



Group Project ENVS 3502  
Presented to: Gregor MacAskill  
April 14, 2006

*Author*

Kristy Brooks  
Leah Brown  
Maritza Estridge  
Kaitlin Fahey  
Stacey Fraser  
Candace Harding  
Andrea Pardoe  
Andrea Parsons  
Hayley Pothier

*Field of Study*

Environmental Science  
Environmental Science & IDS  
Environmental Science & IDS  
BA International Relations  
Biology, minor Environmental Studies  
Environmental Science  
Environmental Science  
Earth Science, minor Environmental Science  
Community Design

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**ABSTRACT**

This paper is the final report of the research project for the Materials group from the Environmental Problem Solving class at Dalhousie University, Winter Semester 2006, supervised by Gregor MacAskill. The intent of this project was to assess the efficiency of the Dalhousie campus recycling program, and based on this assessment, recommend changes that could be implemented to improve the system's efficiency. Specifically, we wanted to understand reasons why individuals were not utilizing the on campus recycling facilities in a consistent and proper manner. The results of this research showed that the Dalhousie University recycling program is operating inefficiently for a number of reasons. These include: a lack of public awareness about the details of the program, such as what can and cannot be recycled on campus; an inadequate number of recycling facilities on campus; inadequate labels on the recycling bins explaining what belongs in each bin; as well as personal indifference towards the system. Furthermore, this study found a significant disconnect between how individuals *perceive* their use of the system, and how the system is actually being used. Lastly, the results of this study suggest that taking simple measures to improve the system, such as: increasing the number of recycling bins; improving the locations of bins; placing better quality signs on the bins; or distributing an informative pamphlet about the recycling system, would encourage more efficient use of the Dalhousie recycling system.

**ACKNOWLEDGEMENTS**

We would like to thank our professor, Mr. Gregor MacAskill, for all his help and dedication to our group while we were completing this project. We would like to thank Mr. Micheal Murphy and Mr. Peter Howitt of Dalhousie's Facilities Management for providing us with useful information about the recycling program during this busy time of year. We would also like to extend our gratitude to all of the students, faculty, and staff who participated in our study.

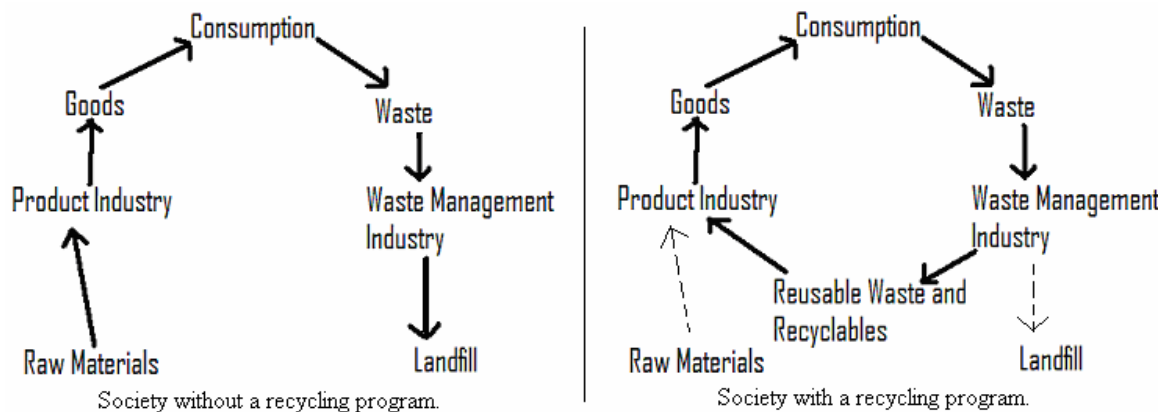
## INTRODUCTION

The global community is producing more waste today than ever before. Factors such as an expanding population and increasing urbanization have both contributed to the vast amount of waste produced in the world annually (Lockwood et al. 2004). In Canada, as is the case in many other industrialized nations, our high rates of consumption and past decades of environmental ignorance, has resulted in an over-reliance on landfills to dispose of our waste (Lockwood et al. 2004). However, landfills are not the solution to our waste problems for a number of reasons. First, toxic effluent from decomposing garbage in landfills may leach into surrounding areas, which may have detrimental effects on the vegetation, wetlands, groundwater, and wildlife populations in the area (Environment Canada 2003). In addition, decomposing waste also produces carbon dioxide and methane gas (Environment Canada 2003). In Canada, landfill sites account for thirty-eight percent of the nation's total methane emissions and produce greenhouse gas emissions equivalent to the amount produced from five million cars (Environment Canada 2003). Gases released from landfills may also contribute to increased acid rainfall and smog, as well as to global warming (Martchek 2000). Finally, in addition to these complications, current landfills have reached maximum capacity and each year there is less available land to create new landfill sites to handle our increasing waste (Environment Canada 2003).

In response to these problems, there has been a governmental and societal shift to reduce the amount of waste going to landfills in Canada and other parts of the world. One of the many globally recognized ways of doing this is *recycling*. As demonstrated in Diagram 1.1, *The Waste Production Loop*, recycling has the potential to minimize the

amount of goods and materials a society deposits in landfills, as well as decreasing the amount of raw materials extracted from the earth. Closing the loop, thus reducing waste entering landfills, is a vital step in moving towards a more sustainable society (Allin 2004). Studies suggest that “recycling has become increasingly important to society and industry to meet the goals of cost reduction, efficient management of limited resources, and reduced landfill utilization (Martchek 2000 p.20).”

Diagram 1.1: The Waste Production Loop (adapted from Allin et al 2003)



Recycling programs in Canada are initiated at the federal, provincial, and municipal governments. In addition, private institutions may operate their own recycling initiatives that aim to close ‘the loop’. At Dalhousie University, the Facilities Management department operates an on campus recycling program that has grown each year after its implementation in 1991 (Dalhousie University<sup>3</sup>, 2005). Initially, the program focused on recycling paper products and beverage containers but expanded by 1999 to include organic waste and batteries. Over the past fourteen years, Dalhousie has recycled over 4,328 tonnes of paper products, saving approximately 60,000 trees from being harvested. (Dalhousie University<sup>3</sup>, 2005). Since 1991, paper recycling on campus has increased by almost 90%! This recycled paper is used to make new consumer goods



such as paper towels, toilet paper, egg cartons, and coffee trays (Dalhousie University<sup>3</sup>, 2005). Dalhousie also recycles more than 140,000 refundable containers each year which can be made into new glass bottles, steel goods, t-shirts, fleece jackets, and carpets (Dalhousie University<sup>1</sup>, 2005). Approximately 150 tons of food waste is also collected on the Dalhousie campus each year. (Dalhousie University<sup>2</sup>, 2005). This organic waste is distributed to a local composting facility where it is later used as soil enrichment or compost (Dalhousie University<sup>2</sup>, 2005). Since its initiation the Dalhousie campus recycling program has eliminated over 5,423 tonnes of recyclable material from entering a landfill. (Dalhousie University<sup>4</sup> 2005).

### **Problem**

By increasing the amount of waste that is diverted from landfills every year, the Dalhousie University campus recycling program continues to be extremely beneficial to our surrounding environment. Moreover, the program is an important step to achieving a more sustainable community, a common goal of institutions and governments alike. However, there is still a considerable amount of recyclable waste that is being sent to landfills and much can be done to improve the program's efficiency and increase its success. The current system operates through voluntary participation by individuals on campus, thus the success of the recycling program can be hampered by individuals who use the system improperly. For example, individuals may place *recyclable items* in the *refuse bins* because: (1) they do not know the item(s) can be recycled on campus; (2) they do not care that the item can be recycled on campus; (3) they do not know where the proper recycling bin is located; or (4) they do not have time/want to walk to the proper recycling bin. Individuals may also place *recyclable items* in *incorrect recycling bins*.

When an item is placed in an incorrect recycling receptacle, the entire contents of that receptacle are thrown away as refuse and sent to the landfill (Estridge, 2006). To prevent these situations and increase the efficiency of the campus recycling system, individuals need to be aware of Dalhousie's campus recycling program, how the system works, its importance to achieving sustainability, and the environmental consequences of improper disposal methods. It is also crucial that improvements are made to the system in order to make it more user friendly and accessible for non-users.

### **Research Question(s)**

How efficient is the campus recycling program at Dalhousie University? What proportion of the campus population is or is not using the recycling facilities on campus and what are the reasons individuals on campus are not utilizing the program or are using the recycling facilities improperly?

### **Purpose**

The purpose of this research project is to increase the efficiency of the Dalhousie University campus recycling program by determining reasons for, and proposing solutions to, the improper disposal of various recyclable materials. Moreover, this project proposes simple recommendations to Facilities Management and other decision makers, that can be used to improve the current system. This will thus decrease the amount of waste going to landfills, reduce Dalhousie's impact on the environment, and make Dalhousie a more sustainable campus.

### **Objectives**

The objectives of this study were to gain a deeper understanding of Dalhousie's recycling program. Specifically, we investigated students' and faculty members'

recycling habits on campus to understand the *reasons why* they do or do not use the recycling bins provided by Facilities Management. We also addressed the reasons why individuals who do use the recycling bins sometimes use them incorrectly. Lastly, we spoke with the Facilities Management staff to gain a better understanding of how the recycling program operates and the success it has had over the past fourteen years. The primary objective of this research project to make recommendations to improve the efficiency of Dalhousie's campus recycling program.

### **Hypotheses**

We hypothesized that a significant amount of recyclable material on campus is discarded as refuse in garbage receptacles instead of the proper recycling bins, that non-recyclable material is being put into recycling bins, and that some recyclable items are discarded into incorrect recycling bins. We hypothesized that there were several explanations as to why some individuals do not use the receptacles on campus properly, including: a lack of knowledge about what waste is recyclable on campus and what waste is not; individuals are too lazy to use the correct receptacles; or there is not a sufficient number of bins for the campus population.

### **Significance**

The information and knowledge presented in this research project is significant because it can be generalized beyond the bounds of the work presented and could be useful for a number of groups and individuals. First, the information provided by this study will be of use to the entire campus population at Dalhousie University. Facilities Management can use this research to better understand, and mediate, the problems associated with the current recycling system on campus. Individual students who have a

personal interest in Dalhousie's environmental initiatives or environmental impact may also be interested in this study. Future Dalhousie students might also be interested in the information provided by this study for use in their own research project or case study. Second, other universities can use this study to compare their campus's recycling habits with Dalhousie's, and the findings may help similar sized institutions understand how to establish a more efficient campus recycling program. Lastly, the findings of this project could be of use to the communities surrounding Dalhousie University. For example, the HRM could set reduction goals for the amount of landfill waste produced by local universities.

Moreover, the findings of this research will be significant because they can be generalized beyond the bounds of the work presented. Not only can the results be used to understand why members of the Dalhousie campus population do not recycle, but the results can also help to decrease the amount of waste Dalhousie produces on campus. Moving further beyond the intended scope of the project, the findings will address larger issues in society today. For example, the idea of recycling and reusing our waste to minimize our ecological impact on the environment relates directly to the fundamental ideas of sustainability, a key issue of environmental discourse today. It is vital that recycling is encouraged in universities, other institutions, businesses, industries, and government agencies in order to decrease the amount of waste sent to landfills and ensure an ecologically sustainable way of life.

## **LITERATURE REVIEW**

Our literature review found a number of studies that have been carried out to

determine the differences in recycling habits of individuals, considering variables such as age, gender, income, and education (Barr 2002). Several of the studies specifically related to our research by addressing questions similar to our research question and were carried out on university campuses. These studies found a number of reasons for *why* individuals, who are presumably aware of the general benefits of recycling, do not recycle consistently and/or do not always recycle properly.

In three separate studies at the University of Waterloo, which looked at the composting facilities, paper recycling facilities, and general recycling facilities on campus, researchers found similar results. Students claimed they did not know what items went in each bin and thus were frequently placing incorrect items in recycling bins (Tsun & Chow 2005). The study showed that this was possibly because individuals were not taking the recycling initiatives seriously and/or were ignoring signs explaining what was recyclable and what was not (King, Pilkington & Myers 2005). The researchers recommended that better signs on the recycling bins on campus would help to remediate the problems (Weldon & Clarkson, 2005). Other studies at the University of Waterloo have found similar results. In a study to determine how much waste produced on campus could be recycled, researchers found that students did not recycle properly either because it was not convenient for them to do so or because they did not understand the recycling system, i.e. what was and what was not recyclable (Clarke, Jajko & Droeske, 2005). A survey conducted at the university also found that students would be encouraged to recycle more often if there were more recycling bins on campus and if the bins were more clearly labelled (Lockwood et al., 2004).

A survey conducted at the University of Guelph showed that of the individuals who did not participate in the recycling program on campus: 30% did not understand the system; 38% believed the university did not have a recycling program; and 15% said recycling took too much effort to recycle (OPIRG 2001). All of these studies found that lack of awareness or knowledge about the recycling system by the general campus population was the reason for the problems with the recycling system. In response to these prior findings, researchers at the University of Waterloo attempted to remediate these problems through a proactive research project. The researchers hung educational posters around campus to inform students about the campus recycling system and encourage better recycling habits. The results of the experiment showed that after the posters had been up for a short amount time, general awareness of students increased, and the amount of recyclable waste in refuse bins decreased (deJong et al. 2003).

## **METHODS**

In this study we utilized a mixed methods approach to collect and analyze both qualitative and quantitative data, in order to provided us with a more holistic interpretation of the Dalhousie recycling program. We also used a concurrent transformative method in our data collection strategy, meaning data was taken simultaneously while not favouring either quantitative or qualitative data (Creswell 2003), and allowed us to use both types of data interchangeably. We first collected relevant information through background research. When first designing the study, as well as during the rest of our research, we consulted with our professor Gregor MacAskil and referenced the textbook, *Research Design: Qualitative, Quantitative, and Mixed*

*Methods Approaches, Second edition*, by John W. Creswell to gain a better understanding of the processes we should follow. We also used previous studies in the field as a guide for our preliminary research and data analysis (see Literature Review). From this information stemmed the idea of using surveys (see Appendix A), involving both qualitative open-ended and quantitative closed-ended questions, and observations (see Appendix B) as the main methods of data collection for our research.

For both the surveys and observations we used a stratified random sample. The sample size for the surveys and the number of observations we would complete, as well as the buildings in which we would carry out these methods, were predetermined. However, the individuals who we surveyed and the exact location of the trashcans and recycling bins we observed, were completely random. We carried out our surveys and observations in five buildings on the Dalhousie University campus, including: The Student Union Building, The Life Science Center, and The Killam Library on the Studley Campus; The Dentistry Building on the Carlton Campus; and the Engineering Building on the Sexton Campus. These five buildings were selected because they housed at least one large multiunit recycling facility. In addition, because the majority of students are based on the Studley Campus, we took more samples and observations there, yet we also included the Sexton and Carleton campuses to give a more accurate representation of the entire Dalhousie community. The surveys were completed by asking random individuals in each of the buildings if they would like to participate, until the quota for each building was met. The observations were performed by selecting random trashcans in each of the five buildings.

Both the surveys and observations were appropriate for our study because they allowed for a holistic interpretation and analysis of the recycling system on campus and provided us with the data necessary for determining the efficiency of the campus recycling program. Surveying a sample of the university campus population, while simultaneously performing observations of actual trashcans and recycling bins, provided us with a means of comparing the participants' stated recycling habits on campus with the reality of campus recycling (i.e. what people say they put into trashcans and recycling bins versus what actually is in these bins). It was also useful that the observations could be used in conjunction or separate from the surveys. Through our observations we wanted to find out if the *location* of the trashcans in relation to the recycling bin made a difference as to what types of materials were discarded in them. We were able to use this information, along with the information collected from the surveys, to create recommendations to improve the recycling system on campus.

### **Reliability and Validity**

It is important in mixed methods research to check the reliability and validity of both qualitative findings and quantitative data (Creswell 2003). *Reliability* is achieved when your research is likely to produce consistent results when replicated (MacAskill 2006). To ensure the reliability of our research, we used a stratified random sampling method that would produce the same results if put into sub-samples and analyzed again. However, there might be one issue with prompting respondents for answers on some of the survey questions. For example, question two (Could you please check *only* the items that you *know* can be recycled/composted *on campus?*) provided participants with a list of items for them to check off accordingly. This may have prompted some respondents



to check items they normally would not have remember if we had left the question open-ended. However, because of time constraints and ease of analysing the data, we decided the question was appropriate for our research.

*Validity* is achieved when your results are both reliable and accurate (MacAskill 2006). To ensure that our research was valid, we made sure to achieve an accurate interpretation of the Dalhousie Campus community through sampling a large population and by conducting research at all three of Dalhousie's campuses. However, one threat to the validity of our research could be caused by participants not truthfully filling out the survey. To compensate for this error, we allowed participants to complete the surveys in private, instead of administering it to them. Although we have taken the necessary measures to provide reliable and valid data in this study, we recommend that the project be carried out again, possibly during a different time of year or in the near future, to guarantee the findings.-

## **Procedures**

Our procedures leading up to and including the administration and completion of the surveys and observations include:

- Step 1) Created research the question, "How efficient is the recycling program at Dalhousie University?" from which we built our study; decided to triangulate our data by conducting interviews, surveys, and observations
- Step 2) Conducted a 'Pilot Study' of our survey; received feedback from participants regarding what they thought should be changed
- Step 3) Edited the original draft of the survey based on participant's recommendations as well as our own ideas and created the final draft of the survey (See Appendix A); also reduced the text size on the survey to fit one page front and back, and added an ethics section
- Step 4) Edited observation sheets and created the final draft of the observation sheets (See Appendix B); made the sheet easier to use and analyze by cutting out unnecessary observations that were futile to our study; did not do a proper

‘pilot study’ as we were the ones completing the sheets

- Step 5) Wrote interview questions and attempted to contact Facilities Management for an interview; were not successful
- Step 6) Determined the three campuses and five buildings where we would conduct the surveys and observations; each buildings had a large multiunit recycling bin and was used by a large number of individuals on campus

Table 1.1: Buildings where we conducted surveys and observations

<i>Campus</i>	<i>Building</i>
Studley Campus	The Life Science Center
Studley Campus	The Killam Library
Studley Campus	The Student Union Building
Sexton Campus	The Engineering Building
Carlton Campus	The Dentistry Building

- Step 7) Set goal of completing 200 surveys, set quota for the number of surveys to be done in each building according to what we thought would be an accurate depiction of the Dalhousie campus, keeping in mind our time constraints

Table 1.2: Projected number of surveys to be completed in each building

<i>Building</i>	<i>Number of Surveys</i>
The Life Science Center	40
The Killam Library	60
The Student Union Building	40
The Engineering Building	20
The Dentistry Building	40

- Step 8) Set goal of observing 10 trashcans in each building on 4 separate occasions; set goal of observing large multiunit recycling bin in each building on 4 separate occasions; determined types of trashcans to observe

Table 1.3: Projected number and type of observations to be completed

<i>Number of times observed</i>	<i>Number of trashcans at location</i>	<i>Location of trashcan relative to multiunit recycling bin</i>
4	1	isolated, not in sight
4	2	in sight
4	2	in classrooms in building
4	5	attached or next to

- Step 9) Determined specific days to conduct the surveys and fill out the observation sheets within a two week time frame; made sure that observations were at different times and different days of the week

- Step 10) Administered surveys from March 7<sup>th</sup>, 2006 to March 17<sup>th</sup>, 2006 in each of

the five buildings; approached random individuals and asked them to complete survey; participation was voluntary and participants read and answered questions themselves; in total completed 198 of 200 surveys

- Step 11) Filled out observation sheets from March 6<sup>th</sup>, 2006 to March 15<sup>th</sup>, 2006 in each of the five buildings; met goal and completed all of the observation sheets for the trashcans; did not meet goal of observing multiunit recycling bins (see 'Limitations')
- Step 12) Assessed, analyzed, and compared data from the surveys and observations; put results into graphs and charts for clear explanations of our findings;

### **Limitations and Delimitations:**

Limitations in your research or study are factors that you have no control over, while delimitations are measures that you intentionally impose on your project or study (MacAskill 2006). There were two major *limitations* we faced when conducting our study. The first limitation was time, we only had one semester (three and half months) to plan, design, implement, and analyse our research. Thus, time was a major consideration when planning how many interviews to complete, how many buildings to observe, and what data to compare and analyze. In addition, we had planned to interview the staff at the Facilities Management department at Dalhousie University to get a better sense of how the recycling program on campus works. Unfortunately, we contacted them at a very busy time, and thus they were not able not answer our questions in a time span useful for our research. The second limitation we faced was a physical barrier to our observation work. We had planned to observe the types of materials in the recycling bins, however, when we went to carry out this goal, we realised the bins were locked. We then contacted Facilities Management to ask them to unlock the bins, we were again met with a barrier. For liability reasons, Facilities Management could not open the bins for us.

There were also several *delimitations* that we intentionally placed on our research. First, we chose to survey a set number of people and observe a specific amount of bins in certain buildings on campus. We also chose to survey more individuals on the Studley campus, than on the Sexton or Carlton campuses, because more students use the Studley campus. In addition, the Studley campus includes buildings, such as the SUB and the Killam Library, that are accessed by a wide variety of students, giving the sample population more randomness and even distribution of individuals from each faculty.

## RESULTS

### Survey Results

The following section includes the questions posed in our survey, along with the results of each question. Some questions are written in an abbreviated form and some open ended questions have been omitted from the results section. A copy of the exact survey that was used during the study can be found in Appendix A: *Survey for Campus Population*. (Please note: the questions in the section below are numbered to correspond with the numbers on the actual survey).

#### **Section 1: General Knowledge**

Q1: To the best of your knowledge, does Dalhousie have recycling and/or composting bins on campus?

Table 2.1: Knowledge of recycling and composting facilities on campus

<b>Recycling bins:</b>		<b>Composting bins:</b>	
<i>Response</i>	<i># of Respondents</i>	<i>Response</i>	<i># of Respondents</i>
Yes	188	Yes	131
No	3	No	20
don't know/not sure	2	don't know/not sure	39

Figure 1a: Percent of respondents who believed Dalhousie has recycling bins on campus.

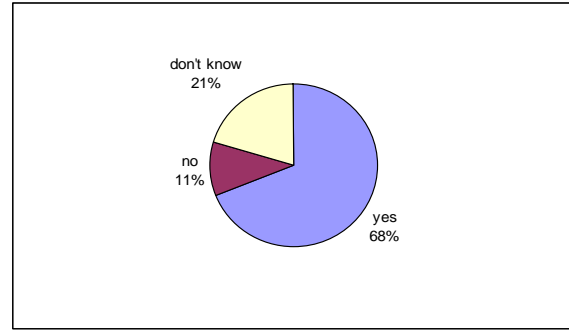
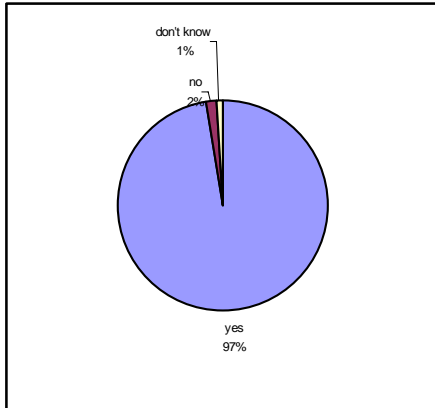


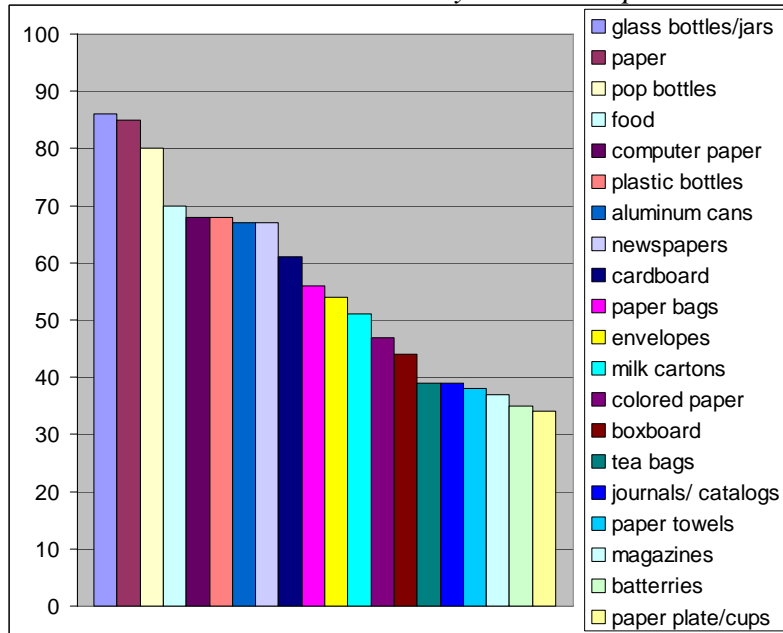
Figure 1b: Percent of respondents who believed Dalhousie has compost bins on campus

Q2: Could you please check the items that you know can be recycled/composed on campus?

Recyclable Items (Numbers indicate the percent of respondents who answered correctly, i.e. they knew/guessed that the item was recyclable on campus.)

glass bottles/jars	86
paper	85
pop bottles	80
food	70
computer paper	68
plastic bottles	68
aluminium cans	67
newspapers	67
cardboard	61
paper bags	56
envelopes	54
milk cartons	51
coloured paper	47
box board	44
tea bags	39
journals/catalogues	39
paper towels	38
magazines	37
batteries	35
paper plates/cups	34

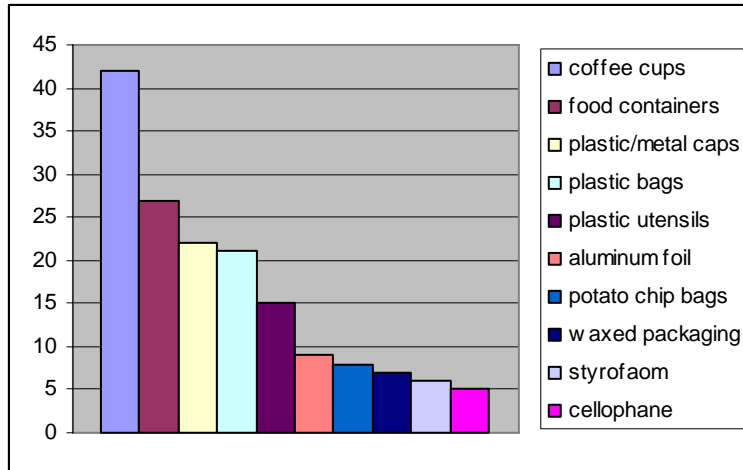
Figure 2a: Percent of respondents who knew which item could be recycled on campus.



Non-Recyclable Items (Numbers indicate the percent of respondents who answered *incorrectly*, i.e. they thought that the non-recyclable item *was* recyclable on campus.)

coffee cups	42	plastic utensils	15
food containers	27	aluminium foil	9
plastic/ metal caps	22	waxed packaging	7
plastic bags	21	Styrofoam	6
potato chip bags	18	cellophane	5

Figure 2b: Percent of respondents who thought that a non-recyclable item *was* recyclable on campus.

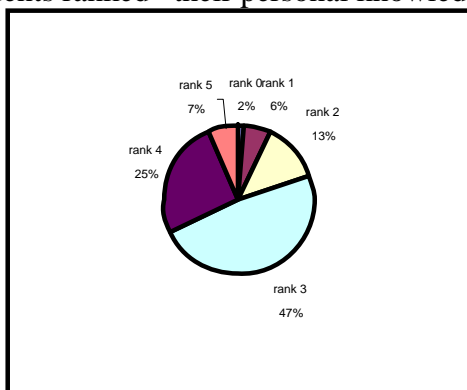


Q3: On a scale of 0-5, how would you rank your personal knowledge of environmental issues?

Table 2.2: Personal knowledge of environmental issues

*Rank	Number of Responses
0 (know nothing)	3
1	10
2	23
3 (know the major issues)	84
4	45
5 (keep up to date on all issues)	12

Figure 3: How respondents ranked\* their personal knowledge of environmental issues.



**Section 2: Habits**

Q4: a.) Do you use the recycling/ composting facilities on campus?

Table 2.3: Use of the recycling/ composting facilities on campus

Response	Number of Respondents	
no, never	19	
yes	171 ... 4b.) If yes, how often?	
	few times a year	9
	few times a month	23
	few times a week	79
	everyday	50
	other	8

Figure 4a: Percent of respondents who said they use the recycling/composting facilities on campus:

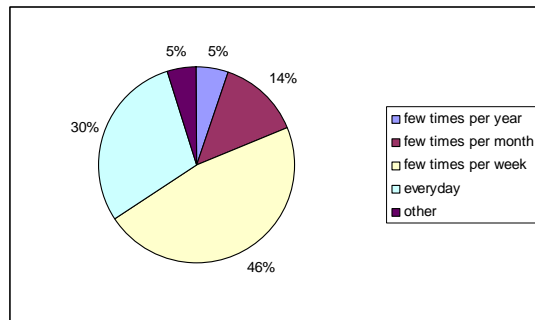
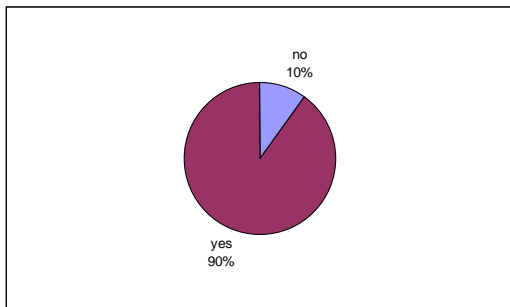
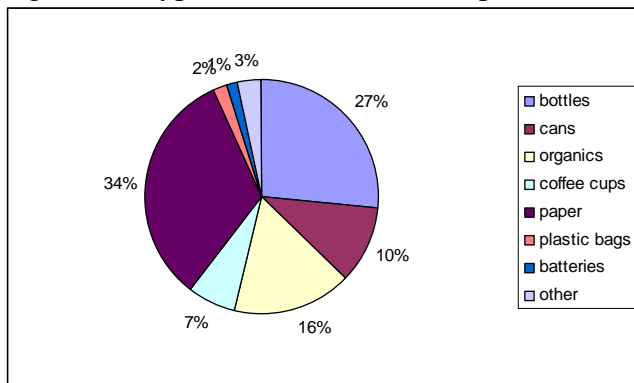


Figure 4b: How often respondents say they use the recycling/composting facilities on campus.

4c.) What types of materials do you regularly recycle on campus? (*open-ended question*)

Figure 4c: Types of materials that respondents said they regularly recycle on campus



4d.) When you have waste that can be *recycled* you:

Table 2.4: Waste that can be *recycled*

<i>Response</i>	<i>Number of Respondents</i>
always use the appropriate bin	91
sometimes use the appropriate bin	46
use the closest receptacle	20
not sure	0
other	3

4e.) When you have waste that can be *composted* you:

Table 2.5: Waste that can be *composted*

<i>Response</i>	<i>Number of Respondents</i>
always use the appropriate bin	49
sometimes use the appropriate bin	54
use the closest receptacle	52
not sure	6
other	9

Figure 4d: What respondents said they do with waste that can be recycled.

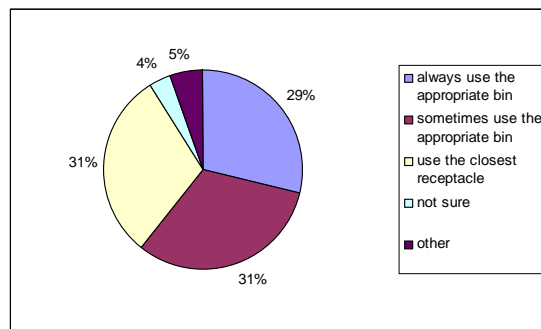
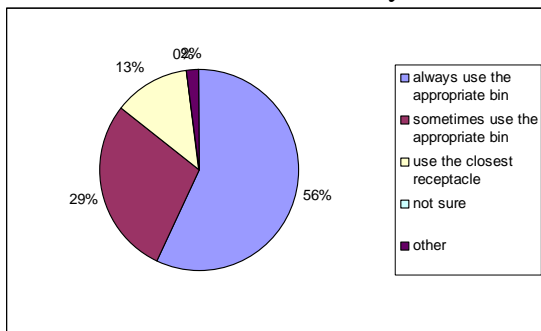


Figure 4e: What respondents said they do with waste that can be composted.

**Section 3: Improvements**

Q5: Do you think that the number of recycling/composting facilities on campus...

Table 2.6: The number of recycling/composting facilities on campus

<i>Response</i>	<i>Number of Respondents</i>
is sufficient and should stay the same	32
should be increased	141
should be decreased	1
don't know/ not sure	12
don't care	3
other	4



Q6: Do you think the location of the existing recycling/ composting facilities on campus is:

Table 2.7: Location of existing recycling/ composting facilities

<i>Response</i>	<i>Number of Respondents</i>
good	125
poor	41
does not matter where they are located	10
don't know	19
don't care	4
other	4

Q7: a.) Do you think the signs on the recycling/ compost bins, regarding what can go into each bin, are clear and easy to understand?

Table 2.8: Signs on the recycling/ compost bins

<i>Response</i>	<i>Number of Respondents</i>
I did not know that there were signs	13
no, they are easy to understand	33
sometimes it is clear, sometimes it is not	62
yes, the signs are very easy to understand	83

Figure 5: The number of recycling/composting facilities on campus.

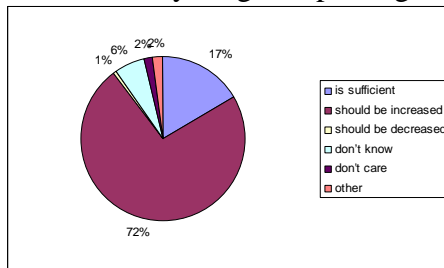


Figure 6: The location of the existing recycling/ composting facilities on campus.

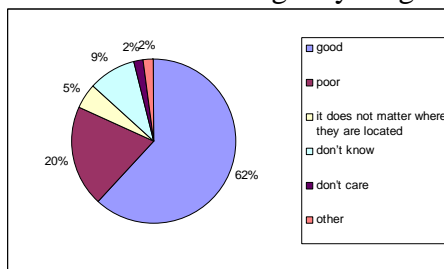
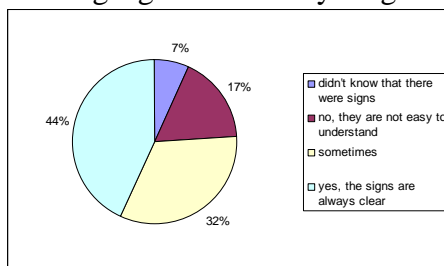


Figure 7a: The existing signs on the recycling bins are clear and easy to understand?

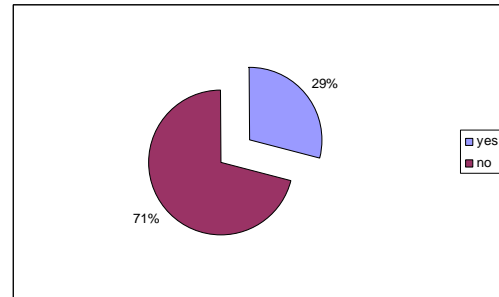


7b.) Are you aware that if an item ends up in an incorrect bag the entire contents of the bin must be thrown into the trash instead of being recycled?

Table 2.9: Incorrect items in recycling bins

<i>Response</i>	<i>Number of Respondents</i>
yes	52
no	127

Figure 7b: Percent of respondents who said they were aware that if waste was placed in an incorrect bin, the entire contents of the bin must be thrown into the trash.



Q8: What would encourage you to recycle/compost on campus more often?

8a.) Would *more* recycling/compost bins on campus encourage you to recycle more often?

Table 2.10: Recommendations: more recycling/compost bins

<i>Responses</i>	<i>Number of Respondents</i>
yes	152
no	14
maybe	23
don't know	4

8b.) Would better signs on bins to let you know what can/can't go in each bin encourage you to recycle on campus?

Table 2.11: Recommendations: better signs

<i>Response</i>	<i>Number of Respondents</i>
yes	141
no	22
maybe	22
don't know	5

8c.) Would better locations for bins encourage you to recycle on campus more often?

Table 2.12: Recommendations: better locations

<i>Response</i>	<i>Number of Respondents</i>
yes	131
no	22
maybe	26
don't know	10

8d.) Would an information pamphlet providing information about the details of the recycling program encourage you to recycle more often?

Table 2.13: Recommendations: information pamphlet

<i>Response</i>	<i>Number of Respondents</i>
yes	82
no	42
maybe	41
don't know	7

Figure 8a: Percent of respondents who said that more recycling/compost bins on campus would encourage them to recycle more often.

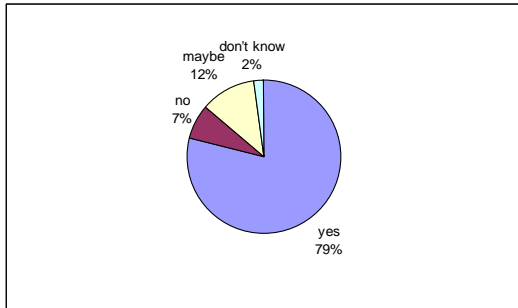


Figure 8b: Percent of respondents who said that better signs on the recycling/compost bins would encourage them to recycle more often.

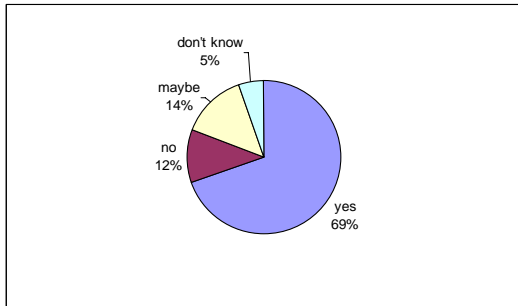
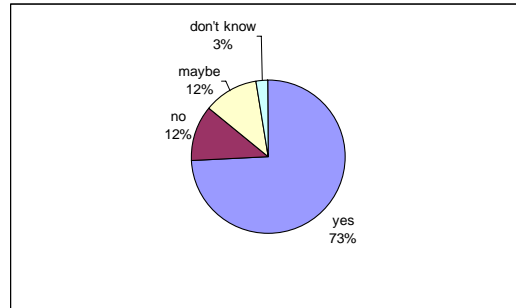


Figure 8c: Percent of respondents who said that *better locations* for the recycling/compost bins would encourage them to recycle more often.

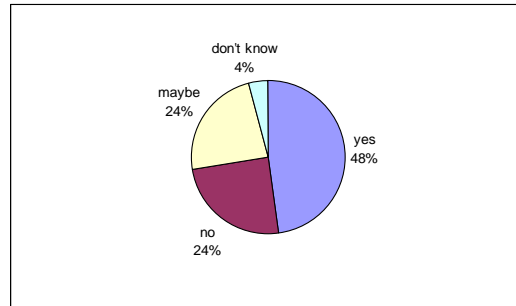


Figure 8d: Percent of respondents who said that an *information pamphlet* about the campus recycling program would encourage them to recycle more often

**Section 4: Demographics**

Although respondents' demographic information was collected during the survey process, they were not used in the data analysis and are therefore not be included in this section. (See the 'limitations' section for further explanation.)

## Observation Results

The following section presents the results from our observations of the trashcans and recycling bins on campus. A copy of the original observation sheets that were used during the study can be found in Appendix B: Observations. (Appendix B 1.1: Observation sheets for trashcans and Appendix B 1.2: Observation sheets for recycling bins).

***Observations of Trashcans*** (See Appendix B 1.1: Observation sheets for trashcans)

Table 3.1: Types of Trashcans Observed

<i>Location of trashcan relative to multiunit recycling bin</i>	<i>number of times observations were done on bins</i>	<i>number of bins observed</i>
Isolated	24	48
In Sight	24	48
Classroom	22	95
Attached/Close	22	22
Total # of garbage cans observed	92	213

Table 3.2: Areas Observed

<i>Building (location of multiunit recycling bin)</i>	<i>number of times observations were done on bins</i>	<i>number of bins observed</i>
Life Science Center (Stairwell)	20	50
Killam Library (Atrium, Common Area)	16	37
Student Union Building (Cafeteria, Basement, Food Services)	17	33
Engineering (Next to Coffee Shop)	15	36
Dentistry (First Floor Lobby)	20	50
Not listed	4	7

Chart 1: Total Occurrences of Recyclable Materials and Refuse  
in the 92 observed Trashcans

Total occurrences of **Compost** in trashcans:

Coffee grounds/Tea bags.....	9
Fruit/vegetables .....	24
Other Solid Food .....	28
Paper towel .....	30
Paper napkins .....	61
Paper bags .....	30
Boxboard .....	6
Paper plates/cups .....	14

Total occurrences of **Paper Products** in trashcans:

White paper .....	42
Coloured paper .....	16
Newspaper .....	18
Envelopes .....	0
Flyers.....	6
Magazines.....	1
Journals/catalogues.....	0
Other paper .....	7

Total occurrences of **Corrugated Cardboard** in trashcans:

Corrugated Cardboard .....	10
----------------------------	----

Total occurrences of **Containers** in the trashcans:

Deposit containers .....	3
Plastic bottles/containers .....	35
Glass bottles/containers.....	11
Aluminium & steel cans .....	14
Tetra juice packs.....	6
Milk cartons.....	28

Total occurrences of **Batteries** in the trashcans:

Alkaline batteries.....	1
-------------------------	---

Total occurrences of **Refuse** in the trashcans:

Aerosol cans .....	0
Aluminium foil.....	4
Broken glass .....	0
Ceramics.....	0
Cloth items .....	0
Coffee cups.....	78
Floor sweepings.....	0
Latex gloves .....	1
Light bulbs.....	0
Plastics.....	27
Potato chip bags.....	29
Styrofoam .....	10

Figure 9: Percent of Occurrence of Recyclable Materials  
and Refuse in Observed Trashcans

## Items Found in Garbage Bins

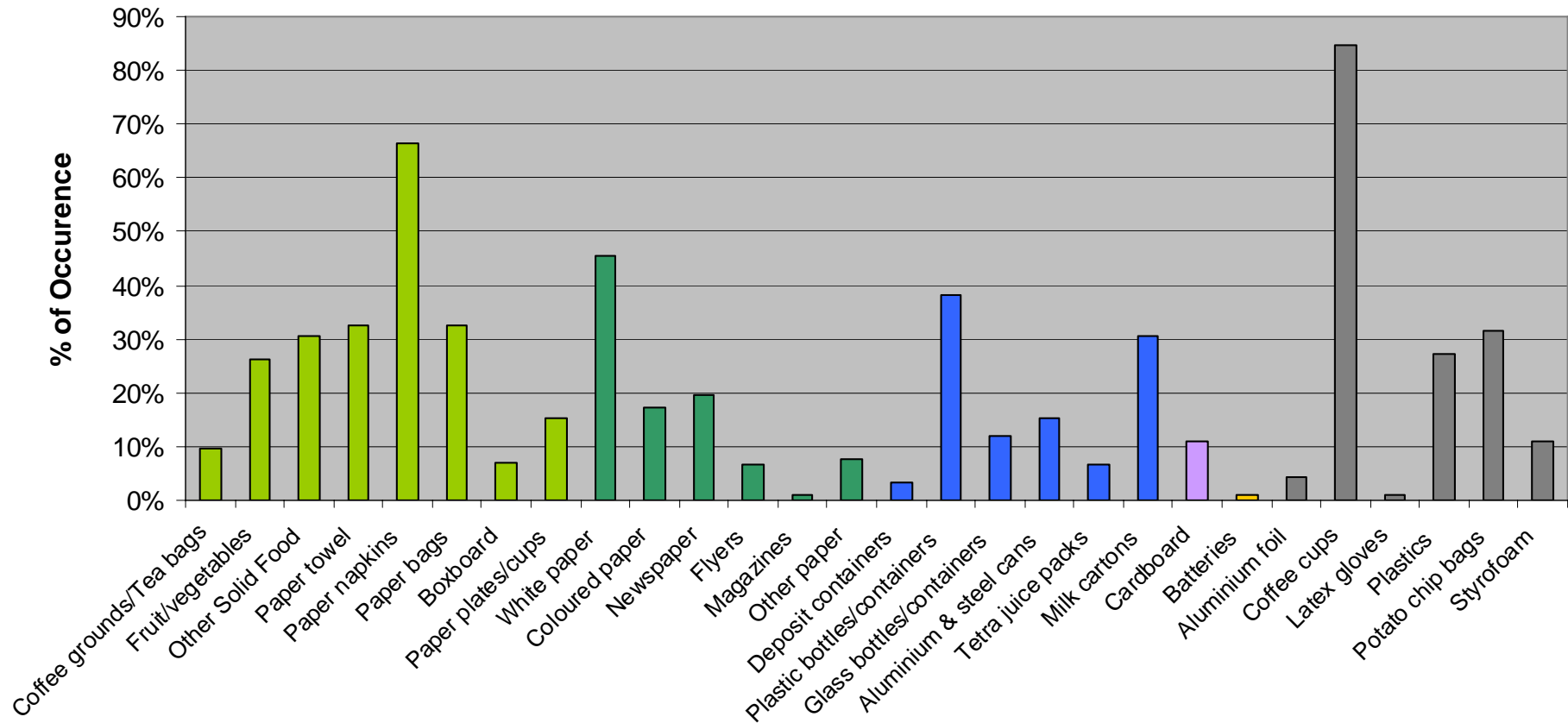


Chart 2: The number of times recyclable waste, organic waste, and refuse occurred  
in the different trashcans

In Sight Trashcans:

Compost .....	21 – 88%
Paper .....	16 – 67%
Cardboard.....	3 – 13%
Containers .....	18 – 75%
Batteries .....	0 – 0%
Refuse .....	23 – 96%

Isolated Trashcans:

Compost .....	23 – 95%
Paper .....	17 – 71%
Cardboard.....	5 – 21%
Containers .....	16 – 67%
Batteries .....	0 – 0%
Refuse .....	24 – 100%

Classroom Trashcans:

Compost .....	19 – 86%
Paper .....	22 – 100%
Cardboard.....	2 – 9%
Containers .....	16 – 73%
Batteries .....	1 – 5%
Refuse .....	21 – 95%

Attached/Close Trashcans:

Compost .....	18 – 82%
Paper .....	8 – 36%
Cardboard.....	3 – 14%
Containers .....	13 – 58%
Batteries .....	0 – 0%
Refuse .....	19 -86%

Total for all Trashcans:

Compost .....	81 – 88%
Paper .....	63 – 68%
Cardboard.....	13 – 14%
Containers .....	63 – 68%
Batteries .....	1 – 1%
Refuse .....	87 – 95%

Figure 10: Percent of occurrence of organic waste, recyclable waste, and refuse in trashcans *insight* of multiunit recycling bins  
**In Sight Garbage Bins**

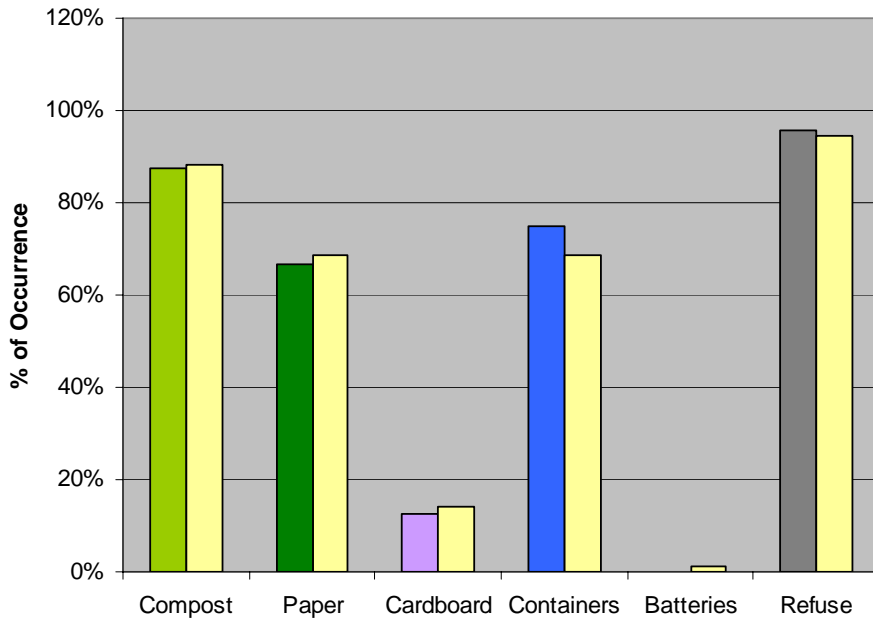


Figure 11: Percent of occurrence of organic waste, recyclable waste, and refuse in trashcans *isolated* from multiunit recycling bins

**Isolated Garbage Bins**

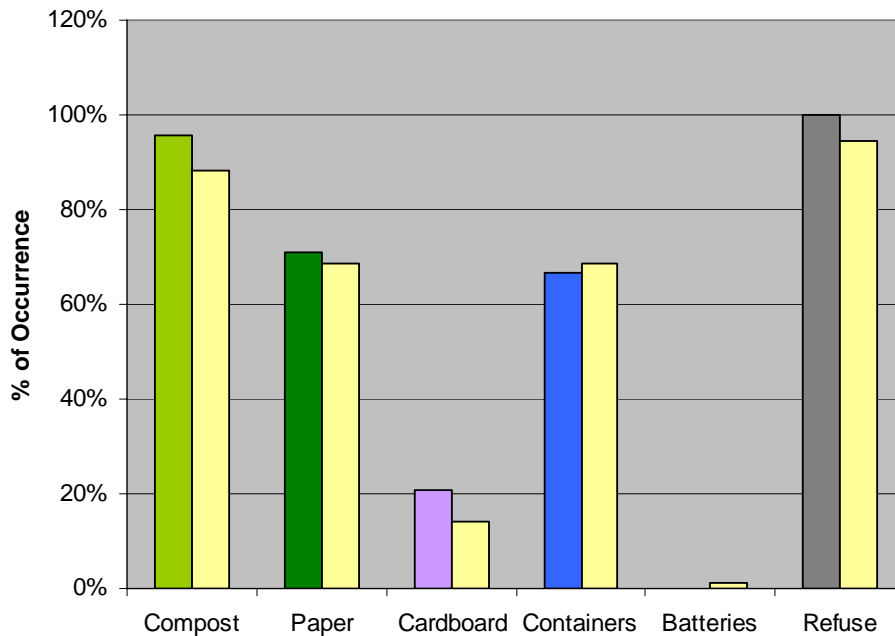




Figure 12: Percent of occurrence of organic waste, recyclable waste, and refuse in trashcans in *classrooms* of buildings with multiunit recycling bins

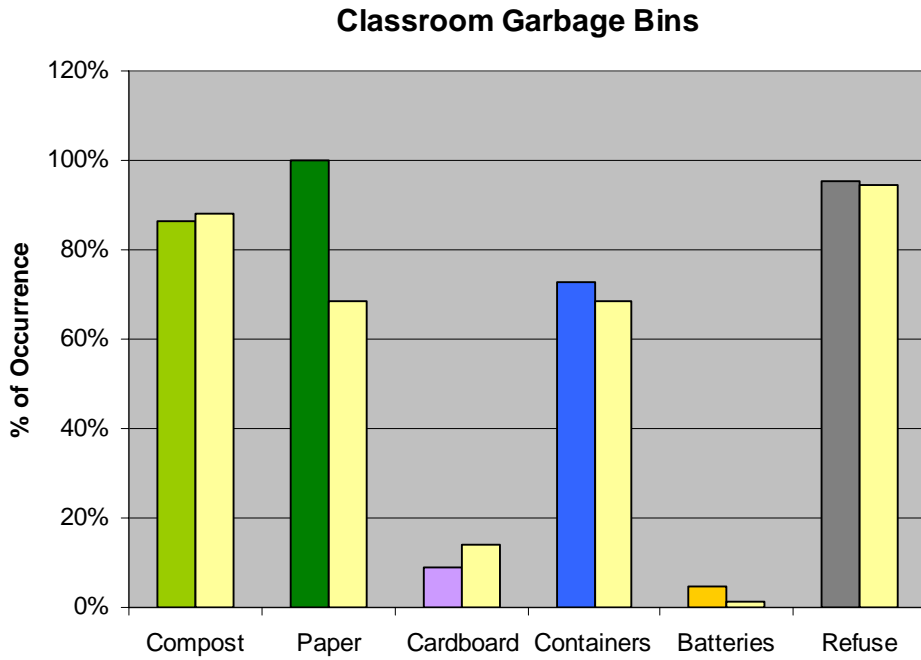


Figure 13: Percent of occurrence of organic waste, recyclable waste, and refuse in trashcans attached or very close to multiunit recycling bins

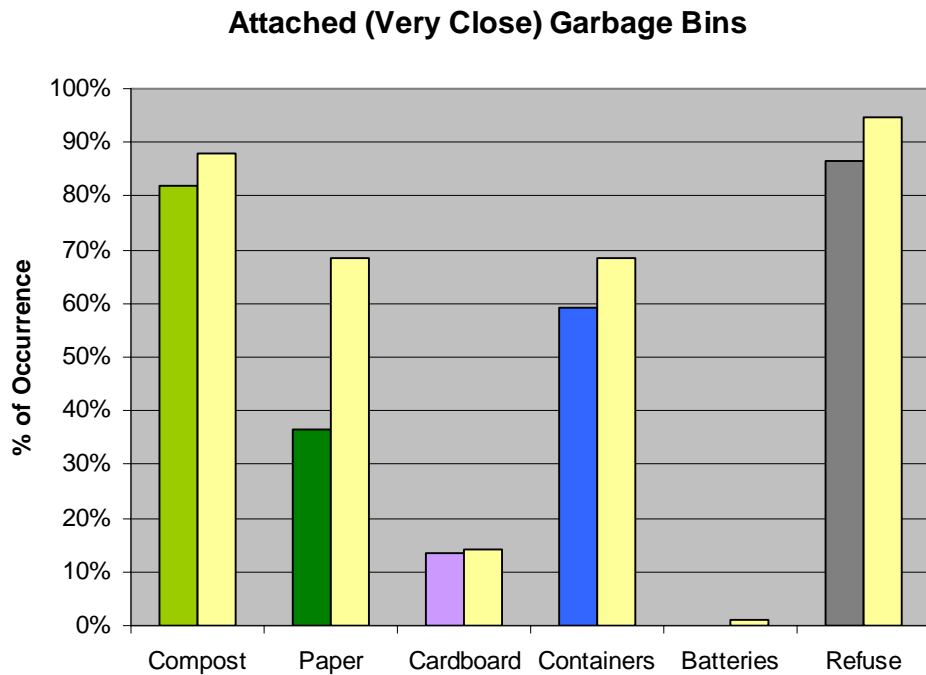


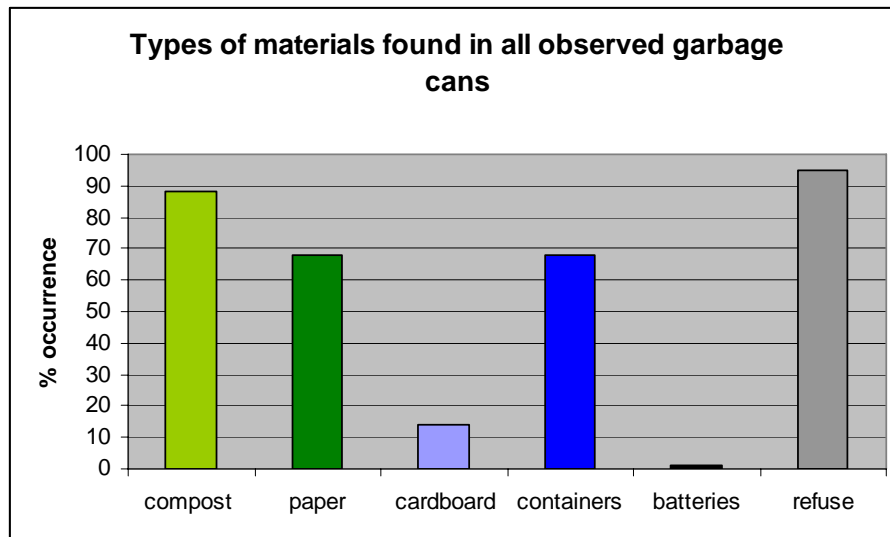
Table 3.3: Ranking of waste in different garbage bin types on Dalhousie Campus:

Garbage Bin Type	Compost	Paper	Cardboard	Containers	Batteries	Refuse
In sight	2	4	5	3	6	1
Isolated	2	3	5	4	6	1
Classroom	3	1	5	4	6	2
Attached/Close	2	4	5	3	6	1

Table 3.4: Total Rankings of waste in garbage bins on Dalhousie Campus:

Garbage Bin Type	1	2	3	4	5	None Present	No data
Compost	14	34	17	6	0	11	12
Paper	14	15	17	6	0	27	13
Cardboard	0	1	4	4	4	74	5
Containers	1	18	20	18	0	26	9
Batteries	0	0	0	0	1	86	5
Refuse	41	15	8	1	0	4	13

Figure 14: The percent occurrence of compost, recyclables, and refuse in observed trashcans



### ***Observations of Recycling Bins***

(See Appendix B 1.2: Observation sheets for recycling bins).

Table 3.5: Number of recycling bins observed in each building

<b><i>Building (location of recycling bins)</i></b>	<b><i>Number of bins observed</i></b>
Life Science Center (Stairwell)	2
Killam Library (Atrium, classroom)	5
Student Union Building (Food services)	4
Engineering (Hallway)	2
Dentistry (First Floor Lobby)	2
Not listed	1

Table 3.6: Number of each type of recycling bins observed

<i>Type of Recycling Bin</i>	<i>Number of bins observed</i>
Organic Waste (Compost)	16
Containers	16
Paper	12
Total number of recycling bins observed	44

Chart 3a: Occurrence of incorrect items in each observed recycling bin

*In Compost Bins*

Compost .....	11
Not Compost .....	14
Total number of wrong material in compost bins.....	28+

*In Paper Bins*

Paper .....	10
Not paper .....	2
Total number of wrong material in paper bins .....	4

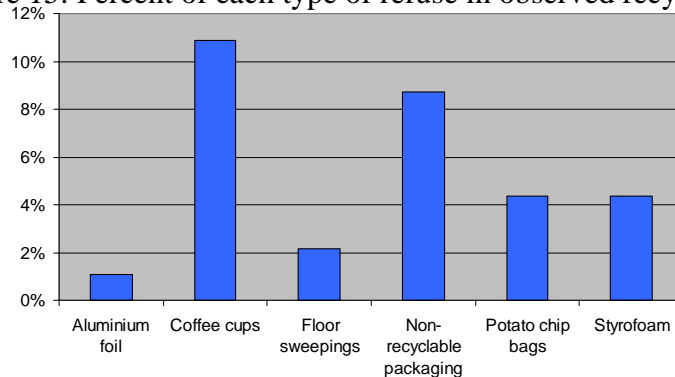
*In Container Bins*

Containers.....	13
Not Containers.....	11
Total number of wrong material in container bins .....	10+

Chart 3b.) Total occurrences of *refuse* in the 44 observed recycling bins:

Aerosol cans .....	0
Aluminium foil.....	1
Broken glass .....	0
Ceramics.....	0
Carbon Paper .....	0
Cloth items .....	0
Coffee cups.....	10
Floor sweepings.....	2
Furniture .....	0
Latex gloves .....	0
Light bulbs.....	0
Non-recyclable packaging .....	8
Potato chip bags.....	4
Styrofoam .....	4

Figure 15: Percent of each type of refuse in observed recycling bins



## DISCUSSION

This study attempted to answer the question, “How efficient is the Dalhousie University campus recycling program?” Our assumption when starting this research was that the Dalhousie campus recycling program was operating inefficiently due to several factors, including: a general lack of knowledge of how the system works; an insufficient number of bins for the campus population to use; and to some degree the apathetic nature of the campus population. As previously discussed, in order to answer our question and prove or disprove our hypothesis, we collected data through surveys and observations regarding who was using the recycling facilities and who was not, as well as the reasons these individuals were or were not using the system.

The purpose and goals of our research were to increase the efficiency of the Dalhousie University campus recycling program by determining reasons for, and proposing solutions to, the improper disposal of various recyclable materials. Thus, the following is a discussion of the results from our surveys and observations that we found significant to these goals. First, we will discuss the sample population’s general knowledge and usual recycling habits on campus. We will also compare some of these results to what we found in our observations of trashcans and recycling bins on campus. Next we will look at the suggested recommendations we proposed to participants on our surveys and discuss the relevance of these solutions to reaching our goal of improving the efficiency of the Dalhousie campus recycling program.

The results of our survey showed that 97% of participants knew about the *recycling* system on campus (see Figure 1a) and that 90% of these individuals were regularly using the facilities on campus (Figure 4a). However, our observation results

found that there was an occurrence of all types of recyclable materials, paper, cardboard, containers, and batteries, in trashcans on campus. As outlined on the Facilities Management website, these trashcans should contain *only* refuse and no recyclable material (Dalhousie University's 2005). These results appear to support our hypothesis. Although 90% of the 97% of participants who are aware of the recycling facilities on campus use the recycling bins, they may not be aware of the *details* of the system and are using the provided facilities incorrectly. Individuals could be using the facilities improperly out of laziness or because it is inconvenient for them to find the proper bin. Our survey also showed that fewer individuals knew about the composting facilities on campus than the recycling facilities, 68% compared to 97% respectively (see Figure 1a and 1b). This information is consistent with the data collected during our observations. Organic waste was the most frequently occurring type of recyclable material found in the trash cans we observed on campus, occurring 88% of the time (see Figure 14). These results appear to support our hypothesis that there is a lack of knowledge about what can be recycled on campus, i.e. people may not know that facilities exist on campus to recycle organic waste. In addition, we found that while 70% of respondents knew food could be recycled on campus, only 38% knew tea bags, an organic material, could be recycled on campus (see Figure 2a). This discrepancy could possibly be due to a lack of proper and informative signs on the compost bins explaining what items may be recycled as organic waste.

Our survey also tested participants' knowledge of what is recyclable on campus. Participants were asked to choose from a list of thirty-one items the ones that they knew to be recyclable or compostable on campus. Ten of the items were refuse, the rest were

recyclable or compostable. Of the recyclable materials on the list, nine out of the twenty items were correctly selected by less than 50% of the respondents. These include: coloured paper, box board, tea bags, journals/catalogues, paper towels, magazines, batteries, and paper plates/cups (See Figure 2a). This means that over half of the respondents did not know these items are recyclable on campus, and are mistakenly discarding these items in the trash. Of the non-recyclable materials on the list, 40% of participants incorrectly claimed that coffee cups were recyclable on campus (see Figure 2b). In addition, of the 90% of respondents who claimed they use the recycling facilities, 7% of them said in an open ended question that coffee cups were an item they *regularly* recycle on campus (see Figure 4c). Our observations complimented these findings, as a high percentage of coffee cups were observed in compost bins on campus (see Figure 15). Again, these results appear to support our hypothesis. Although 97% of the participants were aware of the recycling program on campus, they did not know common, everyday items that can be recycled or composted, possibly because the signs on the bins do not clearly explain what is, and is not, recyclable.

In order to gauge the environmental awareness of our participants, the survey asked individuals to rate their personal knowledge of environmental issues on a scale from zero to five, with zero representing 'know nothing' and five representing 'keep up to date on all issues.' We found that 79% of participants rated their knowledge at three or higher, meaning that the majority of participants believe they understand major environmental issues (see Figure 3). Thus, we can assume that if most of the participants were aware of environmental problems, and were also aware of Dalhousie's recycling program (see Figure 1a), they would then understand the importance of consistently

recycling and composting their waste. However, this assumption does not seem consistent with our observations that showed a high percentage of recyclable and compostable material in garbage cans. A possible explanation for this gap is a lack of recycling and composting bins on campus.

The results from our survey also showed that of the 90% of participants who regularly recycle on campus, the majority, 56%, said they *always* use the *appropriate* bin for waste that can be recycled (see Figure 4d). However, we found incorrect items in all three types of recycling bins observed: organic waste; paper; and recyclable containers (see Chart 3a). These results show that although participants believe they are using the appropriate bin for recyclable waste, they are in fact placing incorrect items in recycling bins and trashcans. This most likely is due to a lack of knowledge about the system, such as what is and what is not recyclable on campus, as well as what types of recyclable items belong in each of the bins. There was also a noticeable difference in how respondents disposed of their organic waste compared to other recyclable items. The survey showed that 31% of respondents use the *closest bin* when dealing with organic waste, whether it is meant for refuse or compost. Only 13% of respondents said the same for waste that is recyclable. We also found that organic waste was the most common type of recyclable material in three of the four types of trashcans we observed, regardless of the distance from the trashcan to the recycling bin (see Figures 10-13). This data suggests that individuals may be less likely to carry food waste with them until they find a compost bin and that more compost bins would likely encourage individuals to recycle organic waste on campus more often.

The final part of our survey questioned participants about their opinion on possible improvements to the recycling system at Dalhousie. As part of the purpose and goals of this research, we came up with a four simple ways to improve the efficiency of the campus recycling program. These proposed improvements were: more recycling and compost bins on campus; better signs on the recycling bins; better locations of the recycling bins on campus; and an informative pamphlet explaining the details of the recycling program, such as what kinds of materials can and cannot be recycled on campus. Our first recommendation to increase the number of bins on campus was strongly support by respondents; 72%, said that the current number of bins should be increased (See Figure 5) and 79% said that the more bins would encourage them to recycle on campus more often (See Figure 8a). The second recommendation to put better signs on the bins was also supported by the sample population; 49% of respondents said that the existing signs on recycling bins were not clear or only sometimes clear (See Figure 7a) and 73% said that better signs would encourage them to recycle more often (See Figure 8b). The third recommendation that participants supported was to have better locations for recycling facilities on campus; 69% of respondents said that better locations would encourage them to recycle on campus more often (See Figure 8c), however, only 20% of participants said that the current locations of recycling bins were poor and 62% said it was good (Figure 6). Our fourth recommendation, to provide an informative pamphlet about the facilities, was not as strongly supported, encouraging slightly less than half, 48%, of the participants to recycle more often (See Figure 8d).



## CONCLUSION

In conclusion, this project and its findings provide a basis for further study and analysis. For example, the questions and concurrent data collected from our survey (see Appendix A) included a number of demographic and open-ended questions that we did not analyze, either because of time constraints or because the information was not directly pertinent to our research goals. If a database was created using the results of the surveys we have already completed, it would allow researchers to organize the data so that several variables could be compared simultaneously. It would also allow researchers to compare data such as a participants' degree or number of years at Dalhousie to their sense of environmental awareness or knowledge of the campus recycling program. A database could also be created to further explore the findings of the observations, allowing researchers to analyze the data for each building. This could possibly result in recommendations and solutions specific to the recycling problems and needs of each building. Another possibility for further research would be to expand the surveys and observations to include other buildings on campus. Our research only included buildings on campus that housed large multiunit recycling bins. A comparative study could look at how recycling habits in buildings without large, central recycling facilities differ from buildings that do have them.

In conclusion, we propose that implementing any of our four recommendations would most likely increase the number individuals using the recycling and composting facilities on campus. As shown in the following table, all of our recommendations would encourage the majority of participants in our study to recycle more often on campus.

Table 4.1: Percentage of participants who support the suggested recommendations to improve the recycling program at Dalhousie.

<i>Recommendation</i>	<i>Participants who support the recommendation*</i>
More recycling bins	91%
Better signs on bins	85%
Better locations for bins	83%
Information Pamphlet	72%

\*(Percentages represent participants who said yes/maybe the recommendation would encourage them to recycle on campus more often.)

As with most environmental problems, solutions need to be reevaluated. The numbers from this study support having better signs on bins, more bins, better bin locations and an informative pamphlet about recycling and composting on campus. We recommend that at least one of these solutions be implemented and then the surveys and observations be repeated to see whether or not these proposed solutions do in fact make a difference.

## APPENDIXES

### Appendix A: Survey for Campus Population

*This survey is being administered by a group of students from the Environmental Problem Solving (ENVS 3502) class of 2006. The results will be used as apart of a study to analyze waste disposal behaviour on campus and may be used in conjunction with the campus sustainability assessment being carried out by the Dalhousie Integrated Sustainability Initiative (DISI). By filling out the survey below you are consenting to participation in this study. It is very important that you are 100% honest when answering these questions. There are no right and wrong answers, we simply want your opinion. Thank you for you honesty and participation.*

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Location: \_\_\_\_\_

### Section 1: GENERAL KNOWLEDGE

**Q1:** To the best of your knowledge, does Dalhousie have a recycling and/or composting bins on campus?

Recycling Bins

- No\*  
 Yes\*  
 Don't know/not sure

Composting Bins

- No\*  
 Yes\*  
 Don't know/not sure

\*(If you answered **NO** to BOTH questions please skip to Section 3: Improvements, Q5)

\*\* (If you answered **YES** or **Don't Know** for one or more of the questions please go on to the next question, Q2.)

**Q2:** Could you please check *only* the items that you *know* can be recycled/composted *on campus*?

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> 1 aluminum foil  | <input type="checkbox"/> 11 food               | <input type="checkbox"/> 21 paper towels       |
| <input type="checkbox"/> 2 aluminum cans  | <input type="checkbox"/> 12 food containers    | <input type="checkbox"/> 22 plastic bags       |
| <input type="checkbox"/> 3 cellophane     | <input type="checkbox"/> 13 glass bottles/jars | <input type="checkbox"/> 23 plastic bottles    |
| <input type="checkbox"/> 4 batteries      | <input type="checkbox"/> 14 journals/catalogs  | <input type="checkbox"/> 24 plastic/metal caps |
| <input type="checkbox"/> 5 boxboard       | <input type="checkbox"/> 15 magazines          | <input type="checkbox"/> 25 plastic utensils   |
| <input type="checkbox"/> 6 cardboard      | <input type="checkbox"/> 16 milk cartons       | <input type="checkbox"/> 26 pop bottles        |
| <input type="checkbox"/> 7 coffee cups    | <input type="checkbox"/> 17 newspapers         | <input type="checkbox"/> 27 potato chip bags   |
| <input type="checkbox"/> 8 colored paper  | <input type="checkbox"/> 18 paper              | <input type="checkbox"/> 28 Styrofoam          |
| <input type="checkbox"/> 9 computer paper | <input type="checkbox"/> 19 paper bags         | <input type="checkbox"/> 30 tea bags           |
| <input type="checkbox"/> 10 envelopes     | <input type="checkbox"/> 20 paper plates/cups  | <input type="checkbox"/> 31 waxed packaging    |

**Q3:** On a scale of 0-5, how would you rank your *personal knowledge* of environmental issues? You know

0                      1                      2                      3                      4                      5  
 (know nothing)                      (know major issues)                      (keep up to date on all issues)

### Section 2: HABITS

**Q4:** Do you use the recycling/composting facilities on campus?

- No, never \*(please answer part a, then skip to question 5)\*

a.) If not, could you please explain *why* you do not use the recycling facilities on campus?

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**Yes \*(please answer b – e, then go on to question 5)\***

b.) How often?

- Few times a year
  - Few times a month
  - Few times a week
  - Everyday
  - Other:
- 

c.) What types of materials do you regularly recycle on campus?

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d.) When you have waste that can be **recycled**, you:

- always* use the appropriate recycling bin
  - sometimes* use the appropriate recycling bin... *please explain* \_\_\_\_\_
- 

- use the *closest* receptacle, either a recycling bin or trash can
  - not sure
  - other: \_\_\_\_\_
- 

e.) When you have waste that can be **composted**, you:

- always* use a compost bin
  - sometimes* use the compost bin ... *please explain* \_\_\_\_\_
- 

- use the closest receptacle, either compost bin or trash can
  - not sure
  - other: \_\_\_\_\_
- 

### **Section 3: IMPROVEMENTS**

**Q5:** Do you think that the **number** of recycling/composting facilities on campus ...

- is sufficient to serve the campus population, and should stay the same
  - should be increased to better serve the campus population
  - should be decreased, please explain: \_\_\_\_\_
- 

- don't know/not sure
  - don't care about recycling facilities on campus
  - Other: \_\_\_\_\_
- 

**Q6:** Do you think the **location** of the *existing* recycling/composting facilities on campus is....

- Good, the bins should stay where they are

- Poor, the bins could be moved to better serve the campus population- Feel free to explain which bins you think should be moved and to where: \_\_\_\_\_
- \_\_\_\_\_
- It does not matter where they are located because \_\_\_\_\_
- \_\_\_\_\_
- Don't know
- Don't care
- Other: \_\_\_\_\_

**Q7:** a.) Do you think the **signs** on the recycling/compost bins, regarding what can go in each bin, are *clear* and *easy to understand*?

- I did not know that there were signs on the bins **\*(please skip to question 8)\***
- No*, they are not easy to understand
- Sometimes* it is clear what goes in which bin, sometimes it is not, please feel free to explain: \_\_\_\_\_
- \_\_\_\_\_
- Yes, the signs are *very* easy to understand and I can read what should and should not go in each bag

b.) Are you aware that if an item ends up in an incorrect bag (such as a plastic container in the bin for 'compost') the entire contents of the bin must be thrown into the trash, instead of being recycled? (*please circle one*)

YES

NO

**Q8:** What would encourage you to recycle/compost on campus more often?

(*please circle a response for each question*)

a). Would *more* recycling/compost bins on campus encourage you to recycle on campus more often?

YES

NO

MAYBE

DON'T KNOW

b). Would *better signs* on recycling/compost bins to let you know what can/can't go in each bin encourage you to recycle on campus more often?

YES

NO

MAYBE

DON'T KNOW

c). Would *better locations* for recycling/compost bins encourage you to recycle on campus more often?

YES

NO

MAYBE

DON'T KNOW

d). Would an *information pamphlet* providing information about the details of the recycling program (such as what kinds of materials can be recycled on campus) encourage you to recycle on campus more often?

YES

NO

MAYBE

DON'T KNOW

**Q9:** What changes/improvement would you recommend for the recycling/composting program at Dal in order to encourage more students to participate in recycling/composting on campus?: (Please feel free to elaborate on any of the above suggestions, or make a suggestion of your own.)

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**Section 4: DEMOGRAPHICS**

<b>Q10:</b> What program are you in?	
<b>Q11:</b> What degree?	
<b>Q12:</b> How many years have you been at Dal?	
<b>Q13:</b> How many environmental studies/science courses have you taken?	
<b>Q14:</b> How many other courses have you taken that have addressed environmental issues?	

**Q15:** If you would like to see the results of this study please provide us with your email address: \_\_\_\_\_

*(Please Note: Providing us with your email address is NOT required for this survey. Your email address will not be used to link you to your responses and will be removed from the survey once an email list has been created.)*

\*If you are interested in learning more about the recycling program at Dalhousie, the Facilities Management webpage [www.fm.dal.ca/waste.htm](http://www.fm.dal.ca/waste.htm) is a great source and includes a list of what can/cannot be recycled on campus ([www.fm.dal.ca/recycling.htm](http://www.fm.dal.ca/recycling.htm)).

**~ T H A N K Y O U SO MUCH FOR YOUR TIME !! ~**

## Appendix B: Observations

### Appendix B 1.1: Observation sheets for trashcans

#### OBSERVATION 1: For the TRASHCANS

**Question:** *Are people on campus putting incorrect items in the trashcans?*

**Objectives:** (1) to see if people are using the trashcans for items that could be recycled on campus; (2) to see what items, if any, are consistently not being recycled/composted when they could be; (3) to see if distance from trashcan to recycling bin affects the amount of recyclable material in trash bin.

**Directions:** *Observe & record all items you can see in 10 different trashcans (2 isolated from recycling bin, 2 insight of recycling bin, 5 in classrooms, 1 attached to recycling bin).* **\*\*[Note: RANK of 1 = Most abundant type of material in trashcan -- The higher the number the LESS abundant a material is -- RANK of 0 = material is no present in trashcan]\*\*** Initials: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Building: \_\_\_\_\_  
Location of large multiunit recycling bin: \_\_\_\_\_

#### ➤ Observation 1a.) TWO trashcans isolated from recycling bin

Estimated distance from trashcan to recycling bin: \_\_\_\_\_ & \_\_\_\_\_ (# of strides)

##### a.) compost

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> _____ coffee grounds   | <input type="checkbox"/> _____ other solid food | <input type="checkbox"/> _____ paper bags         |
| <input type="checkbox"/> _____ tea bags         | <input type="checkbox"/> _____ paper towels     | <input type="checkbox"/> _____ boxboard           |
| <input type="checkbox"/> _____ fruit/vegetables | <input type="checkbox"/> _____ paper napkins    | <input type="checkbox"/> _____ paper plates & cup |

**RANK:** \_\_\_\_\_

##### b.) paper products

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> _____ WHITE paper   | <input type="checkbox"/> _____ envelopes | <input type="checkbox"/> _____ journals/catalogs |
| <input type="checkbox"/> _____ COLORED paper | <input type="checkbox"/> _____ flyers    | <input type="checkbox"/> _____ other paper       |
| <input type="checkbox"/> _____ newspapers    | <input type="checkbox"/> _____ magazines |  |

**RANK:** \_\_\_\_\_

##### c.) corrugated cardboard

- \_\_\_\_\_ any type of corrugated cardboard

**RANK:** \_\_\_\_\_

##### d.) containers

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> _____ deposit containers         | <input type="checkbox"/> _____ glass bottles & jars  | <input type="checkbox"/> _____ tetra juice packs |
| <input type="checkbox"/> _____ plastic bottles/containers | <input type="checkbox"/> _____ aluminum & steel cans | <input type="checkbox"/> _____ milk cartons      |

**RANK:** \_\_\_\_\_

##### e.) batteries

- \_\_\_\_\_ alkaline batteries                       \_\_\_\_\_ rechargeable batteries

**RANK:** \_\_\_\_\_

##### f.) refuse (non-recyclable materials)

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> _____ Aerosol cans  | <input type="checkbox"/> _____ cloth items     | <input type="checkbox"/> _____ light bulbs      |
| <input type="checkbox"/> _____ aluminum foil | <input type="checkbox"/> _____ coffee cups     | <input type="checkbox"/> _____ potato chip bags |
| <input type="checkbox"/> _____ broken glass  | <input type="checkbox"/> _____ floor sweepings | <input type="checkbox"/> _____ Styrofoam        |
| <input type="checkbox"/> _____ ceramics      | <input type="checkbox"/> _____ latex gloves    |   |

**RANK:** \_\_\_\_\_

Comments/Notes on (1a):

➤ **Observation 1b.) TWO trashcans in sight of the recycling bins**

Estimated distance from trashcan to recycling bin: \_\_\_\_\_ & \_\_\_\_\_ (# of strides)

**a.) compost**

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> _____ coffee grounds   | <input type="checkbox"/> _____ other solid food | <input type="checkbox"/> _____ paper bags         |
| <input type="checkbox"/> _____ tea bags         | <input type="checkbox"/> _____ paper towels     | <input type="checkbox"/> _____ boxboard           |
| <input type="checkbox"/> _____ fruit/vegetables | <input type="checkbox"/> _____ paper napkins    | <input type="checkbox"/> _____ paper plates & cup |

**RANK:** \_\_\_\_\_

**b.) paper products**

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> _____ WHITE paper   | <input type="checkbox"/> _____ envelopes | <input type="checkbox"/> _____ journals/catalogs |
| <input type="checkbox"/> _____ COLORED paper | <input type="checkbox"/> _____ flyers    | <input type="checkbox"/> _____ other paper       |
| <input type="checkbox"/> _____ newspapers    | <input type="checkbox"/> _____ magazines |  |

**RANK:** \_\_\_\_\_

**c.) corrugated cardboard**

- \_\_\_\_\_ any type of corrugated cardboard

**RANK:** \_\_\_\_\_

**d.) containers**

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> _____ deposit containers         | <input type="checkbox"/> _____ glass bottles & jars  | <input type="checkbox"/> _____ tetra juice packs |
| <input type="checkbox"/> _____ plastic bottles/containers | <input type="checkbox"/> _____ aluminum & steel cans | <input type="checkbox"/> _____ milk cartons      |

**RANK:** \_\_\_\_\_

**e.) batteries**

- \_\_\_\_\_ alkaline batteries                       \_\_\_\_\_ rechargeable batteries

**RANK:** \_\_\_\_\_

**f.) refuse (non-recyclable materials)**

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> _____ Aerosol cans  | <input type="checkbox"/> _____ cloth items     | <input type="checkbox"/> _____ light bulbs      |
| <input type="checkbox"/> _____ aluminum foil | <input type="checkbox"/> _____ coffee cups     | <input type="checkbox"/> _____ potato chip bags |
| <input type="checkbox"/> _____ broken glass  | <input type="checkbox"/> _____ floor sweepings | <input type="checkbox"/> _____ Styrofoam        |
| <input type="checkbox"/> _____ ceramics      | <input type="checkbox"/> _____ latex gloves    |   |

**RANK:** \_\_\_\_\_

Comments/Notes on (1b):

➤ **Observation 1c.) FIVE trashcans in classrooms**

Estimated distance from trashcan to recycling bin (# of strides) \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

**a.) compost**

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> _____ coffee grounds   | <input type="checkbox"/> _____ other solid food | <input type="checkbox"/> _____ paper bags         |
| <input type="checkbox"/> _____ tea bags         | <input type="checkbox"/> _____ paper towels     | <input type="checkbox"/> _____ boxboard           |
| <input type="checkbox"/> _____ fruit/vegetables | <input type="checkbox"/> _____ paper napkins    | <input type="checkbox"/> _____ paper plates & cup |

**RANK:** \_\_\_\_\_

**b.) paper products**

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> _____ WHITE paper   | <input type="checkbox"/> _____ envelopes | <input type="checkbox"/> _____ journals/catalogs |
| <input type="checkbox"/> _____ COLORED paper | <input type="checkbox"/> _____ flyers    | <input type="checkbox"/> _____ other paper       |
| <input type="checkbox"/> _____ newspapers    | <input type="checkbox"/> _____ magazines |  |

**RANK:** \_\_\_\_\_



**c.) corrugated cardboard****RANK:** \_\_\_\_\_

- \_\_\_\_\_ any type of corrugated cardboard

**d.) containers****RANK:** \_\_\_\_\_

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> _____ deposit containers         | <input type="checkbox"/> _____ glass bottles & jars  | <input type="checkbox"/> _____ tetra juice packs |
| <input type="checkbox"/> _____ plastic bottles/containers | <input type="checkbox"/> _____ aluminum & steel cans | <input type="checkbox"/> _____ milk cartons      |

**e.) batteries****RANK:** \_\_\_\_\_

- \_\_\_\_\_ alkaline batteries                       \_\_\_\_\_ rechargeable batteries

**f.) refuse (non-recyclable materials)****RANK:** \_\_\_\_\_

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> _____ Aerosol cans  | <input type="checkbox"/> _____ cloth items     | <input type="checkbox"/> _____ light bulbs      |
| <input type="checkbox"/> _____ aluminum foil | <input type="checkbox"/> _____ coffee cups     | <input type="checkbox"/> _____ potato chip bags |
| <input type="checkbox"/> _____ broken glass  | <input type="checkbox"/> _____ floor sweepings | <input type="checkbox"/> _____ Styrofoam        |
| <input type="checkbox"/> _____ ceramics      | <input type="checkbox"/> _____ latex gloves    |   |

Comments/Notes on (1c):

**➤ Observation 1d.) ONE trashcan attached/right next to the recycling bin**

Estimated distance from trashcan to recycling bin: \_\_\_\_\_ (# of strides)

**a.) compost****RANK:** \_\_\_\_\_

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> _____ coffee grounds   | <input type="checkbox"/> _____ other solid food | <input type="checkbox"/> _____ paper bags         |
| <input type="checkbox"/> _____ tea bags         | <input type="checkbox"/> _____ paper towels     | <input type="checkbox"/> _____ boxboard           |
| <input type="checkbox"/> _____ fruit/vegetables | <input type="checkbox"/> _____ paper napkins    | <input type="checkbox"/> _____ paper plates & cup |

**b.) paper products****RANK:** \_\_\_\_\_

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> _____ WHITE paper   | <input type="checkbox"/> _____ envelopes | <input type="checkbox"/> _____ journals/catalogs |
| <input type="checkbox"/> _____ COLORED paper | <input type="checkbox"/> _____ flyers    | <input type="checkbox"/> _____ other paper       |
| <input type="checkbox"/> _____ newspapers    | <input type="checkbox"/> _____ magazines |  |

**c.) corrugated cardboard****RANK:** \_\_\_\_\_

- \_\_\_\_\_ any type of corrugated cardboard

**d.) containers****RANK:** \_\_\_\_\_

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> _____ deposit containers         | <input type="checkbox"/> _____ glass bottles & jars  | <input type="checkbox"/> _____ tetra juice packs |
| <input type="checkbox"/> _____ plastic bottles/containers | <input type="checkbox"/> _____ aluminum & steel cans | <input type="checkbox"/> _____ milk cartons      |

**e.) batteries****RANK:** \_\_\_\_\_

- \_\_\_\_\_ alkaline batteries                       \_\_\_\_\_ rechargeable batteries

**f.) refuse (non-recyclable materials)****RANK:** \_\_\_\_\_

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> _____ Aerosol cans  | <input type="checkbox"/> _____ cloth items     | <input type="checkbox"/> _____ light bulbs      |
| <input type="checkbox"/> _____ aluminum foil | <input type="checkbox"/> _____ coffee cups     | <input type="checkbox"/> _____ potato chip bags |
| <input type="checkbox"/> _____ broken glass  | <input type="checkbox"/> _____ floor sweepings | <input type="checkbox"/> _____ Styrofoam        |
| <input type="checkbox"/> _____ ceramics      | <input type="checkbox"/> _____ latex gloves    |   |

Comments/Notes on (1d):

## Appendix B 1.2: Observation sheets for recycling bins

### OBSERVATION 2: For the large multiunit RECYCLING BIN

**Question:** *Are people using the recycling and compost bins correctly?*

**Objectives:** *(1) to see if people are using the recycling and compost bins correctly/incorrectly; (2) to see what items, if any, are consistently being recycled/composted incorrectly*

**Directions:** *Observe & record all items you can see in the large multiunit recycling bins*

[Note; RANK of 1 = Most abundant type of material in trashcan -- The higher the number the LESS abundant a material is – RANK of 0 = material is no present in trashcan]

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Building: \_\_\_\_\_

Location of *recycling bin*: \_\_\_\_\_

Type of bins at site: \_\_\_\_\_

→ Observe & record the items that *do not* belong in each bin.

a.) *Compost* TOTAL # of wrong items \_\_\_\_\_  
 \_\_\_\_\_ Food  \_\_\_\_\_ Not Food

NOTES:

b.) *Fine paper(big green bins)* TOTAL # of wrong items \_\_\_\_\_  
 \_\_\_\_\_ Not present in building  
 \_\_\_\_\_ paper  \_\_\_\_\_ not paper

NOTES:

c.) *Containers* TOTAL # of wrong items \_\_\_\_\_  
 \_\_\_\_\_ containers  \_\_\_\_\_ not containers

NOTES:

f.) *Non-recyclable material (these items should not be in any recycling bin- they are not recyclable on campus)*

- |  |   |
|--|---|
| <input type="checkbox"/> _____ Aerosol cans                    | <input type="checkbox"/> _____ floor sweepings          |
| <input type="checkbox"/> _____ aluminum foil                   | <input type="checkbox"/> _____ furniture                |
| <input type="checkbox"/> _____ broken glass<br>(boxed & taped) | <input type="checkbox"/> _____ latex gloves             |
| <input type="checkbox"/> _____ carbon paper                    | <input type="checkbox"/> _____ light bulbs              |
| <input type="checkbox"/> _____ ceramics                        | <input type="checkbox"/> _____ non-recyclable packaging |
| <input type="checkbox"/> _____ cloth items                     | <input type="checkbox"/> _____ potato chip bags         |
| <input type="checkbox"/> _____ coffee cups                     | <input type="checkbox"/> _____ Styrofoam                |

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