Erb Memorial Union Food Services Waste Study

An Environmental Studies
Service Learning Program Project
in Cooperation with:
The Erb Memorial Union
University of Oregon Campus Recycling

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1.0 EXECUTIVE SUMMARY

In fall term 2002, the Environmental Studies Program Service Learning Program (ESSL), assembled a group of four undergraduate students to study possible ways to reduce the amount of waste produced by food service operations in the Erb Memorial Union (EMU) at the University of Oregon. The study began with narrowing the field of possible options and eventually settling on three: changes to service practices, reusable plates and utensils, and composting. With those options in mind, the team began site-based research in the EMU and began to examine the three options in depth from various angles.

Case studies and interviews with selected peer institutions (Oregon State University, University of British Columbia, Humboldt State University, and Michigan State University) enabled the team to investigate the waste reduction activities of other institutions of higher learning. Through case studies, the team found a variety of waste management approaches from small in-vessel to large institutional composting and a myriad of waste reduction programs. These case studies gave the team insights into the successes and challenges of other institutions' programs and resulted in the team developing a strategy that informed the formulation of the final recommendations.

The team conducted original research while developing its recommendations. Each team member conducted interviews with EMU Food Services vendors with the intent of informing them of the team's progress and areas of inquiry and to solicit their desires and feedback on the study. A major weeklong waste audit of EMU Food Services yielded important information regarding exactly what types and amounts of waste EMU Food Services produces in a week. Additionally, the team designed, implemented, and analyzed a survey aimed at gathering the opinions of EMU Food Services patrons regarding the team's research and proposed recommendations. A demonstration project to promote reuseable plates was performed primarily as a promotional and educational tool.

Combined, all of the team's efforts formed a research strategy that sought to gather information from outside sources to determine the best practices in waste management of other public and private institutions. Internal sources alllowed the team to discover the needs, incentives, and barriers of the food operations with regard to the team's proposed waste reduction operations. Lastly, the team framed its overall work with the waste audit and the survey, which sought to gather information about the amount of waste actually produced and, perhaps most importantly, the attitudes of the people who helped produce it.

This research strategy led the team to produce a set of recommendations for the EMU, organized in three levels. Level I recommendations aim to affect change with the least amount of monetary investment through the pointed use of education and outreach. Level II recommendations seek to implement a reusable plate system in EMU Food Services to utilize the existing resources such as dishwashing facilities and UO card swipe system. Level III recommendations suggest the purchase and implementation of an Earth Tub in-vessel composting system to divert food and food-related waste. The purchase and instillation of an Earth Tub will require significant capital investment and infrastructure modification and will require more study.

This report is a consolidated product of many months of researching and writing about the challenges of discovering and promoting methods to reduce waste not only at EMU Food Services, but at the University at large and the Eugene-Springfield and Lane County communities.

2.0 INTRODUCTION

2.1 Background

In Lane County, 800 tons
of garbage is dumped into Short Mountain Landfill each working day,
contributing to a mushrooming 72-acre footprint on our community. Short Mountain Landfill received 230,000 tons of garbage in 2001. Much of this garbage comes from not reusing or recycling materials such as plastic bags, cans, and paper products. Yet, an astounding 17% of waste residing at Short Mt. landfill is residual food waste.[1] According to the Population Research Center in Portland, OR, the Eugene-Springfield metropolitan area has grown 24.7% since 1990, and will continue to dispose increased amounts of garbage into Short Mountain landfill. With the Southern Willamette Valley forecasted to grow by 25% in the next decade, new ways of reducing landfilled waste must be found. Additionally, production-side impacts (upstream impacts) such as dioxin continue to pollute soil and water as more "disposable" products are produced, purchased, and eventually placed into the waste stream. In addition to mitigating the impacts from the downstream side in landfills, the team hopes to encourage *reduction* in waste from EMU food operators and consumers, thus reducing the amounts of harmful by-products from the production process and relieve pressure on landfills.

2.2 Issue

During one week in winter term 2003, EMU Food Services generated and disposed 9.67yd≈ of food and food-related waste. Most of this waste came from the use of disposable materials such as plates, cups and forks, plastic bags, and napkins. Because all food establishments serve food and beverages in disposable paper and plastic products, they generate 72.83% of the total volume of the EMU's waste stream.

Daily Disposal Averages for EMU Food Services:

- 700 lbs. of garbage generated
- 530 lbs. of recyclable materials generated

Annual Cost of Disposing and Recovering Materials for EMU Food Services:

- $18,000 for solid waste removal
- $30,000 invested in recycling efforts

Resources that enter a landfill do not decompose; they decay. When organic materials, such as an apple or uneaten salad go unrecovered they enter a dead end energy cycle in our landfill and vent harmful chemicals into the atmosphere. Because bacteria are not present in the landfill to fix nutrients derived from the apple into nitrogen and other compounds, carbon dioxide and methane – both greenhouse gasses – are released. These decaying materials can also leach in to the water. Thus landfills, also being sinks for disposable food ware, become huge sources for land, air and water pollution. On the other hand, recovered or reuseable materials that are part of one cycle eventually end up as part of another cycle. As a part of a reusable system, a plate used to serve a patron a pastry in the morning could be used to serve another patron a sandwich for lunch. Each user plays a role in prolonging the use of the plate.

Materials that can be pulled out of the dead-end energy cycle are high-use items that require huge amounts of inputs for manufacturers to produce their disposable counterparts:

The University should strive to be a leader in the community for achieving or working toward zero food and food related waste. Composting and recycling can stimulate this endeavor to reduce waste, however, purchasing changes and the implementation of reusable food ware would make the University's food service system preferrable to the current system of disposal. Opportunities for reduction through diversion and source reduction exist and some can be implemented with little cost.

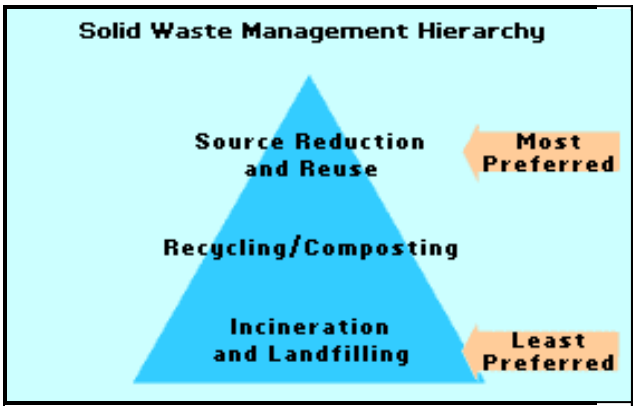

Figure 3. Lane County's Solid Waste Hierarchy Image Courtesy of Lane County Solid Waste Mangement

Food Services should be taking steps to reduce waste at the source. Because of Campus Recycling's outstanding endeavors, the University and EMU Food Services, has climbed up to middle plane in Lane County's solid waste hierarchy (figure 3), yet is still bogged down in a paragdim that encourages landfilling of all other resources. This in itself is only partial success. Source reduction should be the goal, which would involve changing the types of food-related products used and promoting consumer reuseables, such as reuseable beverage containers.

2.3 Project Partners

The EMU Food Services

The Food Services arm of the EMU houses ten individual vending establishments, with Greatful Bread and The Buzz operated by the EMU, and eight outside venues operating under licensure of the EMU. EMU Food Services Director, John Costello, has greatly assisted our team in exploring and developing options for reducing waste.

Figure 4. The Fishbowl, one of the main dinning areasin the EMU. Photo courtesy of the EMU.

Greaful Bread is primarily a coffee and pastry venue, also serving homemade sandwiches and soups. Many patrons order a cup of coffee as they are heading off to lecture or study. It has a convenient location adjacent to University Street, in the heart of the Fishbowl.

Photos courtesy of the EMU

Disposed materials from Greatful Bread's waste stream:
coffee cups ⟨ paper pastry sleves ⟨ paper pastry plates ⟨ plastic utensils
plastic to-go containers ⟨ poly-lined cold cups ⟨ plastic cold cups

The Buzz is a trendy coffee shop located on the bottom floor of the EMU. Many students relax with a cup of coffee or converse with friends in an environment punctuated with original works of art and lively music. An a la carte menu features daily soups, breads, pastries, and sandwiches. The Buzz has recently added pizza to their menu, which is served in individual boxes.

Photo courtesy of the EMU

Disposed materials from the Buzz waste stream:
coffee cups ⟨ poly-lined cold cups ⟨ paper pastry plates ⟨ plastic utensils
cardboard pizza boxes ⟨ plastic to-go cartons ⟨ soup bowls

Holy Cow Café serves an entirely vegetarian and organic menu. The café offers hot meals and a salad bar with daily soup specials. They also feature and bottled beverages from local businesses. Meals are served on customer's choice of a paper or a reusable plate.

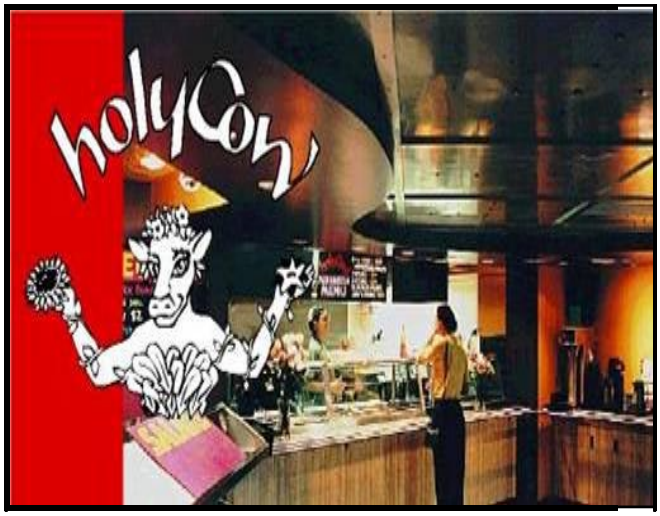

Photo courtesy of the EMU

Disposed materials from the Holy Cow Café waste stream:
paper plates ⟨ plastic utensils ⟨ napkins ⟨ chop sticks
soup containers ⟨ plastic cold cups

Subway serves many students a traditional cold lunch style meal. Most customers get a sandwich meal deal with separately packaged chips and fountain drinks. Sandwiches are prepared as they are being ordered and preparing sandwiches requires employees to use plastic serving gloves. Sandwiches are individually served wrapped in paper.

Photo coutesy of Jessica Rose

Disposed materials from Subway's waste stream:
paper sandwich wrap ⟨ plastic bags ⟨ napkins ⟨ poly-lined cold cups
package of chips ⟨ paper straw wrappers ⟨ plastic serving gloves

Andrew Smash serves veggie burgers with potato chips, bottled beverages and smoothies. Food is served on a piece of paper cradled by a reusable plastic tray. Pre-consumer food waste is low, however, recycling of tin cans from food preparation and food packaging could be recycled.

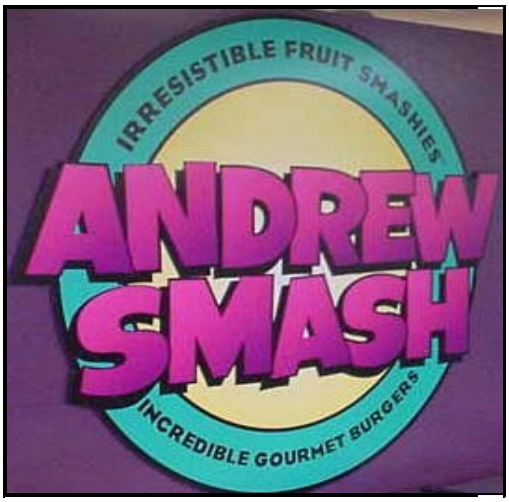

Photo by Jessica Rose

Disposed materials from Andrew Smash's waste stream:
plastic basket linings · poly-lined cold cups · individually wrapped condiments
plastic cold cups · napkins · plastic eating utensils

The Market Place houses five vendors with diverse menus. India House, Ritta's Burritos, Pita Pit, Orient Express, and Kim's Bento alternate Monday through Friday.

Photo by Jessica Rose

Disposed materials from Market Place waste stream:
sandwich wrap ⟨ lined paper cartons for hot plates of noodles
wax-lined cold cups ⟨ plastic to-go containers with lids ⟨ napkins ⟨ plastic eating utensils

2.4 Project Methodology

Goals of this study revolve around possible ways for EMU Food Services to reduce waste. Throughout this year, our team has consulted with each vendor, some continually, our advisory board, and EMU Food Services Director. Our team has taken three major steps that refined our list of feasible recommendations.

Step 1: Understand exactly how Food Services operates as a whole establishment. Critical things for us to understand were that little space was available for increased receptacles for an improved recovery system and the culture and attitudes toward recycling and other waste management issues among vendors.

Each venue has various operational conditions as well as overall character that is in its own best interest to preserve. Attitudes toward methods for reduction were reflected by constraints such as space, time, and overall efficiency and accountability.
Mainly, our initial efforts focused on becoming:

- Oriented with how each venue operates
- Familiar with patron behaviors

Step 2: Became familiar with the venues, and formulate a comprehensive set of goals.

Goal 1. Research options for waste reduction and diversion
Goal 2. Analyze EMU food services waste stream
Goal 3. Collaborate with vendors regarding waste management issues
Goal 4. Educate EMU users about waste prevention and reduction efforts
Goal 5. Recommend institutionally and economically feasible options to the Advisory Board, resulting in actual waste reduction.

Step 3: To refine our work, data collection, survey and analysis, and feasibility study were main paths we took to comprehensively develop waste reduction methods for EMU Food Services. By using information gained with each goal reached, we explored a set of paths to follow on the way to a set of feasible recommendations that are tooled for EMU Food Services.

Recommendations are a refined set of outcomes and final review of:

- Web-based research
- Observations of patrons' behavior
- Tour of Food Services with staff
- Data collected from our waste audit
- Interviews with waste management specialists
- Interviews with peer institutions
- Survey of 300 EMU users
- Demonstration project

Working toward achieving all five goals required continual revision and ingenuity. Each goal achieved gave this project more integrity, putting it in the ballpark for feasibility.

Goal 1 *Research options for waste reduction and diversion*
Accomplished by investigating four options for waste reduction:

1. Retool existing service through food service employee education or moving to service options that reduce waste, are easier to recycle, or compostable.
    - Observations were made of existing system and research of wise use of resources contributed largely to formulation

2. Educate consumers about how to reduce waste. Promoting reuseable beverage cups will reduce a larg eamount of waste by a closed-loop approach using reuseable food ware and compostin education.

3. Implementing a Reusable Plate Deposit System
    - Research largely came from our case studies.

4. Develop a composting system for food and food-related waste.
    - Research of case studies and implementation.
    - Research from City of Eugene
    - Research from Lane County

Goal 2 *Analyze EMU food services waste stream*
Accomplished by conducting a waste audit. It set a baseline for improving waste diversion projects. Furthermore, we quantified Food Services potential for reduction because we discovered the volume of materials that could be:

- Reduced
- Composted
- Recycled
- *or* Had reusable substitutes.

Goal 3 *Collaborate with vendors regarding EMU waste management issues*
Accomplished by conducting interviews with vendors. Each vendor was contacted to review results of the waste audit and to solicit ideas for recovering wasted materials.
Goal 4 *Educate EMU users about waste prevention and reduction efforts*
Accomplished by conducting a survey to know who our patrons are and what their degree of interest in reducing waste is.

- Education needed
- Level of interest
- Medium for education
- Website development

Goal 5 *Recommend institutionally and economically feasible options to the Advisory Board, resulting in actual waste reduction*
Accomplished by presenting a final set of recommendations that are feasible for the current Food Service system. These recommendations will reduce waste based on our waste audit. Recommendations have a broad scope beginning with education, and a series of more probing methods for reduction. They are tiered at three levels: education, for vendors and patrons; reusable plates, oriented toward reducing source waste; and in-vessel composting, for diverting organic waste. Based on cost, education is least costly and a reusable plate system is second because Campus Recycling posses plates Food Services can use. All recommendations have been carefully researched and formulated to fit the character of EMU Food Services at a multi-vending entity.

It is our hope as students and members of this community that these recommendations serve as a compass for achieving major waste reduction. We have estimated 81.22% of total volume could be reduced if they are all implemented. Eventually Implementing all three options will insure the best

achievable outcome for Food Services as well as the surrounding community. We have shared an environmental ethic – to begin reducing waste and work towards zero waste – with our partners in this project that we hope they will embrace.

Recommendations have environmental equity, business and investment, and community outreach interwoven throughout to achieve progress that serves the greater good. The combination of the three recommendations will propel EMU Food Services toward achieving the greatest amount of progress.

2.5 Conclusion

There is a real danger that lies in this mass of garbage unseen by so many EMU Food Services patrons and employees. As hungry lunchtime patrons, much of our focus is to get good food the quick and easy way. Vendors and patrons by in large are addicted to the *toss what is waste* mentality predicated on the currency that a disposable food ware system has provided. It is an issue of convenience, and cost-savings strategy for vendors.

The *toss what is waste* mentality is the largest contributor to our growing problem with waste because it is a well-ingrained behavior. One way to deal with this is to bring to the attention of patrons and Food Services is that what we often toss is not waste through eduaction conerning alternatives to disposables. Mostly, these materials are wasted opportunities to recover valuable resources. Composting is a great example of yielding to valuing resources rather than tossing them in the landfill. We know that food items, as well as paper plates and chop sticks, can break down in natural processes. We know that they yield mulch and soil. We also know that as soon as we toss resources in the garbage they only feed our growing landfill, and pollute the environment.

The waste stream feeding into Short Mountain Landfill and the waste stream feeding into EMU food services three dumpsters share a common problem – tons of materials can be recovered from the waste stream. The University of Oregon EMU Food Services contributes 3,500 lbs. of the 5,000 tons of wasted material entering Short Mt. Landfill each day. Five thousand tons of garbage is enough to fill Autzen Stadium seven times each year.[2]

But when we rip this system apart we discover many unforeseen opportunities for waste reduction and cost savings. Vendors' behaviors are often focused on cost savings. But this is a false sense of cost savings, only forecast for the short term. With 81.22% of the total volume of garbage reduced or diverted (and possibly more), an $18,000 waste bill can be eliminated or significantly reduced as well as savings from no longer having to pay to purchase disposable products, only to watch thrown into the trash. Composting, a reusable option, and changes to service practices could change how we account for garbage costs as well as our valued resources.

REFERENCES

1. "In 2001, Short Mountain Landfill accepted over 230,000 tons of Lane County's trash". http://www.co.lane.or.us/PW_WMD_Disposal/default.htm
2. Maben, Scott. Register Guard November 21, 2002. Paraphrased.

3.0 WASTE AUDIT

3.1 Profile

In effort to establish a base line for the types of materials discarded by the Erb Memorial Union's (EMU) Food Services, the EMU Team conducted a five-day waste audit, beginning January 27, 2003. The waste profile determined by volume:

- 9.67 cubic yards of food waste was generated.
- 41.1% of the total volume is potentially compostable material.
- 26.37% of the total volume is beverage containers and lids (not compostable).

3.2 Methodolgy

The study was conducted Monday through Friday January 27th through 31st 2003 at the University of Oregon. The site encompassed multiple dinning areas in the EMU: the atrium, dinning area adjacent to the atrium, the fishbowl, and the south dinning area were included as well as pre-consumer waste from each vendor. Garbage was collected and transported from the EMU to Facilities Services for sorting, weighing and recycling.

Each bag of garbage was sorted into lined and labeled garbage cans. Garbage was sorted by hand into 13 categories:

- Trash
- Paper Wrappers and Pastry Sleeves
- Plastic Bags
- Coffee Cups and Jackets
- Paper Plates
- Wax-lined Cold Cups
- Food Waste: No Meat or Dairy*
- Food Waste: Meat and Dairy*
- Napkins
- Plastic Cold Cups
- Cold Cup and Coffee Lids
- Plastic Utensils
- Coffee Products (grounds, filters)

* Two food waste categories were established for the audit; however, further research determined that both categories are resources for compost. Food Waste difficult to separate from trash went into trash. Therefore the data for both Food Waste categories are considered conservative. Food waste without meat or dairy is currently compostable. Currently in the Eugene-Springfield area, food waste with meat and dairy cannot be composted, but Rexius Forest Products is researching a composting system that will allow meat and dairy into the composting stream.

The team also had to take into condsideration that much of the waste may have "walked off" in the hands of customers who took thier food to other places on campus. The wet weather of January however, tended to keep patrons in or near the EMU.

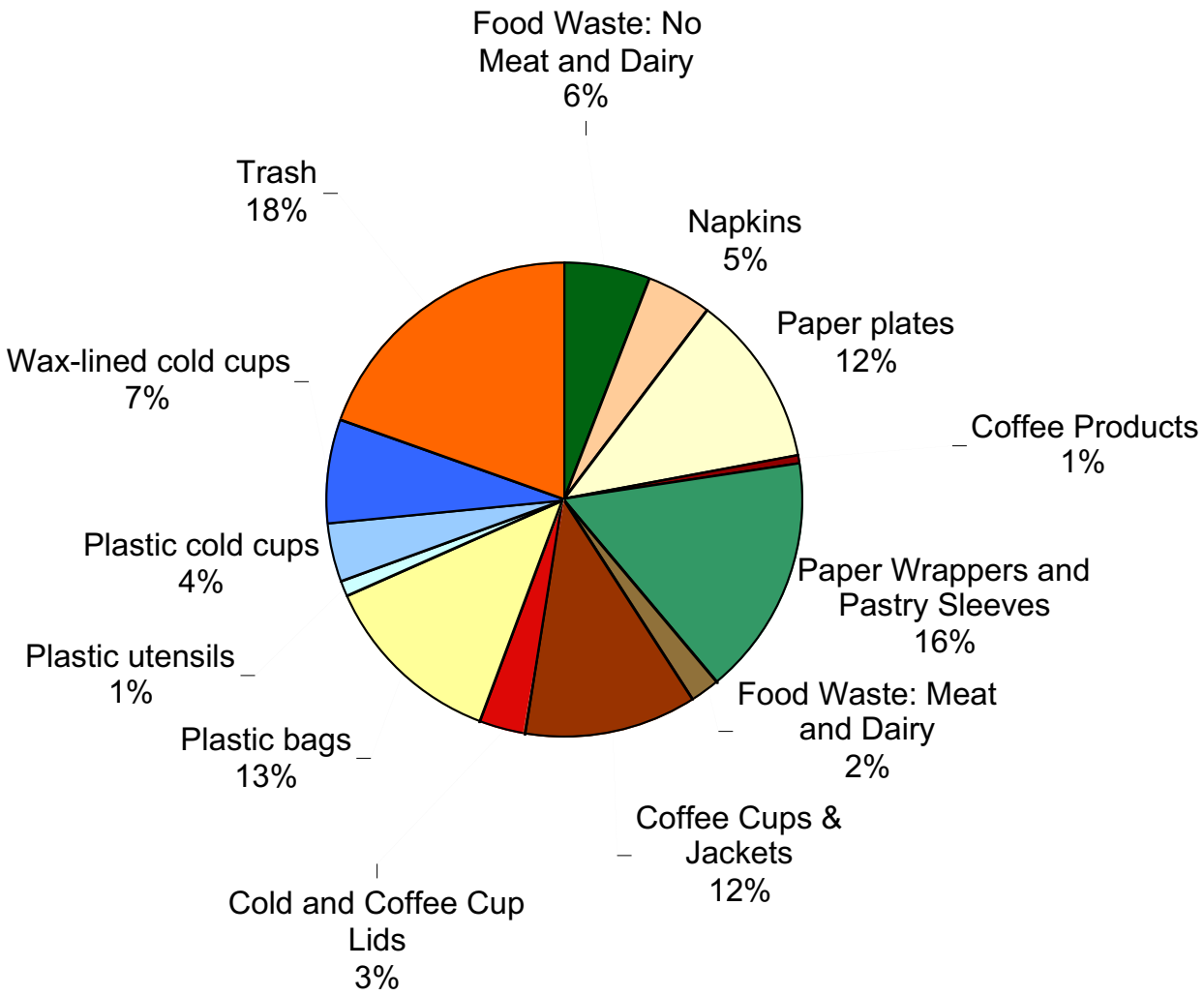

Figure 5: EMU Food Services Waste Profile

3.3 Results

Total volume for the week was 9.67 cubic yards of trash; more than three Dumpsters worth. Total weight was 856.8 lbs. Because the EMU is charged by volume, it will be the primary unit discussed.

Currently Recoverable:*	Weight (lbs)	Volume (in^3)	Volume (yd^3)	% Total Volume
Food Waste: Meat and Dairy	43.6	8423.6	0.18	1.66
Napkins	41.7	20515.44	0.44	4.58
Paper plates	43.1	52779.19	1.13	11.76
Coffee Products	59.9	2766.08	0.06	0.6
Paper Wrappers and Pastry Sleeves	77.1	73524.64	1.58	16.37
Currently Non-recoverable:*				
Food Waste: No Meat and Dairy	180.9	25891.54	0.56	5.77
Cold and Coffee Cup Lids	4.7	13479.2	0.29	3.01
Plastic bags	14.3	57245.76	1.23	12.5
Plastic utensils	15.6	4622	0.09	0.94
Plastic cold cups	14.3	17593.65	0.38	3.95
Poly-lined cold cups	35.8	32987.15	0.71	7.38
Coffee Cups & Jackets	26	53878.64	1.15	12
Trash	299.8	87036.96	1.87	19.48
Total	**856.8**	**450743.85**	**9.67**	**100**

Table 1. Weekly totals for all 13 categories were recorded and converted into weight, volume, and percent of total volume.

* When designing the waste audit, the team decided to sort materials into these two larger categories. "Currently Recoverable" waste comprises materials that can be diverted from the waste stream by composting, as demonstrated by UO Campus Recycling at the ASUO Street Fair and the Willamette Valley Folk Festival. "Currently Non-recoverable" waste comprises materials that cannot be diverted in their current form. For example, disposable coffee cups currently used by EMU vendors are not recyclable or compostable due to the polyethylene lining used to prevent leakage. Coffee cups that are made of unbleached paper, have food-grade wax lining and are double-stamped on the bottom to prevent leakage can be recycled (if clean) or composted.

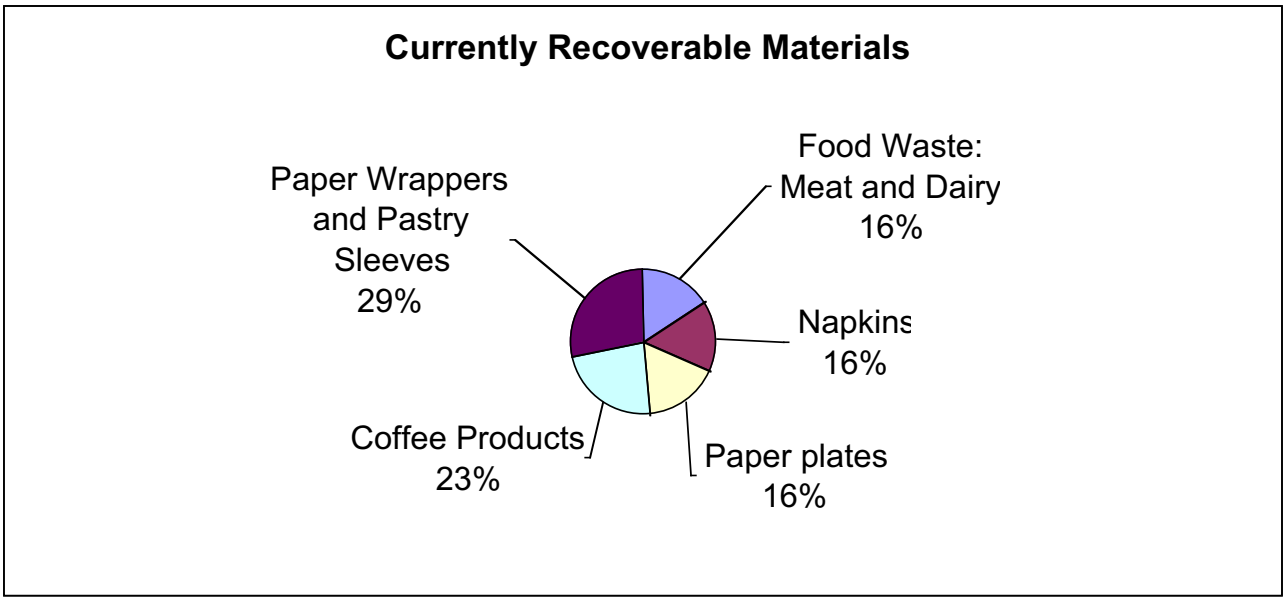

Figure 7. Percent by volume of currently recoverable materials

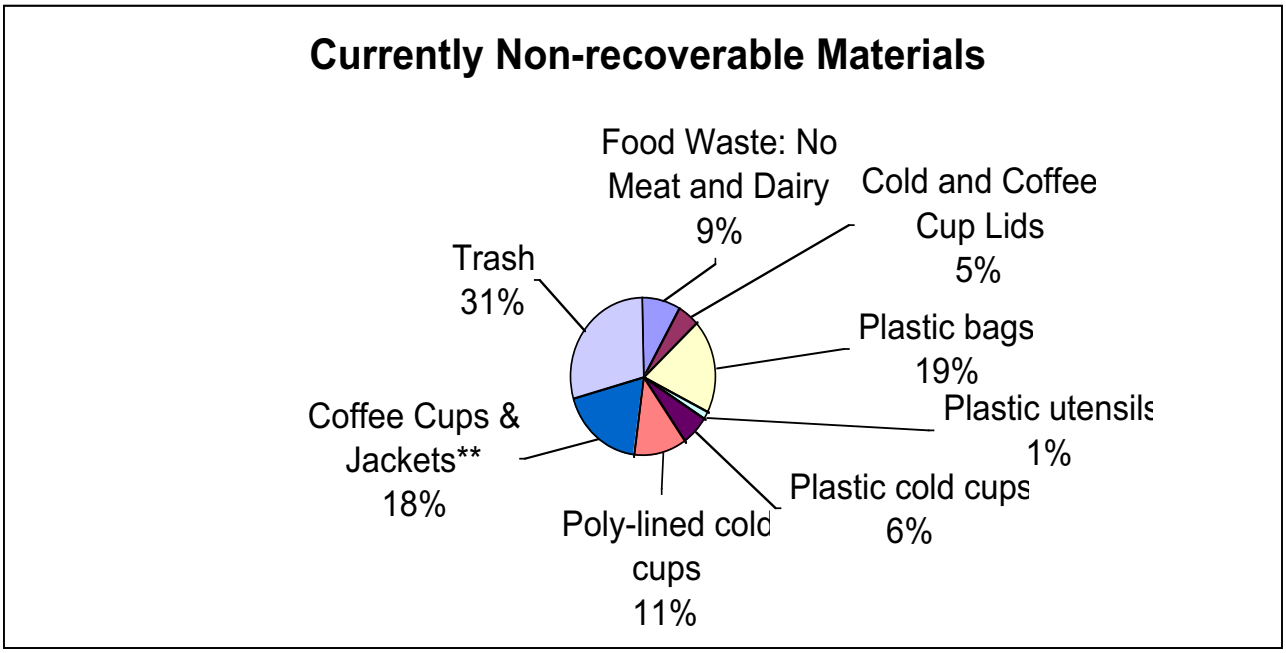

Figure 8. Percent by volume of currently non-recoverable materials

3.4 Significant Materials

A strategy for identifying the materials to target for reduction or diversion was to identify which items in the audit composed more than ten percent of the total volume of waste.

Materials exceeding 10% of total volume:

- Paper wrappers and pastry sleeves: 16.46 % total volume (1.58 yds^3)
- Plastic bags and serving gloves: 12.81 % total volume (1.23 yds^3)
- Coffee cups and jackets: 12.0 % total volume (1.15 yds^3)
- Paper plates: 11.77 % total volume (1.13 yds^3)
- Disposable beverage containers (coffee, poly-lined cold and plastic cold cups) and their respective lids: 26.37% total volume (2.53 yds^3)

Options Researched	Item	% Total Volume
Reuseables, Service Changes and/or Compost	Paper Wrappers & Pastry Sleeves	16.46
Service Option and/or Recycle	Plastic Bags & Serving Gloves	12.81
Reusables and/or Compost	Coffee Cups and Jackets	12
Reusables and/or Compost	Paper Plates	11.71

Table 2. Significant materials and the option that has the potential to reduce amount of material entering the waste stream.

3.5 Strategies for Reduction

By targeting key materials, significant amounts of waste could be reduced or diverted from the waste stream. For example, completely eliminating disposable beverage containers and implementing a compost system would reduce total volume of garbage by 67.47%. The following is a summary of strategies:

- Compost food waste and paper products (total of 41.1% of total volume).
- Reduce use of disposable beverage containers through durable food ware and service changes.
- Educate EMU users and vendors regarding waste creation and reduction through increased signage, selling reusable beverage cups, and cooperation with Campus Recycling.
- Encourage EMU vendors and Food Services management to consider products that are easier to recover.

4.0 SURVEY

In order to better understand the patrons of the EMU Food Services and their behavior, the team designed, implemented, and analyzed data from an eleven question survey. This portion of the study seeks to add to the team's ability to gather information from the most important group, the patrons of the EMU, and craft a set of recommendations according to patron's desires and support.

4.1 Goals

Three goals were established when designing the survey:

1. Understand the demographics of the patrons of EMU Food Services.
2. Understand the waste reduction behavior of the patrons, which are mainly the faculty, staff and students of the university.
    - In the waste audit, we discovered the types and amount of waste produced by EMU Food Services. The survey helped us to further understand the behavior of the patrons that EMU Food Services serves with the current disposable system.
3. Have a basic idea about patrons' level of support concerning waste reduction options as identified by the study team.

We suggested two options to implement in the EMU for waste reduction, which include a reusable plate system and a composting system. These two options require the cooperation of the patrons in order to be successful. The survey provides an idea about how supportive the patrons are concerning these waste reduction options.

4.2 Methodology

The design of the survey aimed at obtaining the information we needed in a short but well-directed survey. In order to meet the goals of the survey, three types of questions were addressed to EMU Food Service patrons :

1. General Demographics
   The first four questions address general information about the patrons that will help us to understand the demographic composition of the patrons. For example, "How long have you been at the U of O?" "Are you primarily a faculty, staff or student?"

2. Current behaviors
   The next five questions, five through nine, are about patrons' current behavior when using the EMU food services facilities and also their habits about using environmentally friendly products. These questions helped us to understand how the patrons eat at the EMU. For example, "How many times a week do you eat at the EMU?" "Do you use a refillable mug when you buy beverages?"

3. Level of support
   The final questions are the most important questions in the survey. They gave us an idea on the patrons' level of support on the two options we suggested to implementthe EMU to reduce waste,

which includes reusable plate system and composting system. There are also sub-questions concerning their level of support of some of our recommendations if they are being used in the EMU. For example "Would you support a reusable plate system in the EMU for people who choose to eat at the EMU?" "Would you use such a system if a $5 deposit were required?"

4.3 Implementation

When and where

The survey was conducted Monday through Friday from April 7, 2003 to April 23, 2003, over a period of 2 ˚ weeks. Four team members conducted the survey mainly from 10am-3pm on weekdays in order to target the patrons who eat lunch at the EMU. Because our waste audit studies revealed that most garbage is produced during lunchtime and patron influx is the highest during the lunch rush, we targeted these patrons. It was conducted in the multiple dining areas in the EMU, including the atrium, dining area adjacent to the atrium, the fishbowl, and the south dining area.

How

1. We approached patrons within the listed dining areas, some who were waiting in the line.
2. It was difficult to approach patrons taking their food to go because they were usually in a rush and had little or no time to answer the survey.
3. Patrons participated in the survey took 2-3 minutes to answer the questions.

4.4 Results

A total of 260 patrons of the EMU were surveyed. This included 147 female and 113 male respondents. The following is a summary of results:

General demographics

Students: 225
Faculty and Staff: 35

- We planned to interview about 100 faculty and staff, but most respondents represented in this survey are students, while faculty and staff are under represented.

Time	Number of patrons surveyed
10am-11am	0
11am-12pm	40
12pm-1pm	74
1pm-2pm	84
2pm or later	62

Patrons' Current Behavior

- A very large percentage of the interviewees, 82%, which is 213 patrons, recycle at home. Of those 213 patrons, 179 of them are students. 46 patrons, or 18% of the total, do not recycle at home

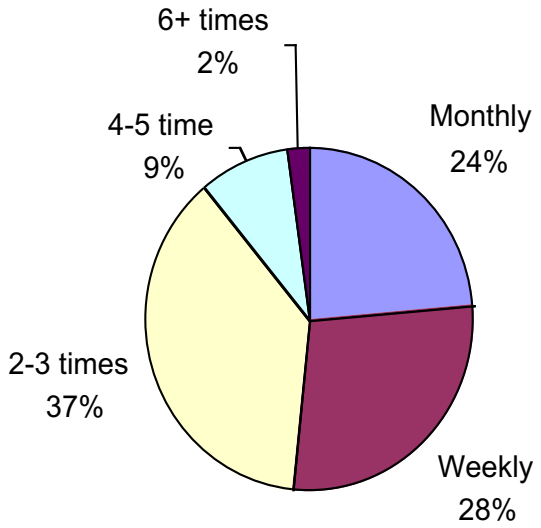

Figure 10. How often patrons eat at the EMU. 37% of the patrons eat at the EMU 2-3 times a week. 28% of them eat at the EMU every week and 24% eat there every month. Only a small percentage, 11%, eat at the EMU more than 4 times a week.

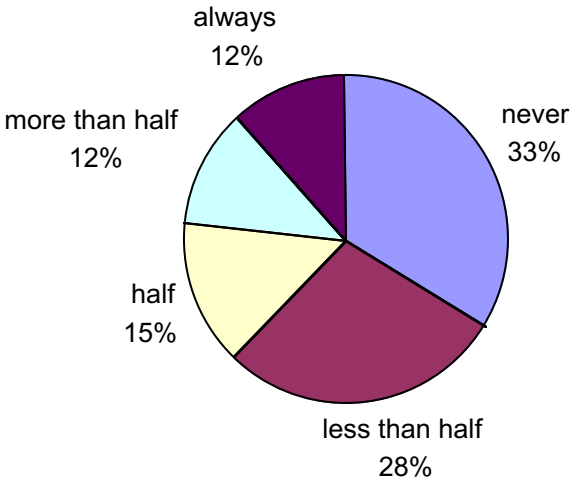

Figure 11. The majority of the patrons take their food with them. According to Figure 11, a combination of 61% of patrons mostly enjoy their food inside the EMU, and the remaining 39 % patrons mostly take their food to go.

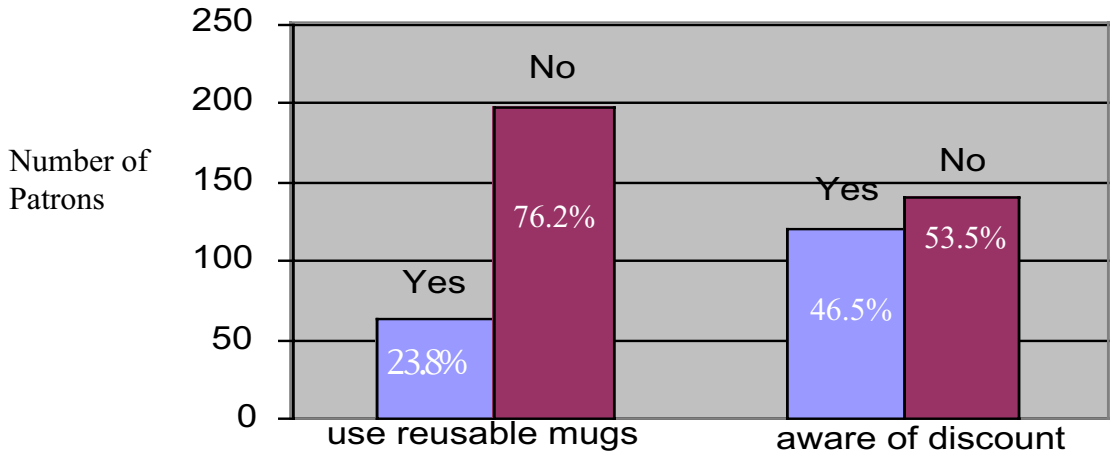

Figure 12. Number of patrons that use reusable coffee mugs, and the number that is aware of a coffee discount

Only a small percentage of the patrons, 23.8%, uses refillable coffee mugs when they buy coffee. Figure 12 also illustrates that the number of the patrons who use refillable coffee mugs, 46.5% of the patrons, are aware that many vendors offer a discount on their coffee or soft drinks purchase when they use their own cup. There are still more than half of the patrons, 53.5%, who are unaware of the coffee discount if refillable coffee mugs are used.

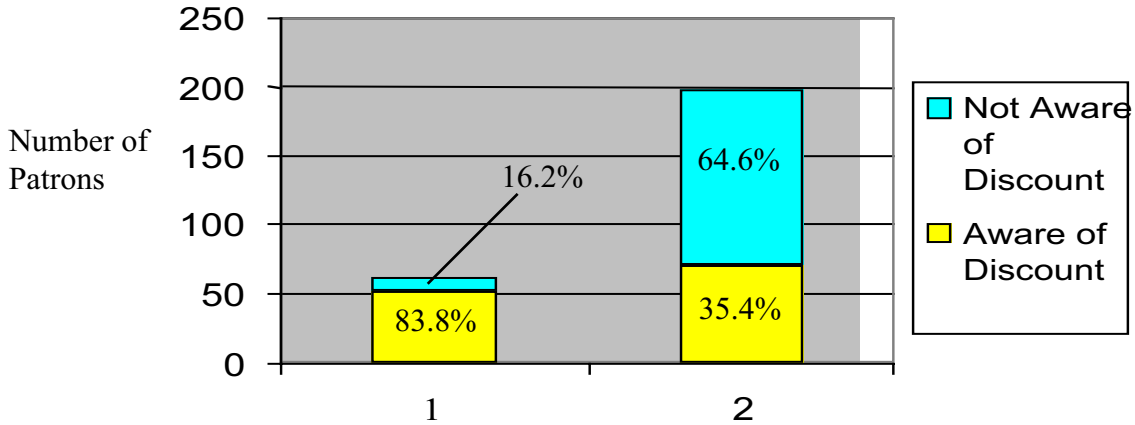

Figure 13. Comparison of EMU users who use refillable beverage containers (1) and who do not use them (2) versus awareness of available discount for reuseable beverage containers.

Among the patrons who use reusable mugs, a large percentage, 83.8%, are aware of the coffee discount provided by the vendors. Among the 198 patrons who do not use reusable mugs, 35.4% are aware of the coffee discount, and more than half, 64.6% of them do not know that EMU vendors provide coffee discount if they use reusable mugs.

Level of support for reusable plate system and composting system

The following results are regarding the patrons' level of support on the two options we suggested to implement in the EMU to reduce waste, which include a reusable plate system and a composting system. The results are scale-based, with 1 indicating no support and 5 indicating strong support.

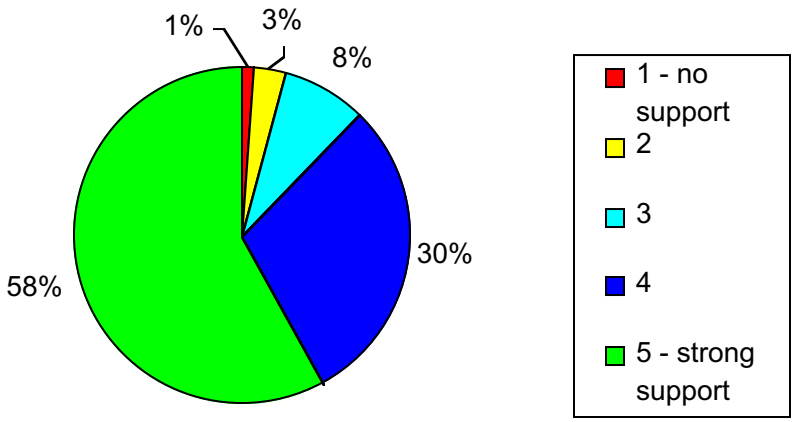

Figure 14. Patrons' level of support for reuseable plate system

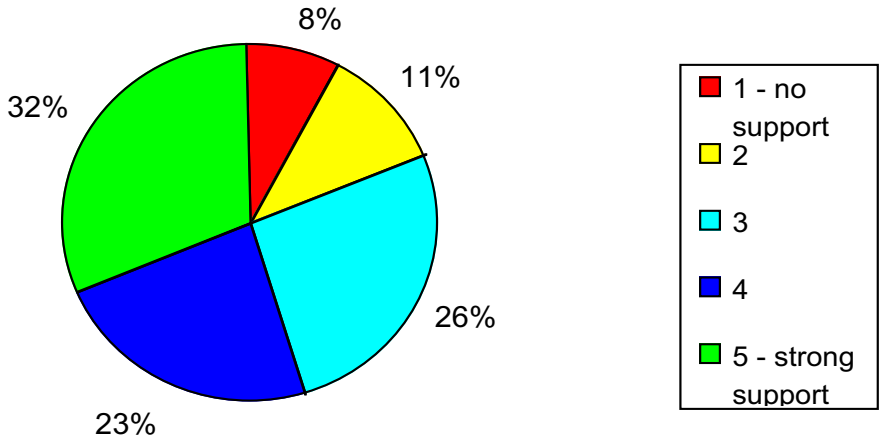

Figure 15. Patrons' level of support for plate system if $5 deposit required

Figure 14 shows that more than half of the total patrons strongly support the use of reusable plate system, and a combination 88% of the patrons support this system (includes patrons who give a score of 5 and 4). However, in Figure 15, when a $5 deposit (which will be scanned on the UO ID through Campus Cash) is required for the system, the level of support dropped tremendously. The strong level of support dropped 26%, from 58% in fig 13 to 32% in fig 15, and the number of patrons who support the system dropped from 88% to 55%.

There are a few possible reasons for the dropped in level of support when the system required $5 deposit.

1) Many patrons think that the $5 deposit is too expensive, although they can get back the money when they return the plate. However, the cost of each plate, depending on the size, is around $2.50. Therefore the cost for the deposit has to be at least higher than that to pay off the price for a lost plate.
2) Some patrons do not have campus cash. Campus Cash allows students, faculty or staff to deposit money on their UO ID card and pay for their photocopies, print for their computer documents and buy food from food services vendors. Although Campus Cash is getting more and more popular among patrons of the EMU, some patrons do not have Campus Cash, therefore they think that using Campus Cash as a way for deposit is not convenient for them.

To further implement reusable plate system in the EMU, these two concerns from the patrons have to be solved. First, educating the patrons about the reusable plate system can encourage them to use the system. Education can inform them that the $5 deposit will be returned to them anyway, so the cost of the deposit will not be a big concern for them. Also educating them about the potential waste reduction by using reusable plate system can persuade them to use the system. For patrons who do not have Campus Cash, cash deposit can be an alternative way to encourage them to use reusable plates. However, it may be difficult for the vendors to return the deposit.

Level of Support for Composting

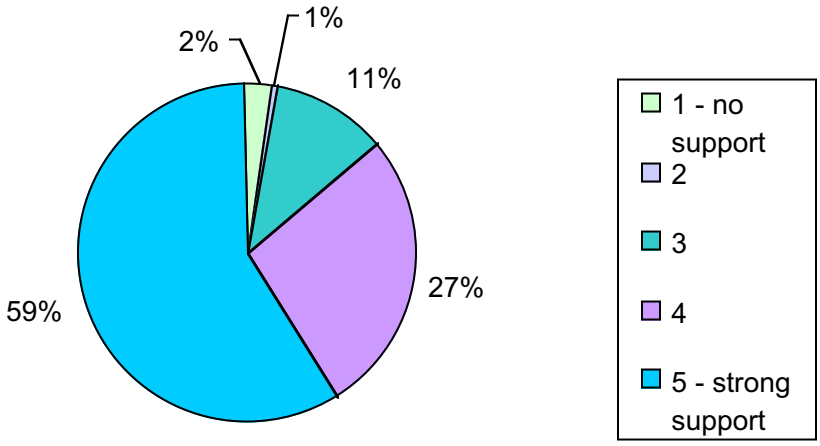

Figure 16. Patrons' level of support for composting system

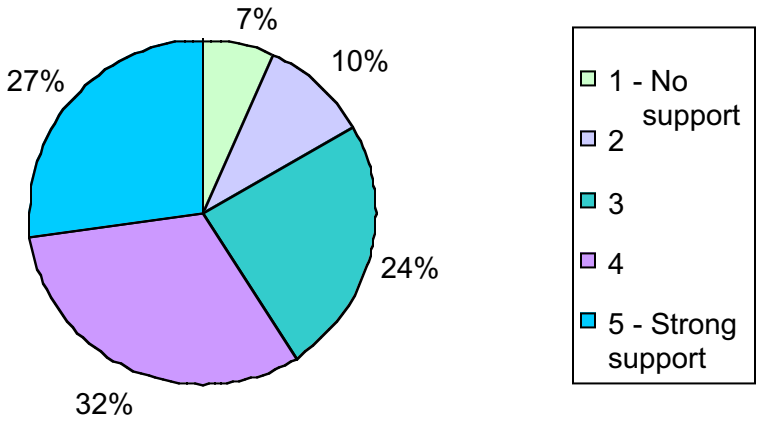

Figure 17. Patrons' level of support for composting if higher food prices are required

Patrons strongly support the implementation of a composting system for food and food related waste in the EMU. 59% of the patrons strongly support composting system, and 86% of the patrons support the system (includes patrons who give a score of 5 or 4). However, the level of support dropped if higher food prices is needed to pay for composting. In Figure 17, the strong level of support is 27%, which is a 22% decrease compared to Figure 16. Also the percentage of patrons that support the system dropped from 86% to 59%.

We think there are two reasons why the level of support dropped so dramatically if patrons have to pay higher food prices.

- Some patrons think that food prices in the EMU are already high, and it is not reasonable to increase the price.
- Some patrons do not think that there is a need to increase food price if a composting system is implemented.

Whether there will be higher food prices for composting depends on who is going to pay for the operation of a composting system. The EMU might be willing to absorb the cost for composting if they can find supporting money from a grant. This has been the case for the Eugene 4J School and the City of Eugene. But if food vendors are responsible for part of the operation fee, then the food prices might increase.

5.0 RECOMMENDATIONS AND ASSOCIATED WASTE REDUCTION METHODS

Based on nine months of research, the team has formulated a three-tiered group of recommendations. Level I recommendations are awareness and education-based and are the easiest to implement and require the least amount of capital expenditure. Level II recommendations require some degree of capital expenditure, but tend to rely on exisiting infrastructure and competencies. Level III recommendations may require significant capital expenditure and more study as they rely on significant infrastructure and organizational culture change. Detailed examples and suggestions follow each set of recommendations as tools to help EMU Food Services build a waste management system that reduces waste, provides educational leadership, and saves money.

5.1 Level I Recommendations

1. **Facilitate changes through leadership in service practices**
2. **Sell reusable beverage containers at all locations and promote associated discounts**
   2a. Help consumers make educated decisons on beverage purchases
3. **Provide napkin dispensers at centralized stations throughout the dinning areas to reduce napkin use and waste.**

5.1.1 Changes Through Leadership in Service Practices

This recommendation is the overarching goal of all recommendations in that it encourages EMU Food Services to continually seek new methods to reduce the amount of waste produced through innovative practices. Some of these sources and inspiration can be in-house, as Kathy LeVine of Holy Cow Café and her cliental have demonstrated through the plate deposit system developed there. More patrons will be getting on board with the option of reusable food ware available to them. Campus Recycling has demonstrated leadership through the implementation of composting and other zero-waste initiatives at the ASUO Street Fairs and the Willamette Valley Folk Festival. Peer institutions such as Humboldt State University and Oregon State University can also provide inspiration and ideas, and perhaps more importantly offer advice based on experience. Additionally, the City of Eugene, Eugene 4J Schools and other municipal and county governments can offer solutions and advice.

Currently: Vendors have stacks of poly-lined paper cartons that are not recyclable or compostable at counters ready for the thousands of customers that eat at the EMU daily. Many walk away from venues, such as Holy Cow Café with a plate of salad or Market Place with a plate of noodles, each time using paper products and plastic not recoverable within the current system. These disposable containers fill waste cans and eventually go into the landfill and then have to be purchased again from companies that discharge often harmful effluent as a by-product of the production process. Vendors seem to perfer this system largely because there is no other. Innovation is stymied by the "toss what is waste" mentaility and the fact that serious discussions among EMU vendors with regard to waste and impact are not present in the daily conversations of the food service businesses in the EMU.

Resource Use: Potential reduction for EMU Food Services is up to 68% of volume, depending on the system(s) developed and implemented.

Proposed: Two things must happen. First, vendors must and EMU management must engage in conversations conerning waste management and follow-up with on the ground action. Second, involving customers in a friendly, efficient process is essential for it to catch on.

- Education and outreach to patrons, vendors, and distributers must raise awareness.
- Vendor staff must encourage use by asking customers to try and participate.
- Continue to fine-tune system and get critical feedback internally and externally.

5.1.2 Sell Reuseable Beverage Containers at all Locations and Promote Associated Discounts

EMU Food Services must begin transitioning away from disposable beverage container use. This is one area with very high potential to reduce waste. Reusable cups are substitutes for disposable cups, and they can be used for all beverages. Marketing mugs where coffee and other beverages are sold is a sensible strategy that would get students and faculty on-board.

Currently: Reuseable beverage containers are not actively marketed to users of EMU Food Services, with the noteable exception of Holy Cow. Many students surveyed did not know that reuseable beverage container use was acceptable and were unaware that a 20-cent discount is given when patrons bring thier own container. Several different reasonably priced styles and types are available from Campus Recycling or private companies.

Resource Use: Potential reduction exceeds 15% of total volume of waste.

Proposed: Market reusable mugs at or near every counter selling coffee and beverages. Highly consider The Buzz and Greatful Bread's entrance.

- Clearly mark the price **and** potential customer cost-savings.
- Consider pricing mugs at cost or at a low markup. The price of materials and waste savings will pay each mug over time; for the cup-a-day coffee drinker, this would be about three weeks.
- Signs must display that using them on campus is welcome.

Photo: Chris Evans

Use a refillable coffee mug and save 20 cents on the price of your drink purchase.

Figure 18. Signs should be placed in prominent places to advertise reuseable beverage discounts. The survey indicated that over half of EMU patrons (53%) were not aware of the discount.

5.1.2a Help consumers make educated decisons on beverage purchases

Currently: Vendors offer a 20-cent discount from the prices listed on menus when patrons bring thier own beverage container. This is not, however, prominently displayed or encouraged verbally when patrons are purchasing coffee and other beverages.

Resource Use: Paper cups require chlorine compounds, intensive energy and water use, as well as polyethylene, the reduction of dispoable cups can reduce the amount of these chemincals produced.

Proposed:
Two ideas for reducing disposable beverage container use beyond simply selling them to customers:

1. Menus are an utmost important tool used to educate consumers. Prominently display the reusable beverage container option to patrons. The "reusable" option is currently vacant from menus.
2. Discounting has not stimulated an incentive for heightened mug use. Charge for coffee cups, instead. This is like a tax. Charging cups as separate items will motivate patrons to find an alternative, and will allow Greatful Bread and Buzz menus to show less steep coffee prices.

With patron and vendor participation EMU Food Services would see:

- Disposal needs for coffee cups subside, reflecting a cost-saving strategy.
- Customers return where coffee refills are welcome with a 20-cent discount.

Vendors should consider:

- Displaying a "no cup" price for all beverages.
- Placing an "eco-tax" on purchases made without a reusable mug.
- Proceeds from reusable mug purchases could go towards a charitable foundation.

5.1.3 Provide napkin dispensers at centralized stations throughout the dining areas to reduce napkin use and waste

Currently: Napkins are distributed on vendors' counters. Areas are cluttered with other amenities. People may take more than they will use because they would rather not leave their belongings at their table to retrieve napkins as need.

Resource Use: The waste audit revealed that 41.7 lbs, or 4.5% of volume for the week, was napkins. Additionally, while sorting during the waste audit, the team noticed that a large majority of these napkins were unused and simply thrown away with the "trash" from one's meal. While napkins may not seem like a major issue, over the course of a school year approximately 1,200 lbs of napkins alone are thrown away, many unused.

Proposed: Within the EMU's main dining areas, over a hundred tables exist, thus making it difficult to purchase and stock a dispenser on every table. To reduce napkin use, place dispensers on top of recycling and garbage disposal stations. Stations and napkin dispensers would be closer to each table and patron within each dining area, and make it easier for patrons to use napkins as needed. Use educational tools such as table tents to help patrons be mindful of their napkin use.

Figure 21. Table tents could be placed on tables (below) to educate EMU users on the virtures of napkin conservation and waste reduction.

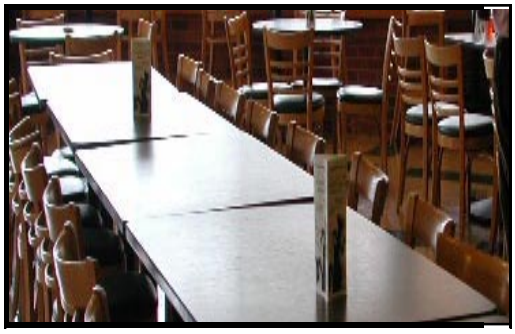

Photo: Courtesy UO Campus Recycling

5.2 Level II Recommendations

1. Implement a reuseable plate and deposit system coodinated with student ID cards and Campus Cash.

5.2.1 Reuseable Plates

In 1992, the EMU food services replaced its cafeteria-style food ware system with the disposable food ware system, which EMU customers currently use. The cafeteria-style system used china dishes, and were washed in a dishroom previously located in the south end of the building. The team was unable to ascertain the reasons for the switch, but possible reasons provided to the team include the desire to move away from a system that was expensive to maintain due to breakage, loss, and consumers' desire to have more convenience with a to-go dining option. In additon, a major restructuring of EMU dining services added franchises such as Subway and Andrew Smash. These operations usually desire to use thier own packaging, which is disposible. Under the current system, which is heavily reliant on disposables, paper plates alone comprise 11.7% of the total volume of trash for the week.

Implementing a reuseable plate system poses serveral barriers under the current disposable system:

- Cost of supplies, namely, plates. Campus recycling, however, has offered 1,500 plates for use in the EMU.
- Cost of labor
- Shrinkage. Durable plates may be attractive to consumers who wish to take them for their own personal use or could be simply (and mistakenly) thrown in the trash.
- Infrastructure. A system to distribute and collect plates must be developed. Industrial dishwashers are already present in the kitchen area of the EMU.

Many of these barriers have been addressed, however, by one of the EMU's vendors, Holy Cow. Aware of the impact paper plates have on the waste stream, Holy Cow developed a small-scale reuseable plate deposit-return system:

1. When customers approach the counter, they can choose whether they would like a paper plate if they are taking thier food to go or a reuseable plate if they are staying.

2. When a customer using a reuseable plate purchases thier food, they are charged an extra $5.00 for both a plate and a metal fork. This money is placed in a recepticle separate from the cash till.

3. After the customer has finshed thier meal, they first show thier plate and fork to an employee at the register then drop it in the bin (right). The employee then returns the depoist to the customer.

4. When the bin is full, the employees of Holy Cow bring the dirty plates to the rear of the establishment to be washed in a dishwasher especially bought by Holy Cow specifically for the reuseable plate program.

In its first two months, Holy Cow reported a 10% participation level.

Obviously, this system would have to be modified to effectively serve the EMU's customers:

Plates would need to be distributed by each vendor to the customer who asks for one. This would be done at the point of service at the request of the customer. Health department regulations dictate that plates be handled only by food service workers prior to and during service; therefore, a universal plate distribution staion at the entrance to the food court where customers can pick up thier owm plate and utensils is not an option.

In order for a deposit to be easily collected, a card swipe deposit system at each vendor's cash wrap can be established. Utilizing the current campus cash system of the university could be a convenient way for customers to use the system. Campus Cash is being used in the EMU by students and staff to print computer documents, photocopy, and buy food from the Food Services vendors. Campus Cash is more and more popular among users of the EMU. In a reusable plate system, campus cash can used as a money deposit system, when a customer uses a plate, $5 deposit will be deducted from the Campus Cash by swiping the student's ID.

Perhaps the most difficult issue to resolve is plate return. Ideally, the customer would return the plate to the vendor from which they purchased thier food. The cashier would swipe the customer's card and credit the deposit back to the customer's Campus Cash account. This system may cause two problems: 1) Customers returning plates may have to wait in line to gain access to the cashier. Undoubtedly, many customers may be unwilling to do this especially during the busy lunch hour. Therefore, these customers may attempt to cut in line, thus disrupting line flow. 2) Many students or staff with offices on campus may "collect" plates, knowing that they can return them at thier leisure. If enough plates collect in offices on campus, shortages may occur in the EMU's inventory. Line flow disruptions at vendors may also occur if plate collectors attempt to return large amounts of plates at one time. Ideally, a central return area can be created to mitigate these concerns.

Case Study:Humboldt State University

Starting fall, 2002, the Jolly Giant Dining Commons,the dining hall Humboldt State University, established a system that people can take their meals in insulated Tupperware style bowls. For coffee and other beverages, each residence hall student is given free a coffee mug to use. This is encouraged because the disposable food ware, including paper plates and cups, plastic utensils and Styrofoam to-go containers, that are used for to go food can be eliminated, also it can reduce the food waste produced by people's left over food. The dining hall have a cafeteria style food ware system, they use reusable china so they have the infrastructure for dishwashing. This system is very successful, they receive many positive feedbacks from their from their follow up survey, which is give six months after the system is implemented. This is probably because of the convenience for the students to get and return the containers.

- Students either purchase a container or check one out in the dining hall when they need it.
- Container deposits are collectedwhen customers pay for their meal. The deposit which is around $5 is deducted from their meal card. The $5 deposit is more than the cost of the container to offset any loss from continaers not retuned.
- When the container is returned to the dishroom, the $5 will be credited back to the customer's account.

Figure 24: Students eating at the Jolly Giant Commons at HSU
Photo: Humboldt State University

Costs and Benefits:

- The cost of using reusable china. The greatest loss for the dining hall is students stealing reusable china. The main reason is because of the infrastructure design of the dining hall. The dining hall has two exits and it makes it difficult to make sure no one leave with the plates. Although new policies are introduced but it is not significant to reduce the number of loss china.
- By replacing disposable food ware with reusable containers, HSU expected that the Tupperware would pay for themselves in 1-3 years.
- Education. At the beginning of a term, workshops are held by the Campus Recycling program to talk about the recycling program on campus and also the waste reduction efforts in the dining halls.

5.3 Level III Recommendations

1. **Purchase an Earth Tub, an in-vessel composting system, and modify infrastructure behind the EMU to support it.**
2. **Use Earth Tub as an educational tool to educate the campus community concerning the virtues of composting, waste reduction, and diversion.**

5.3.1 Purchase an Earth Tub, an in-vessel composting system and modify infrastructure behind the EMU to support it.

Composting is a wonderful way in which people can begin to change their perceptions of waste and the waste stream. By diverting organic materials such as vegetable waste from the waste stream we can continue the resource cycle of the "waste" and return the resources to the life cycle such into soil for growing plants.

Facts

While our focus on composting is local, dealing only with the Erb Memorial Union on campus, the problem of wasted opportunities to turn food waste into resources persists throughout the country.

- Every year each person creates 360 pounds of compostable food and yard waste.
- In the growing season, 30% or more of the landfill waste is organic yard refuse.
- The number of landfills in the United States continues to decline from approximately 30,000 in the 1970s to less than 2,500 today.
- Organic materials represent up to 70% of the solid waste stream. In efforts to reduce waste, some communities in the United States are already switching to market-based systems in which citizens are charged per bag of garbage they create.

(Source: EPA)

Benefits of Composting

- Reduces trash disposal rates and taxes (source reduction).
- Reduces pressure on our dwindling landfill sites.
- Eases burden on water treatment facilities by decreasing the food waste stream.
- Improves plant health and increases growth rate resulting in higher yields.
- Increases the tilth, workability, water-holding capacity, porosity and drainage of the soil.
- Replenish and sustain the soil's fertility for future generations.

Composting on Campus

At the University of Oregon we have had the opportunity to compost on campus at select events, such as the Willamette Folk Festival and the ASUO Street Faire. Campus Recycling provided materials and staff to monitor the process and help sort the waste so that the separation process was done correctly. The 2003 Willamette Folk Festival on campus was able to divert 71% (2700 lbs) of the total waste generated from the festival through recycling and composting efforts. The garbage was kept to a minimum (1120 lbs).

Institutional Composting

Many campuses and institutions (such as Oregon State University and Penn State) are beginning to implement industrial composting to divert food waste. In Eugene, both the 4J School District and the City of Eugene in cooperation with PC Market are also experimenting with composting. The industrial composters are in-vessel, which means they are self-contained, temperature regulated, thus differentiating them from the conventional, opened aired systems.

In-vessel Composting Systems:

There are many in-vessel composting systems available ranging from a motor-run system to a vermicomposting system, which uses worms to break down the organic material.

Earth Tubs

While researching different peer institutions we discovered the widespread use of the Earth Tub, which is manufactured by Green Mountain Technologies. Oregon State University Housing will be installing an Earth Tub for use by April 2003.

- The Earth Tub has a 3.5 cubic yard capacity and is made of durable plastic.
- The unit consists of one 7'6" diameter tub and a biofilter (for removing odors).
- The overall height of the container is 48".
- The bottom is tapered which facilitates the unloading process.
- A 12- foot square area is suggested to allow for operation.
- The Earth Tub has a powered auger to mix up the composting material.
- It is electrical (3-phase power) and so produces no fuel exhaust.
- For a typical daily load that is 40- 100 pounds per day, it takes the following times to fill the tub:

Pounds per day	Approximate time to fill tub
40	4 months
75	3.5 months
100	2+ months
150	6 weeks

Source: Rice University

- Numbers from our waste audit of the EMU Food Services shows that there was a total of 180.9 pounds of no dairy and meat food waste was generated in five days (∪36.18 lbs/day), 41.7 lbs of napkins (∪8.34 lbs/day), 43.1 lbs of paper plates (∪8.62 lbd/day), and 59.9 lbs of coffee grinds (∪11.98 lbs/day). All of these materials can be composted in the Earth Tub. The total for all materials is 65.12 lbs/day.
- The compost undergoes a volume reduction of 70% as it cooks over time.
- A curing time of a 2-3 weeks is needed to let the soil settle after it is removed from the Earth Tub.
- Presuming that the final cooking period occurred long enough and periodic mixing occurred, then all of the material is decomposed. Therefore pests are not attracted to the compost during the curing process.
- The units should be situated near to the source of the materials you wish to compost and preferably near to a sanitary sewer or suitable drain for the leachate that is generated.

(Source: Green Mountain Technologies)

Earth Tubs in Eugene

PC Market

In order to meet a 1991 Oregon Recycling Act of 1991, which mandates the state to reach an overall recovery rate of 50%, the City of Eugene's Solid Waste and Recycling program has developed a partnership with a local supermarket to divert food waste previously destined for the landfill. They have set up an Earth Tub at a project demonstration site behind the Price Chopper Foods supermarket located at 29th and Willamette. The site will be used to determine the feasibility of duplicating the project for other generators of similar wastes in Eugene and will be used as a demonstration site to attract future partners, should the "in-vessel" technology operate favorably and result in a net cost savings to the store. Store staff are adding up to 200 pounds of fruit and vegetable trimmings to the two Earth Tubs, installed outside the produce department. These units mix, grind. amd aerate the discarded organic matter with wood shavings to createa stabilized compost product in four to eight weeks. PC Market of Choice has agreed to operate this equipment for three years.

Eugene 4J School District

"As a result of a $68,000 Environmental Protection Agency Sustainable Development Grant written by City Solid Waste and Recycling Program staff, six Eugene District 4J schools have received in-vessel composters which compost cafeteria and kitchen discards. six Eugene District 4J schools have received in-vessel composters which compost cafeteria and kitchen discards. The six schools which partnered with the City are Churchill High School, Monroe Middle School, Kennedy Middle School, Kelly Middle School, River Road Elementary School, and Patterson Elementary School. In addition to the composting equipment, each school benefits from the support of a compost specialist hired with grant funds to oversee the project for a period of two years. Waste audits were conducted at participating schools. Cafeterias alone generate almost 60 pounds of organic discards each day. Composting this material and kitchen discards may allow these schools to downsize their garbage collection service." -from "4J Schools Earth Tub Project" City of Eugene Planning and Development: http://www.ci.eugene.or.us/pdd

Composting at the University of Oregon's EMU Food Services

Costs:
Costs can be significant for installation and implementation for in-vessel composting. According to the City of Eugene, the demonstration project at PC Market totaled $8,882 for complete installation. Operational costs, however, are only expected to be about $100 a year. The demonstration project with Eugene 4J schools, however, was initiated with a $68,000 Environmental Protection Agency Sustainable Development Grant. Similar grants can be researched to provide start-up costs at the EMU.

Infrastructure and Campus Culture:
In order for the university to implement a widespread pre- and post consumer composting system at the EMU, significant changes must be made to the internal and external infrastructure, culture, and outreach. To begin with, some respondents in the survey revealed that they had general misunderstandings about the role and science of composting despite the high level of interest (86%) in establishing a composting system. These respondents often associated composting with odor, rodents, and "messiness" when separating waste. Therefore, the primary concern for the EMU, were they to decide to implement industrial composting would be to educate EMU users concerning the benefits and efficacy of institutional composting, as detailed in the preceding section.

Other considerations that will require infrastructure changes or further study:

- The footprint for the Earth Tub and similar composters is approximately 12 cubic feet. The south loading dock of the EMU, the likely siting location, has very little usable space. Currently this area houses three 3-cubic yard trash containers, storage, and parking. Ideally, over time an industrial composter would replace one or more of the trash containers, but at start-up a dedicated space would need to be found.
- In order for the Earth Tub to properly drain and control odor and rodents, it must be tied into the plumbing system. The City of Eugene and Price Chopper reported $1,379 in set up costs for plumbing the Earth Tub. This is in addition to the $6,530 for the Earth Tub itself. The necessity of plumbing will dictate the location as well.
- Separation: Currently, the Earth Tub is not designed to compost non-vegetable and wood fiber waste. Therefore, food waste must be separated. Post consumer waste accounts for most of the difficulty for the separation issue. Ensuring post consumer waste is not contaminated with meat or dairy is of critical importance. As a result, so is educating consumers concerning separation as well as providing them with effective and convenient locations to separate their waste. At the ASUO street fairs on campus, Campus Recycling staffs composting areas to ensure no contamination. Perhaps the best way to being would be to isolate composting to pre-consumer waste from behind the counters to work out any difficulties and devise the best manner in which to educate consumers about separation.

5.3.2 Use Earth Tub as an educational tool to educate the campus community concerning the virtues of composting and waste reduction and diversion.

The University of Oregon is a perfect environment for modeling sustainability practices. The University strives to educate its community as well as the overall Eugene and Lane County community. Waste reduction and diversion education has the potential to naturally mesh with the University's educational goals and enable the University to continue as an educational leader in the surrounding community. The team recommends that the level-three recommendation of a composting unit be accompanied with an educational display.

An informative poster could be placed on the composting unit on the south loading dock of the EMU. This poster would explain what the composting unit is, and how the process works. Secondly, a garden area on the Southwest corner of the EMU could be maintained by mulch from EMU food waste. A sign could also be displayed there, describing the connection between the garden and the EMU compost, while furthermore directing people around the corner to the display at the compost site itself.

The direct use of food waste compost on campus grounds provides the University and EMU Food Services with myriad opportunities to draw in other students and departments regarding how food waste can be diverted *and* retained as a valuable resource. For example, the EMU could partner with one or more departments, programs, or student groups to maintain the composting system. Study and use of composting could be a valuable experiential tool in a class such as sustainable campus in the Environmental Studies Program, a department such as Public Policy and Planning, or with the Urban Farm.

6.0 APPENDICES

6.1 ERB MEMORIAL STUDENT UNION WASTE STUDY FINAL WORK PLAN SERVICE LEARNING PROGRAM, ENVIRONMENTAL STUDIES PROGRAM, THE UNIVERSITY OF OREGON

I. Background

The Erb Memorial Union (EMU) is a 228,000 square foot building that serves the UO student community with meeting space, offices, activities centers, a post office, and food service. The food service arm of the EMU serves approximately 3,500 customers daily, with seven individual establishments, some operated by the EMU and some operated by outside vendors under licensure of the EMU. Each day an average of 700 lbs. of garbage and 530 lbs. of recyclable materials are produced by the food service arm of the EMU. Currently, all food establishments serve food and beverages in disposable paper and plastic products. Eating utensils are plastic and disposable as well. Despite recycling efforts, EMU food services continues to produce 75 percent of all waste generated by the EMU. The EMU spends an annual average of $18,000 for solid waste removal and an additional annual $30,000 is invested in recycling efforts.[1]

The EMU food services director, John Costello would like the Environmental Studies Service Learning Program (SLP) to explore options to help EMU food services reduce the amount of waste produced by all EMU food services establishments. These options may include composting efforts, deposit/return reusable eating ware, biodegradable eating ware, and consumer education, and employee waste reduction training. The SLP will also explore the cost-effectiveness and user-friendliness of implementation and operation of all potential waste reduction efforts.

II. Proposed Work Program

The Environmental Studies Service Learning Program will be responsible for the project. A team of 4 juniors and seniors will work over the course of the academic year to complete the work. Steve Mital, coordinator for the Service Learning Program, will be the overall project supervisor, and Mike Sims, the Graduate Teaching Fellow for the Program, will be the immediate project manager of the EMU Waste Study Team. John Costello, Director of EMU food services will be the principle partner with the research team.

Description of Tasks

This project will be conducted in four phases:
1. Start-up and preliminary research
2. Continued research and information gathering via interviews and surveys
3. Survey analysis and demonstration project
4. Analysis of research/demo project and report writing

[1] From the "Rose E. Tucker Charitable Grant Request," Univeristy of Oregon, 2001

Options to be Explored:
The team will be implementing this work plan based on five options determined by primary partner suggestion and desirability and preliminary case study research of universities currently using one or more of the options:

1. Reusable plate deposit system.
2. Biodegradable plates, cups, and utensils.
3. Developing compost system for food waste (pre and post consumer including plates and napkins).
4. Retooling existing service through food service employee education or moving to service options that reduce waste, are easier to recycle, or compostable.
5. Educational campaign focusing on consumers about how to reduce waste.
   This could include reusable coffee mugs, recycling education, and consumption education.

Project work will begin in mid-October 2002 and conclude by June 15, 2003.

A detailed list of tasks follows:

I. Start-up and preliminary research

Task 1: Clarify project objectives and tasks
The SLP project manager will review the history of the project and project goals and produce a set of clear objectives. He will then meet with EMU food service staff to discuss goals and objectives, and adjust objectives and tasks as necessary.

Schedule: October
Product: Revised Work Plan

Task 2: Form Advisory Committee
The SLP project manager will form an Advisory Committee to oversee and advise the team as it moves through the work plan. The committee will also view the final presentation prepared by the team.

Schedule: October
Product: Advisory committee formed

Task 3: Background Research
The team will research the problem, keeping an eye toward current usage and waste production and the costs associated with waste removal. It will also discuss current options to mitigate food services waste production.

Schedule: October and November
Product: Internal document charting waste production and mitigation options

Task 4: Case Studies
The team will research other university and college unions that serve food to its students and staff. This research will be mostly web-based, and will include The University of British Columbia, Humboldt State, Auburn University, Oregon State University, and Portland State University. Each of these case studies is currently pursuing one or more of the study options.

Schedule: November
Product: Write-ups of research indicating types of services, results of waste audits, educational campaigns, and contact information.

II. Continued research and information gathering via interviews and surveys

Task 5: Research of other university food service operations

Based on research from Tasks 3 and task 4, the team will design a survey and use it to conduct telephone interviews with other food service managers and recycling coordinators at the above-mentioned universities to determine best practices in waste reduction and recycling. The team will question the administrators regarding economic, institutional, and consumer incentives and barriers regarding their current practices.

Schedule: Early January
Product: Taped and summarized phone interviews

Task 6: Waste Audit of EMU food services

In an effort to ascertain the amount of waste EMU food services produces, the team, in cooperation with UO Recycling, will perform a waste audit that will occur over one week. Trash will be emptied in the food services dining area and placed in a designated receptacle to be moved to facilities services. The team will then sort the waste according to type (plates, cups, and utensils) and content (recyclable, compostable, and pure waste [non-recyclable, and non-compostable]). This audit will include collection and observation of pre-consumer waste and employee behaviors behind the counters of the vendor operations. This audit will serve as an educational tool and serve as a baseline for establishing a waste reduction goal.

Schedule: Late January and early February
Products: Waste audit methodology and audit results in graphic and tabular form accompanied by a narrative.
Poster display for the EMU to educate consumers.
Article in the *Daily Emerald*.

Task 7: Conduct interviews with current EMU vendors

The team will conduct interviews with the vendors currently operating in the EMU, which include Holy Cow, Andrew Smash, Subway, and the Marketplace. The manager for food services, John Costello, will be interviewed to speak for operations managed by the EMU. The interview will question managers concerning their desire to make waste-reduction changes to their operations, barriers to proposed options, and possible incentives to implementing one or more of the proposed options.

Schedule: Late February and early March
Product: Transcribed interviews and student report

Task 8: Continued research on options
Based on results from tasks six and seven, additional research will be performed about each option. The team will contact suppliers, manufacturers, and experts to discuss feasibly of each option in an institutional setting and availability of resources and products given current contracts, economic considerations, and vendor and consumer ease of use.

Schedule: On going throughout spring term; report due mid-March.
Product: Chapter discussing each option in detail based on information in tasks five through seven.

Task 9: Plan Survey of EMU Users
A survey will be designed to determine the level of interest by the University of Oregon student body and faculty and staff for waste reduction actions including composting, enhanced recycling services, and changes in food service options such as consumer sorting of waste prior to disposal. The survey will also inquire if the student body is willing to support an increase in fees to enhance waste reduction efforts.

Schedule: Mid March
Product: Survey to administered to EMU patrons

Task 10: Conduct survey
The team will conduct the survey created in task ten to determine the level of public support that exists for the various waste reduction options.

Schedule: Late March to Early April
Product: Survey results document to be included in final report

Task 11: Begin planning demonstration project
Based on preliminary survey results, the team will being initial planning for a demonstration project to be conducted at the EMU in cooperation with vendors. It will more than likely include more than one option. This task will only occur if special funding can be secured to cover materials costs.

Schedule: Late March
Product: Planning document for demo project

III. Survey analysis and demonstration project

Task 12: Barriers, costs, and benefits at the University of Oregon
The team will conduct follow-up interviews with current vendors, managers, and health inspectors to determine the potential barriers, costs, and benefits of each option. The interview will focus on vendor's willingness to change their purchasing and service procedures given the research by the team regarding the vendor concerns identified in task seven and the detailed research from task eight, above. Possible options for a demonstration project for the spring term will also be discussed with each of the vendors.

Schedule: Early April
Product: Addendum to chapter discussing each option in detail

Task 13: Complete analysis of survey and research
The team will complete analysis of the EMU survey and consider incentives and barriers to the various waste reduction options available at the EMU. Interviews with other university staff and food vendors will be synthesized into the analysis.

Schedule: Early April
Product: Chapter for final report detailing survey and results in graphic and tabular form

Task 14: Plan demonstration project
If funding is available, the team, based on analysis in task 8, above, will design a demonstration project to determine the feasibility and effectiveness of a selected option. The SLP team, in cooperation with EMU vendors and UO Recycling Services, will implement the demonstration project. The primary objective of the project will be education and outreach.

Schedule: Early to mid-April
Product: Protocol for demonstration project implementation

Task 15: Implementation of demonstration project
Based on the protocol designed above, the team will implement the demonstration project and gather data as to its effectiveness and ease of use by patrons and vendors.

Schedule: Late April
Product: Data from project to be analyzed

Task 16: Analysis of demonstration project
The demonstration project data will be analyzed based on ease of use by vendors and patrons, changes the EMU would have to implement to systematically implement the project, and cost to implement and maintain the chosen option.

Schedule: May
Product: Paper discussing project: successes, challenges, and suggestions

Task 17: Education and Outreach
The SLP team will produce posters to display in the EMU to publicize findings from the case study research, survey, and demonstration project.

Schedule: May
Products: Poster display for EMU,

Task 18: Prepare final written report
The team will combine and synthesize all data from the project including background research, best practices, current waste stream analysis, and options. It will include and recommendations for future action.

Schedule: May to June
Product: Final written report

Task 19: Prepare oral report
The team will prepare an oral report detailing the findings of the project and the written report. This report will be presented to the Advisory Committee.

Schedule: May to June
Product: PowerPoint presentation to advisory committee, UO Environmental Issues Committee, and campus community

Summary of Project Schedule

Task	Dates
Task 1: Clarify project objectives and tasks	**October**
Task 2: Form Advisory Committee	**October**
Task 3: Background Research	**October and November**
Task 4: Case Studies	**November**
Task 5: Waste Audit of EMU food services	**January 13th-17th**
Task 6: Research of other university food service operations	**Early January**
Task 7: Conduct interviews with current EMU vendors	**Late January**
Task 8: Continued research on options	**Early to mid-February**
Task 9: Plan Survey of EMU Users	**Late February**
Task 10: Conduct survey	**Early March**
Task 11: Begin planning demonstration project	**Late March**
Task 12: Barriers, costs, and benefits at the University of Oregon	**Early April**
Task 13: Complete analysis of survey and research	**Early April**
Task 14: Plan demonstration project	**Early to mid-April**
Task 15: Implementation of demonstration project	**Late April**
Task 16: Analysis of demonstration project	**May**
Task 17: Education and Outreach	**May**
Task 18: Prepare final written report	**May to June**
Task 19: Prepare oral report	**May to June**

6.2 Survey Questions and Raw Data

A. Survey questions

Time: 10am-11am 11am-12pm 12pm-1pm 1pm-2pm 2pm or later

1. Male or Female? M F

2. Age: 17-21 22-30 30-40 40 plus

3. Are you a faculty, staff, or student? Faculty Staff Student

4. What department are you most closely affiliated with?

5. How many times a week do you eat at the EMU?
   1) once a week 2) 2-3 times a week 3) 4-5 times a week 4) 6+ times a week
   5) once a month

6. Do you recycle at home? 1) yes 2) no 3) decline

7. When you purchase food at the EMU, do you eat it in the EMU or do you take it with you? 1) eat at EMU 2) take it to go

8. Do you use a refillable mug when you buy coffee? 1) yes 2)no

9. Are you aware that many vendors offer a discount on your coffee purchase when you use your own cup or mug? 1)yes 2)no

As part of our study, we are considering changes to some of the ways food vendors and EMU food services create and dispose of waste. My final few questions regard your level of support for a few of our study programs. Answers are scale-based, with 1 indicating no support and 5 indicating strong support.

10. Would you support a reusable plate system in the EMU for people who choose to eat at the EMU? 1 2 3 4 5

    10a. Would you support such a system if a $5 deposit were required (and scanned on your UO ID)? 1 2 3 4 5

11. Would you support a composting system for food and food-related waste in the EMU? 1 2 3 4 5

    11a. Would you support composting if it meant slightly higher food prices to pay for composting? 1 2 3 4 5

    11b. How willing are you to participate composting if you needed to separate compostable waste from non-compostable waste? 1 2 3 4 5

B. Results

1. Time:

Time	Number of patrons surveyed
10am-11am	0
11am-12pm	40
12pm-1pm	74
1pm-2pm	84
2pm or later	62

2. Male or Female:

Sex	Number of patrons surveyed
Male	111
Female	147

3. Are you a faculty, staff, or student?

	Number of patrons surveyed
Student	225
Faculty and staff	34

4. What departments are you most closely affiliated with?

Department	Number of patrons surveyed
Business	23
Journalism	19
Psychology	18
Architecture	13
Biology	12
Environmental Studies	13
Chemistry	9
English	9
Education	8
Sociology	6
Music	4

5. How many times a week do you eat at the EMU?

Frequency	Number of patrons surveyed
Once a month	61
Once a week	72
2-3 times a week	98
4-5 times a week	23
6+ times a week	5

6. Do you recycle at home?

	Number of patrons surveyed
Yes	213
No	46
Decline	1

7. When you purchase food, not including coffee, at the EMU how often do you take it with you?

	Number of patrons surveyed
Never	88
Less than half	73
Half	38
More than half	31
Always	30

8. Do you use a refillable mug when you buy beverages?

	Number of patrons surveyed
Yes	62
No	198

9. Are you aware that many vendors offer a discount on your coffee purchase when you use your own cup or mug?

	Number of patrons surveyed
Yes	121
No	139

For questions 10 and 11, answers are scale-based, with 1 indicating no support and 5 indicating strong support

10. Would you support a reusable plate system in the EMU for people who choose to eat at the EMU?

Level of support	Number of patrons surveyed
1 (no support)	3
2	8
3(moderate support)	21
4	77
5 (strong support)	151

10a. Would you support such a system if a $5 deposit were required (and scanned on your UO ID)?

Level of support	Number of patrons surveyed
1 (no support)	21
2	28
3(moderate support)	68
4	61
5 (strong support)	82

11. Would you support a composting system for food and food-related waste in the EMU?

Level of support	Number of patrons surveyed
1 (no support)	6
2	2
3(moderate support)	29
4	70
5 (strong support)	153

11a. Would you support composting if it meant slightly higher food prices to pay for composting?

Level of support	Number of patrons surveyed
1 (no support)	18
2	26
3(moderate support)	62
4	82
5 (strong support)	71

11b. How willing are you to participate composting if you needed to separate compostable waste from non-compostable waste?

Level of support	Number of patrons surveyed
1 (no support)	6
2	6
3(moderate support)	34
4	79
5 (strong support)	136