. Clair Ave.

**Saint Paul Farmer’s Market**
Farmer’s Markets help reduce food miles, thus vehicle pollution, noise, and fossil fuel use, encourage more environmental production practices, such as organic or pesticide free. Packaging requirements are less thus reducing the amount of non-food waste. The **Saint Paul Farmer’s Market** is located at 290 E 5th St, St. Paul, MN 55101 (biking distance from Macalester!). It’s open Saturdays from 6:00-1:00 and Sundays from 8:00 to 1:00.

**Mississippi Market Cooperative**
A simple way to reduce post-consumer waste, eliminate excess packaging, save money, buy fresh, and only in quantities that you need is to shop in the **bulk** department at Mississippi Co-op (and bring your own container to refill too!) Mississippi Market offers lots of self-service bins loaded with grains, rice, beans, pasta, shelled nuts, coffee, teas, spices, granola, dried fruits, candy and more. They even carry liquid bulk items including maple syrup, honey, oils, soaps, shampoos and laundry detergent.

**Macalester Zero Waste Committee**
Visit [http://www.macalester.edu/sustainability/zerowaste/index.html](http://www.macalester.edu/sustainability/zerowaste/index.html) to learn more about how Macalester is working to reduce their waste. Keep in mind that there are places at Macalester set up to recycle some odd items:

- Small and Medium Electronics used on campus, such as radios and computer components, can be brought to the E-Waste Recycling bin located in the Sustainability offices, on the first floor of Kagin Commons
- Number 5 Plastics cannot be put in the standard plastic recycling bins. However, these plastics can now be recycled in the lower level of the campus center. Also, Whole Foods, located just west of campus on Grand, does have a collection bin for these.
- PDAs and Cell Phones can be brought to the bin located in front of the Highlander Store, in the lower level of the campus center
- Inkjet Printer Cartridges and Overhead Transparencies are collected by Ann Esson in the Environmental Studies Department Office, Olin-Rice 249. Inkjet cartridges can also be brought to the bin in front of the Highlander Story, in the lower level of the campus center.
- Plastic bags can also be recycled in the lower level of the campus center.

**Rethink Recycling**
**Rethink Recycling** is a campaign and website to give citizens the information needed to make these decisions, so to reverse the ever-growing waste stream and protect the environmental health of the six-county Twin Cities metro area. Visit their informative website for guides, suggestions, facility locations for waste and more.

**The Story of Stuff**
From its extraction through sale, use and disposal, all the stuff in our lives affects communities at home and abroad, yet most of this is hidden from view. The **Story of Stuff** is a 20-minute, fast-paced, fact-filled look at the underside of our production and consumption patterns. The Story of Stuff exposes the connections between a huge number of environmental and social issues, and calls us together to create a more sustainable and just world. It'll teach
you something, it'll make you laugh, and it just may change the way you look at all the stuff in your life forever. Watch it here: http://www.storyofstuff.org/movies-all/story-of-stuff/

**Eureka's A-Z Recycling and Safe Disposal Guide**
This is a great resource if you are looking to recycle, reuse, or properly dispose of an item and can't find a way to do it.

**Reduce Waste Website**
This website, supported by the Minnesota Pollution Control Agency, has great suggestions on how to reduce your waste. I found the resources about stopping junk mail to be the most helpful.

**ACKNOWLEDGEMENTS**

This project would not be possible without the continued dedication of the current EcoHouse residents Leah Plummer, Lisa Goese, and Nicholas Matzke. A special thank you to Suzanne Hansen and Chris Wells for guidance and support. Thank you to MN Waste Wise for providing this project with a fishhook. Thank you to the Macalester Sustainability office for their continued efforts on campus and their extensive resources used frequently throughout this project.

**REFERENCES**


*Discussion Course on Voluntary Simplicity*, Portland: Northwest Earth Institute, 2008.

*Discussion Course on Choices for Sustainable Living*, Portland: Northwest Earth Institute, 2008.
