

**Exploring Ways to Lighten AMS Food and Beverage Department's Ecological Footprint: A
Focus on the Pendulum and Development of an AMS-wide Strategy to Encourage
"Ecological Eating"**

**Dean Jeffery, Richard Santoso, Jaclyn Smith, Vashti Timmermans, Sandra Van Vliet, Yu-
Wing (Tom) Wong, LoDik (Ludi) Yuen**

University of British Columbia

AGSC 450

April 11, 2008

Disclaimer: "UBC SEEDS provides students with the opportunity to share the findings of their studies, as well as their opinions, conclusions and recommendations with the UBC community. The reader should bear in mind that this is a student project/report and is not an official document of UBC. Furthermore readers should bear in mind that these reports may not reflect the current status of activities at UBC. We urge you to contact the research persons mentioned in a report or the SEEDS Coordinator about the current status of the subject matter of a project/report".

**UBC Food System Project
Scenario 3, 2008**

**Exploring Ways to Lighten AMS Food and Beverage Department's
Ecological Footprint: A Focus on the Pendulum and Development of an AMS-wide
Strategy to Encourage "Ecological Eating"**

AGSC 450
Group 29

Dean Jeffery
Richard Santoso
Jaclyn Smith
Vashti Timmermans
Sandra Van Vliet
Yu-Wing (Tom) Wong
LoDik (Ludi) Yuen

Table of Contents:

Section	Page
1 Executive Summary	3
2 Introduction	4
2.1 UBCFSP Scenario 3	4
2.2 Problem Definition	4
2.3 Vision Statement	5
2.4 Value Assumptions	6
2.5 Literature Review: an Informed Methodology	6
3 Methods	8
3.1 Research Methodology	8
3.2 Key Informant Interviews	9
3.3 Pendulum Customer Survey	9
3.4 Eco-label Criteria Development	11
4 Results	13
4.1 Outcome of Interviews	13
4.2 Survey Results	14
4.3 Eco-label Application at the Pendulum	16
5 Discussion	17
5.1 Discussion of Survey Results	17
5.2 Marketing Strategy: “Eating Ecologically”	19
5.3 Challenges and Limitations	21
6 Recommendations	22
7 Conclusion	23
8 References	24
9 Appendices	26

1 Executive Summary

As part of the UBC Food System Project our group developed a strategy to reduce the Ecological Footprint (EF) of the Pendulum restaurant by reducing the amount of meat and cheese consumed and encouraging local, organic, and unprocessed ingredients. We took a community-based action research approach, incorporating various perspectives through collaboration with a number of stakeholders. After an initial literature review, we interviewed Nancy Toogood (the AMS Food and Beverages manager) and Rick Kellough (the Pendulum manager). Based on the results of these interviews, we developed a survey for Pendulum customers. This survey, along with recommendations from previous AGSC 450 students, indicated a need for customer education and promotion of low EF foods. The survey revealed consumer awareness about the EF concept and acceptance of a potential incentive program for choosing low EF foods at the Pendulum. In order to identify and promote low EF foods, we developed a set of criteria for an eco-label that can be applied at the Pendulum and other AMS food and beverage outlets. As part of a marketing strategy, this eco-label can be paired with educational materials and incentives for choosing low EF foods. We hope that the proposed marketing strategy will be applied at the Pendulum restaurant and adopted by other AMS food and beverage outlets to raise awareness about the ecological impact of food, and ultimately, encourage consumers to make low EF food choices. This will contribute to meeting the goals of the AMS lighter footprint strategy and work towards making the UBC food system more sustainable.

2 Introduction

2.1 UBCFSP Scenario 3

The UBC Food System Project (UBCFSP) is directed towards improving the sustainability of the food system on campus. Through collaboration between the AGSC 450 class and the AMS Food and Beverage Department (AMSFBD), scenario 3 relates to a major target in the “AMS Lighter Footprint Strategy,” aiming to lighten the ecological footprint (EF) of AMS food and beverage outlets. This scenario includes three outlets in the Student Union Building: Blue Chip, PieR² and the Pendulum. With a goal to make recommendations to the AMSFBD, we have narrowed the scope of our research by focusing on the Pendulum. Upon a literature review, interviews, and a survey of Pendulum customers, we have explored the need for customer education regarding the EF of the food system. We have also gauged the level of acceptance for the potential of an incentive program aimed at increasing the consumption of foods that have a low EF.

2.2 Problem Definition

Exponential population growth and increasing consumption of the world’s resources is having serious ecological and environmental implications, including water and air pollution, health problems, and climate change (Rees, 2008). Today’s global food system relies on the use of fossil fuel for food production and global distribution, increasing the EF of the food system. EF is a tool used to approximate how much land and water is required to meet individual, community, or population consumption needs (Rees, 2008; Baynham & Dalton, 2005). According to recent data, the EF of the total human population is more than 23% of what the earth can regenerate (Global Footprint Network, 2008). Current lifestyles and food consumption behaviors have outpaced the

regeneration capacity of the natural world, threatening food security and food system sustainability. Fish, beef, poultry, pork, cheese, butter, and cream (shortened to meat and cheese) are large contributors to the EF of the food system. The production of meat and cheese generates greenhouse gases and involves excessive use of fossil fuels (Global Footprint Network, 2008). However, by consuming proportionately less meat and cheese, the EF of the food system can be reduced. Local and organic food also has less of an impact on the EF of the food system; local food travels a shorter distance and both local and organic food uses less fossil fuel (Rees, 2008).

2.3 Vision Statement

As part of the UBCFSP, the AGSC 450 class envisions a sustainable food system for UBC, where social equity and environmental diversity and quality are protected and enhanced. Our group also envisions a food system that is consciously supported and improved by the students and staff at UBC, where personal choices are guided by a common environmental ethic. We envision the AMS food and beverage outlets, specifically the Pendulum, as a model for ecological change by providing food with a low EF, labeling those foods with an identifiable eco-label, educating customers, and motivating customers to choose low EF food options. Various stakeholders have contributed to this vision and guided our research and recommendations, including the AMSFBD, the Pendulum, and the AGSC 450 teaching team and students. We hope our vision can inspire the AMS to encourage ecologically-minded consumer choices by educating customers about the value of choosing foods that take less energy for production, are local and organic, and have undergone minimal processing and

packaging. We would like our research to contribute to this effort by providing useful information and practical strategies for obtaining these goals.

2.4 Value Assumptions

The value of social and environmental sustainability is central to our research focus. As fourth year students in the Faculty of Land and Food Systems, we have been exposed to information and concepts that have helped shape our view of the current food system. We consider the impact of global markets on health, food security and social justice (Lang & Heasman, 2004). We also recognize how an increasingly industrialized food system functions to disconnect individuals from their food (Pollan, 2008). With different cultural and educational backgrounds, each member of our group is looking through a different set of lenses; we each have different values and perspectives. We believe that the diversity of our group has contributed to a more holistic approach to the UBCFSP. As a group we believe in the importance of social and environmental justice. By adopting a weak anthropocentric paradigm, we regard both humans and animals as important, but not necessarily equal (Murdy, 2003). We focus on human needs, while also considering the impact human actions have on the environment.

2.5 Literature Review: an Informed Methodology

The UBCFSP Executive Summary of Findings (Richer, 2006) reported benchmarks for the AMS to purchase 30% local food by 2010 and an average of 54% local food by 2020 when available (Group 18) and to increase vegetarian options to 50% of menu items and 13% for vegan options (Group 18). In light of our research objective, another benchmark is required, to reduce the EF of menu items. Thus, a systematic evaluation tool for determining the EF of menu items is necessary. Identifying such a

need directed the focus of our subsequent research: to develop a set of criteria for identifying and promoting low EF items.

The AGSC 450 Group 3 (2006) suggested a UBC farm logo to identify ingredients from the farm at Bernouli's Bagels. This strategy could also work for menu items with a low EF. Group 6 (2006) recommended surveys to assess the level of awareness of food issues related to the UBCFSP and the level of consumer acceptance of local foods, or in our case, low EF foods (which includes local food). Developing marketing strategies for educating consumers was also suggested. With these recommendations, our group was inspired to conduct a survey to assess consumer understanding about the EF concept and the potential effectiveness of a marketing strategy to encourage consumption of low EF menu items at the Pendulum.

We conducted research on other Vancouver restaurants in search of initiatives for reducing the environmental impact within the food industry. There were a number of restaurants that were committed to serving local and/or organic produce to their customers, including Bishop's, Raincity Grill, Aphrodite Café and Aurora Bistro. Raincity Grill recently promoted a 100-mile menu with items made from ingredients sourced from farms within a 100-mile radius of the restaurant. Raincity Grill is also part of the Vancouver aquarium's conservation program, *Ocean Wise* (2007), which certifies seafood harvested in an environmentally friendly manner. Using similar promotions that emphasize, local, organic, and sustainable food, the AMS could work towards lessening the EF of its food and beverage outlets.

An Eco-label has been applied to food products in other countries to help consumers distinguish greener and more environmentally friendly products. In Europe,

the European Eco-label was designed in 1992 to increase consumers' awareness towards products and services that are friendlier to the environment. All products, which have the "Flower" logo, have been thoroughly checked by independent bodies for complying with strict ecological and performance criteria (Europa, 2008). By implementing such a criteria, the AMS could realize its goal of being an innovator of sustainability at UBC and the local community. With these examples, our group decided to develop criteria for assessing the EF of menu items at the Pendulum and other AMS food and beverage outlets.

In Canada, several logos such as *Canada Organic* and *BC Certified Organic* have been regulated to certify organic production, ensuring at least 95% organic ingredients (Ecolabelling, 2008). An Ontario-based non-profit organization, Local Food Plus (LFP), aims to develop environmentally and socially responsible food production by applying standards for certification, including production methods, labor practices, animal welfare, biodiversity and habitat preservation, on-farm energy use, packaging and recycling (LFP, 2008). Food labeling and collaboration with various stakeholders are strategies the AMS can use to help lighten the EF of AMS food and beverage outlets.

3 Methods

3.1 Research Methodology

We conducted our research using a community based action research approach (CBAR). Both researcher and subject took the role of an active participant (Stringer, 1999). We aimed to work collaboratively with our fellow classmates, teaching assistants, professors, and AGSC 450 guest speakers, as well as with the people we interviewed and the Pendulum customers we surveyed. Using the CBAR approach, we incorporated the

knowledge, values, and objectives of each of our stakeholders in determining the focus of our research, as well as the type of recommendations we would provide.

3.2 Key Informant Interviews

Interviews of key informants provided background information and helped guide the direction of the research to follow. Along with other scenario groups from the AGSC 450 class, we set up an interview with Nancy Toogood, the AMSFBD manager. Nancy described the “AMS Lighter Footprint Strategy” and the involvement of AMS food and beverage outlets in this strategy. The history of food policy, supply distribution, and past relationships between the AMS and the AGSC 450 class provided ideas of what direction to take. We chose to focus our project on the Pendulum restaurant.

We met with the Pendulum manager, Rick Kellough, on more than one occasion. At the first interview, we asked questions to assess what kind of strategies could realistically and effectively lessen the EF of the Pendulum. After giving Rick an overview of our assignment and proposing potential strategies, we asked Rick questions about popular menu items, the types of food prepared, sales trends, purchasing and suppliers, marketing, finances, and other business operations at the Pendulum.

3.3 Pendulum Customer Survey

The Pendulum survey consisted of 10 separate questions. The survey was designed to determine if respondents were knowledgeable about the concept of an EF, if they considered EF factors when making food choices, and if they would participate in an incentive program rewarding low EF food choices. The survey also functioned to determine how frequently respondents consumed high EF food items, as well as their reasons for patronizing the Pendulum restaurant (see Appendix A).

One hundred individuals (n=100) completed the survey. Three student pollsters distributed and collected surveys after a few minutes' time, allowing respondents time to fill in surveys privately. Potential respondents consisted of people who were at the Pendulum or within its vicinity. Age, gender, appearance, etc. were not factors in determining who would be asked to participate in the survey. All respondents polled were solicited and surveyed in accordance with the guidelines set forth by the UBC Behavioral Research Ethics Board (Rojas, 2008). All respondents read and signed an informed consent form. The survey was conducted over 2 days, March 19th and 20th, between the hours of 11am and 5pm. This time period was chosen to ensure a sufficient quantity of potential respondents.

Of the ten questions in the survey, four were considered likert-type items (questions 2-5). These items contain response levels that are arranged horizontally with nominal labels (i.e. never, sometimes, always) that are spaced symmetrically and bivalently across a neutral middle response (Uebersax, 2006). In order to facilitate statistical analysis, numerical equivalents were assigned to the nominal responses. Five of the survey questions (questions 1 & 6-9) fell under the category of ordered-category items. These questions have response labels that are neither symmetrically arranged around a neutral middle response, nor distinctly bivalent. They are however, still based on a frequency scale (i.e. once per month, once per week, etc). For the purposes of this survey, it was determined that these response labels would be more concretely quantifiable, and would better reflect consumers' willingness to participate in a low EF incentive program. The ordered-category items were assigned whole integer values for

ease of data analysis. The tenth and final question of the survey was an open response question and analyzed on a quantitative and qualitative basis.

3.4 Eco-label Criteria Development

An EF is a numerical value that assesses the amount of material used for human consumption in a given area in terms of meters squared (m^2) or global hectares (gha) ($1m^2 = 0.0001gha$). In order to calculate an EF value for a specific menu item at the Pendulum (or other food and beverage outlet) several online resources were used. The Environmental Protection Agency of Victoria, Australia (2006), the Royal Museum of Saskatchewan (2005), and Mountain Equipment Co-op (2008) have interactive calculators available on their websites designed to estimate an individual's EF.

The papers by Chambers et al (2000), *Sharing Nature's Interest* and Kitzes et al (2007), *Current Methods for Calculating National Ecological Footprint Accounts*, were most instrumental in developing a method to calculate the EF of menu items. By grouping foods into categories such as fruit and vegetables, bread, fish, etc, a specific EF for each food type was determined by valuing its impact on the four different types of productive land, including fossil energy, arable land, pastureland, and sea (Baynham & Dalton, 2005). To convert average global yields from each land type into a common unit (gha), we applied equivalence factors used by Kitzes et al (2007). These equivalence factors account for the difference between land types and their productivity. For example, primary cropland is 2.21 times more productive than the average global hectare (Kitzes et al, 2007). By using these food ingredient categories, EF values and equivalence factors, we developed a formula (an *EF-calculator*) that can be used to calculate the EF of menu

items at the Pendulum or other food outlets. To view how the EF-calculator works, see Appendix D, or the attached CD.

We developed a step-wise evaluation process to determine whether a menu item would be considered as having a low EF or not. The first step involves assigning an EF value to the ingredients of a recipe, using the aforementioned EF-calculator. The resulting value is compared to a table of cut-off points (see Appendix E) and depending on the cut-off point, recipes can qualify as having a low EF, may require additional evaluation where a secondary set of criteria is applied, or may be excluded for further evaluation altogether.

Cut-off points for the EF of menu items were determined by considering the ecological impact of the food ingredient as well as nutritional requirements for protein and essential vitamins and minerals. Each successive cut-off point includes foods with increasingly greater impacts on EF. For the first cut-off point, eggs and milk are included as a small percentage of the overall EF (Level 1). Eggs and milk have a relatively light ecological impact and are valuable sources of protein and calcium. The second cut-off point includes a small percentage of poultry (Level 2). The third cut-off point includes a small percentage of pork (Level 3). The fourth cut-off point includes a small percentage of cheese (Level 4). Recipes whose value goes beyond the fourth cut-off point (Level 5) cannot be labeled as having a low EF, regardless of other criteria being met.

Once determining the EF level of a recipe, secondary criteria may be applied. For Level 1 menu items, further analysis is not necessary and those recipes may be labeled as having a low EF. Recipes above the first cut-off point must be at least: 1) 50% local, 2) 50% organic, and/or 3) 50% unprocessed. Level 2 recipes must meet any one of the

secondary criteria; Level 3 recipes must meet any two of the secondary criteria; and Level 4 recipes must meet all three of the secondary criteria. For a step-by-step description of how to apply the eco-label criteria, see Appendix F.

Following development of the eco-label criteria, we recorded various recipes for analysis from the Pendulum's recipe book. Rick provided us with estimated volumes of each recipe ingredient (since amounts were not included in the recipe). These ingredient amounts were applied to our eco-label criteria, and a level was assigned to each recipe.

4 Results

4.1 Outcome of Interviews

The information Nancy Toogood provided about the AMSFBD and its "Lighter Footprint Strategy" provided a good context, allowing more focused research using the Pendulum as a model for implementing an eco-label. During our interview with Rick, we discussed how the AMS food and beverage outlets can lessen their ecological impact and specifically, what the Pendulum is currently doing and what it could do in the future. Rick continually introduces new recipes (including vegan and vegetarian dishes), recycles cardboard, cans, and paper, composts waste from the kitchen (as directed by the AMS), and reuses large plastic containers to store stews and chilis.

When we proposed changing an existing menu item or making small changes to a number of items (to reduce the total amount of meat and cheese), Rick was less enthusiastic. He explained that many of the meat and dairy-containing menu items were big sellers, and that it wouldn't make business sense to change what sells well. We also suggested introducing new menu items (without meat or cheese); since Rick likes trying new recipes, he was open to this idea. However, when we offered some recipe ideas,

none had yet been introduced at the time of writing this report. In light of customer behavior, with Rick explaining that many customers would often choose the same menu items, we proposed a strategy to educate customers. We suggested introducing an eco-label and stamp-card to identify and reward food choices with a low EF. Rick thought this was an interesting idea, and one that might work. We gained approval from Rick to conduct a customer survey at the Pendulum.

4.2 Survey Results

A complete summary of respondents' answers to all survey questions is provided in Appendix B. With the exception of question #8, in which only 98 respondents chose to answer, all 100 respondents answered every other question. Chi-Square analysis was conducted on each of the ten questions (see Appendix C). The null and alternate hypotheses for each chi-square analysis were as follows: H_0 – There is no preference for how respondents answer the question; H_a – There is a preference for how respondents answer the question. The alternate hypothesis, H_a , states that overall respondents will indicate a preference for one or more of the responses in each question by selecting it/them more frequently relative to others.

In the first question, with a choice of three responses, “no,” “somewhat,” or “yes,” chi-square analysis reveals a rejection of H_0 , indicating that respondents had a significant preference for one or two of the answers to this question ($X^2_{\text{critical}} = 5.99 \leq X^2_{\text{calculated}} = 67.3$; $\alpha = 0.05$; d.f. = 2). In questions two through five, respondents could answer once from a choice of 5 responses: “never,” “rarely,” “sometimes,” “usually,” or “always.” All of these questions contained 4 degrees of freedom and were compared to an $X^2_{\text{critical}} = 9.49$ ($\alpha = 0.05$). The $X^2_{\text{calculated}}$ for questions two, three, four, and five were 36.7, 17.2,

56.5, and 37.3 respectively, requiring H_0 to be rejected in all cases and indicating a significant preference for at least one response in each question. In questions six through nine, respondents could answer once from a choice of 5 responses: “never,” “once/month,” “once/week,” “once/day,” or “more than once/day.” All of these questions contained 4 degrees of freedom and were compared to an $X^2_{\text{critical}} = 9.49$ ($\alpha = 0.05$). The $X^2_{\text{calculated}}$ for questions six, seven, eight, and nine were 53.5, 113.5, 25.1, and 48.2 respectively, requiring H_0 to be rejected in all cases and indicating a significant preference for at least one response in each question. In the tenth question, respondents could answer one or more of the following six responses: “taste,” “value,” “quality,” “atmosphere,” “location,” or “health.” The results of a chi-square analysis on this final question supported the rejection of H_0 , indicating that respondents had a significant preference for one or more of the answers to this question ($X^2_{\text{critical}} = 11.07 \leq X^2_{\text{calculated}} = 11.62$; $\alpha = 0.05$; d.f. = 5). When the data collected on “health” was set aside so that only the data from the first five responses were considered, there is no statistically significant preference for any of the responses ($X^2_{\text{critical}} = 9.49 \geq X^2_{\text{calculated}} = 5.84$; $\alpha = 0.05$; d.f. = 4).

For questions one through nine, answers were quantified in order to relate responses to a likert-scale and calculate a mean response value (see Appendix B). For the first question, responses had a value of 1, 2, and 3 for “no,” “sort of,” and “yes,” respectively. The mean response value for question one (familiarity with the EF concept) was 2.58, indicating a mean response approximately equidistant between “sort of” and “yes.” The responses for questions two through five were assigned values of 1-5 for “never” to “always.” The mean response values for questions two (consideration of environmental impact when choosing food), 2.87, and three (consideration of locality

when choosing food), 2.79, both lay between “rarely” and “sometimes,” while the mean response values for questions four (consideration for organic production when choosing food), 3.25, and five (consideration of processing when choosing food), 3.71, both lay between “sometimes” and “usually.” The responses for questions six through nine were assigned values of 1-5 for “never” to “more than once/day.” The mean response value for question nine (frequency of eating at the Pendulum), 2.53, lay between “once/month” and “once/week,” while the mean response values for questions six (frequency of meat in the diet), 3.65, and eight (potential frequency of selecting low EF menu items), 3.56, both lay between “once/week” and “once/day.” The mean response value for question seven (frequency of dairy in the diet), 4.35, lay between “once/day” and “more than once/day.”

4.3 Application of Eco-label Criteria at the Pendulum

We applied our eco-label criteria to selected recipes from the Pendulum. Using the EF-calculator, the vegan stew and winter roasted vegetables matched Level 1 criteria; the couscous salad with feta and basil, chicken and pesto pasta, and vegan veggie-bird matched Level 2 criteria; the T-bird fell matched Level 3 criteria; the chicken quesidilla, bowtie shrimp, black bean burrito casserole, and breakfast burrito matched Level 4 criteria; and the salmon quesidilla and beef dip went beyond Level 4, and were excluded from further analysis. Due to the difficulty in measuring the locality, amount of organic ingredients, and degree of processing (as described in the limitations below), we have only completed the first step of our proposed analysis. However, the two Level 1 recipes may be labeled as being low EF menu options. Recipes matching Levels 2-4 cannot be further evaluated with the resources and systems currently in place.

5 Discussion

The Pendulum is doing many great things to reduce its EF: offering many healthful vegan and vegetarian dishes, encouraging local food procurement, ordering organic ingredients on occasion, recycling, composting, and reusing when possible. Since the Pendulum offers a wide variety of meat and cheese-free dishes, we felt that introducing another meat and cheese-free menu item would not impact the proportion of meat and cheese consumption at the Pendulum. Based on the recommendations from previous AGSC 450 students, a literature review, interviews, and survey results we decided to focus on customer education and marketing of low EF menu options. The Pendulum does not lack meat and cheese-free options, but endorsement of these options is minimal. Thus, we have developed a strategy that would educate, inform, and reward choices for low EF menu items. As evidenced by our survey results, customers would choose low EF foods more often if they were made aware of them and rewarded for making those choices. With complementary educational material, an eco-label can increase customer awareness surrounding the ecological impact of food.

5.1 Discussion of Survey Results

In question one, chi-square analysis indicated that a statistically significant proportion of respondents (72%) were familiar with the concept of an EF, 14% of respondents were “sort of” familiar, and only 14% of respondents were completely unfamiliar with the concept. The success of any advocacy-based project such as this is contingent on the target demographic being at least modestly informed on the topic of concern. Thus, these findings provide motivation for implementation of an eco-label indicating low EF foods.

Questions two through five gauged the extent to which Pendulum customers incorporated their knowledge of the EF concept [environmental impact (Q2), locality (Q3), organic production (Q4), and processing (Q5)] into the processes governing their daily food choices. With 34% of respondents never or rarely considering the environmental impact of their food choices (Q2) and 38% never or rarely considering the locality of their food (Q3), there is potential for increasing awareness and marketing around the environmental impact and benefits of consuming local food. Thus, an incentive program encouraging the choice for low EF foods should also include education pertaining to these topics. Fewer respondents never or rarely considered whether their food was organic (Q4) or processed (Q5) (16% and 11%, respectively). It was encouraging that of all respondents polled, a large proportion of people sometimes, usually, or always considered organic and food processing as important characteristics of their food (84% and 89%, respectively). With additional education, these same customers may also include environmental impact and locality of their food as other important considerations.

Questions six through eight indicated the extent to which a low EF incentive program would be feasible. With a high percentage of respondents consuming meat and dairy at least once per day (67% and 92%, respectively), it may prove difficult to encourage these respondents to reduce their meat and cheese consumption. However, 83% of respondents would choose a low EF menu item at least once per week, or 55% once per day if rewarded with an incentive such as a stamp-card and potential for a free meal. While, meat and dairy are notable components in the average Pendulum customer's diet, there is a possibility for change. Furthermore, the ninth question in the survey

simply asked respondents how frequently they dined at the Pendulum restaurant. An incentive program at the Pendulum may help to further increase customer patronage. Since 55% of respondents stated they would utilize an incentive program at the Pendulum once a day or more often, the number of customers patronizing the Pendulum more than once a day may increase from the current 14%.

Analysis of the tenth question indicated that “taste,” “value,” “quality,” “atmosphere” and “location” were equally important factors in why people dined at the Pendulum (53%, 43%, 39%, 43% and 58%, respectively). Curiously, the only factor that was chosen significantly less frequently than others was the “healthy” factor (33%). Generally, it can be seen that reducing the EF of food coincides with increasing healthfulness of food (improving the health of the land and surrounding environment translates to continued production of safe and healthful food). Accordingly, people who do not consider health an important aspect of their food choice may be unlikely to voluntarily lower the EF of the foods they select. However, direct promotion of low EF foods could prove as a valuable technique to educate customers on both environmental and human health aspects of food choice.

Customer acceptance of, and potential participation in a low EF incentive program would be instrumental in lessening the EF of the Pendulum and other AMS food and beverage outlets. Based on survey results, there is evidence to apply such a program, to promote the consumption of low EF foods.

5.2 Marketing Strategy: “Eating Ecologically”

We have developed an integrative marketing strategy for promoting the choice of low EF foods, titled “Eating Ecologically.” While many consumers consider whether

their food is organic and how processed it is, few consider its locality and impact on the environment. Thus, we aim to increase awareness of all aspects of the EF associated with food, as well as promote the choice of low EF menu items (see Appendix G). Nutritional labeling serves as a device for evaluating food choices. Thus, labeling can be used to identify and promote low EF foods. Using the EF-calculator and the additional criteria we developed, the Pendulum and other AMS food and beverage outlets have a tool to identify and label menu items that have a low EF, educating customers and promoting low EF foods in the process. Ultimately, we hope to habituate EF as a routine consideration when consumers choose what to eat. Our target is to have 100% of customers at the Pendulum become aware of the EF of food and what it means to make ecologically minded choices by the year 2015.

The menu boards at the Pendulum are serviceable resources that can be utilized to promote EF awareness with educational material (see Appendix G-c for Sample Information Sheet). According to our EF criteria, a low EF logo sticker can be placed beside appropriate menu items and on menu boards (see Appendix G-b for Sample Eco-label Sticker). Incentive can be provided for choosing low EF menu items through use of a stamp card (see Appendix G-a Sample Stamp Card). Using a stamp card, similar to currently used coffee cards that reward use of reusable coffee mugs, a low EF stamp card would reward low EF food choices. For instance, with 10 stamps the customer receives a complimentary low EF salad. The stamp card acts as a reminder of the link between food and the environment. Through awareness, education and rewards, we hope to increase the consumption of low EF foods at the Pendulum and ultimately, all AMS food and beverage outlets, so that UBC may lighten its EF.

Eating Ecologically Strategy Summary:

Step 1: Apply each menu item to the EF criteria (Appendix D, E & F)

Step 2: Label appropriate menu item with eco-label stickers (Appendix G-b).

Step 3: Post an informational poster to educate customers (Appendix G-c).

Step 4: Offer a stamp-card as an incentive for low EF food choices (Appendix G-a)

5.3 Challenges and Limitations

A lack of consistent literature made it difficult to develop EF criteria. With the criteria we developed, a lack of information about where food comes from made it difficult to assess the locality of each menu item; all ingredients for the AMSFBD are ordered by the AMS purchaser and ingredients can be changed at any time (brand, locality, organic, etc). To assess the degree of processing and the percentage of organic ingredients, the cooperation of managers and employees is essential, since they see all items coming into the Pendulum. While Rick was very keen to help, he admits he would not have time to evaluate every menu item at the Pendulum.

Determining the cut-off points between high and low EF foods was another challenge, since we had no comparable literature to reference. Furthermore, when applying our resulting criteria and cut-off points, each ingredient percentage was an approximation of recipe volume (pre-processing). Alternate measures may have been more accurate, such as percent weight, however, volume proved to be a more practical index for application (since recipes are often quantified by volume).

It was challenging to analyze the survey results because the responses in questions six through nine collected discrete, non-continuous data, making it more difficult to apply a statistical analysis; thus, future surveys should utilize a continuous (likert-type) scale for ease of statistical analysis. Furthermore, question seven asked how often dairy was present in the diet, when it should have asked how often cheese, cream, or butter was

present in the diet. Since milk does not have as high of an EF, this would have provided more applicable data. However, this question enabled us to discern the level of animal products present in the diets of Pendulum customers.

6 Recommendations

The findings of our study uncovered several recommendations for many of the project stakeholders. By considering the limitations of our project, we suggest ways to improve the proposed marketing strategy, as well as suggest new areas for research.

Future AGSC students:

- Find a way to better determine, or increase AMS purchasing of local and organic ingredients (to $\geq 50\%$) for better application of low EF (secondary) criteria.
- Re-evaluate the criteria we developed according to research pertaining to EF of food as it becomes available in the future. Apply more appropriate criteria weighting to locality, organic, and processing criteria.
- Implement our proposed strategy and apply low EF criteria to menu items at the Pendulum and/or other AMS food and beverage outlets.
- Expand and combine the stamp card system with other ecologically friendly initiatives, such as “bring your own container,” recycling and composting programs.
- There is a need to promote nutrition education about meat and cheese alternatives. Along with promoting a reduced consumption of meat and cheese, people need to have nutritionally appropriate alternatives.

AMS Food Outlets:

- Adopt eco-label and stamp card system at the Pendulum and other AMS outlets.

- Make local and organic ingredients more accessible to AMS outlets through a revision of the current purchasing system by connecting to more local providers.

Management of the Pendulum:

- Promote low EF food items by applying the low EF criteria we have developed and adopting the proposed marketing strategy.
- Introduce new recipes that follow low EF criteria.
- Use local or organic produce whenever available.

Food Project Coordinator(s):

- Continue Scenario 3 as a part of the UBCFSP and include other food outlets at UBC.
- Include a scenario to develop more innovative ideas about making user-friendly recycling and composting bins for plastic water cups, paper and food (an idea from Rick, the Pendulum manager).

7 Conclusion

As a result of our research, we have created a simple and systematic way of evaluating the EF of menu items at the Pendulum or other AMS food and beverage outlets. We hope that managers, staff and students can apply the EF criteria and determine whether or not menu items have a low EF. The Pendulum is known for high quality, tasty food, but it has the potential to offer more – to provide and label food with a low EF. By educating customers and making them aware of low EF menu items, the AMS can work towards lessening its EF. Thus, the “Eating Ecologically” strategy functions to inform and educate customers, and ultimately, change customer trends towards consuming more low EF menu items.

8 References

- Baynham, M. & Dalton, J. (April 2005). "Ecofootprinting the Pendulum Restaurant". Retrieved October 15, 2007, from http://www.sustain.ubc.ca/pdfs/seeds_05/winter/Ecofootprintpendulum/Footprint%20Report.pdf.
- Chambers, N., Simmons, C., & Wackernagel, M. (2000). *Sharing Nature's Interest: Ecological Footprints as an Indicator of Sustainability*. London, England: Earthscan Publications.
- Doherty, E. (2008). *AMS Lighter Footprint Strategy – Consultation Draft*. Retrieved February 14, 2008, from <https://circle.ubc.ca/bitstream/2429/312/1/AMS+Lighter+Footprint+Strategy+Jan+15+08+w+Appendicies.pdf>
- Ecolabelling. (2008). *Who's Deciding What's Green*. Retrieved March 31, 2008, from: <http://ecolabelling.org/type/food/>
- Ecological Footprint. (2008). *Mountain Equipment Co-op*. Retrieved March 31, 2008, from http://www.mec.ca/Main/content_text.jsp?FOLDER%3C%3Efolder_id=2534374302883396&bmUID=1207592228371
- Ecological Footprint Calculator. (2006). *EPA Victoria*. Retrieved March 31, 2008, from <http://www.epa.vic.gov.au/Eco-footprint/Calculator.asp>
- Ecological Footprints. (2005). *Royal Saskatchewan Museum*. Retrieved March 31, 2008, from http://www.royalsaskmuseum.ca/gallery/life_sciences/footprint_mx_2005.swf
- Europa. (2008). *European Union: Eco-label*. Retrieved March 31, 2008, from http://ec.europa.eu/environment/ecolabel/index_en.htm
- Global Footprint Network. (2008). *Advancing the Science of Sustainability*. Retrieved March 31, 2008, from http://www.footprintnetwork.org/gfn_sub.php?content=glossary#globalhectare
- Group 10. (2007). *UBCFSP Scenario 3: Incorporating UBC farm products into Bernoulli's Bagels' Menu*. University of British Columbia. Faculty of Land and Food Systems: AGSC 450: Land, Food and Community III. Retrieved March 17, 2008, from http://www.webct.ubc.ca/SCRIPT/agsc_450/scripts/serve_home
- Group 17. (2007). *UBCFSP Scenario 3: Incorporating UBC Farm Items into Campus Food Provider Menus*. University of British Columbia. Faculty of Land and Food Systems: AGSC 450: Land, Food and Community III. Retrieved March 3, 2008, from http://www.webct.ubc.ca/SCRIPT/agsc_450/scripts/serve_home
- Group 6. (2006). *UBCFSP Group Paper: Scenario 2: Incorporating Seasonal BC Food Item into Campus Food Provider Menus*. University of British Columbia. Faculty of Land and Food Systems: AGSC 450: Land, Food and Community III. Retrieved March 5, 2008, from http://www.webct.ubc.ca/SCRIPT/agsc_450/scripts/serve_home

- Group 13. (2006). *UBCFSP Group Paper: Scenario 2: (No Title)*. University of British Columbia. Faculty of Land and Food Systems: AGSC 450: Land, Food and Community III. Retrieved March 5, 2008, from http://www.webct.ubc.ca/SCRIPT/agsc_450/scripts/serve_home
- Group 18. (2006). *UBCFSP Scenario 7: Benchmarking Transitions Towards a Local and Sustainable UBC Food System*. University of British Columbia. Faculty of Land and Food Systems: AGSC 450: Land, Food and Community III. Retrieved March 5, 2008, from http://www.webct.ubc.ca/SCRIPT/agsc_450/scripts/serve_home
- Group 20. (2006). *UBCFSP Scenario 3: Grown in your Backyard: Linking Bernoulli's Bagels to the UBC Farm in an Effort to Localize the Food System*. University of British Columbia. Faculty of Land and Food Systems: AGSC 450: Land, Food and Community III. Retrieved March 31, 2008, from http://www.webct.ubc.ca/SCRIPT/agsc_450/scripts/serve_home
- Kitzes, J., Peller, A., Goldfinger, S., & Wackernagel, M. (2007). Current Methods for Calculating National Ecological Footprint Accounts. *Science for Environment & Sustainable Society*, 4(1). pp. 1-9.
- Local Food Plus. (2008). *Your Link for Local Sustainable Food*. Retrieved March 31, 2008, from <http://www.localfoodplus.ca/index.htm>
- Murdy, W. H. (2003). *Anthropocentrism: A Modern Version*. In Armstrong, S., & Botzler, R. (Eds.), *Environmental Ethics: Divergence and Convergence* (3rd ed). Toronto, Canada. pp. 280-288.
- Rees, W. E. (2008, February 26). *Climate Change and the Human Eco-Footprint (with a Side-Bar on our Moral Conundrum)*. Lecture Presented in the AGSC 450 course, University of British Columbia, Vancouver, Canada.
- Richer, Liska. (2006). *UBCFSP Executive Summary Report 2006*. Retrieved February 28, 2008, from http://www.webct.ubc.ca/SCRIPT/agsc_450/scripts/serve_home.
- Rojas, A. (2008). *2007-2008 Ethics Approval Certificate*. Retrieved April 02, 2008, from http://www.webct.ubc.ca/SCRIPT/agsc_450/scripts/serve_home
- Stringer, E. (1999). *Action Research*. (2nd Edition). Thousand Oaks, CA: Sage.
- Uebersax, J. S. (2006). *Likert Scales: Dispelling the Confusion*. Retrieved April 02, 2008, from <http://ourworld.compuserve.com/homepages/jsuebersax/likert.htm>
- Vancouver Aquarium. (2007). *If You Love Seafood and the Oceans, Choose Ocean Wise*. Retrieved March 1, 2008, from <http://www.oceanwisecanada.com/>

9 Appendices

Appendix A: Pendulum Customer Survey

1. Are you familiar with the concept of an ecological footprint?
 Yes No Sort of
2. When making food choices, do you consider the environmental impact of the foods you choose?
 Never Rarely Sometimes Usually Always
3. When making food choices, do you consider how far your food travels to get to you?
 Never Rarely Sometimes Usually Always
4. When making food choices, do you consider whether your food is organic or not?
 Never Rarely Sometimes Usually Always
5. When making food choices, do you consider how processed your food is?
 Never Rarely Sometimes Usually Always
6. How often is meat (beef, pork, poultry, or seafood) present in your diet?
 Never Once a month Once a week Once a day More than once
7. How often are dairy products (milk, cheese, yogurt, etc.) present in your diet?
 Never Once a month Once a week Once a day More than once
8. How often would you select *low ecological footprint* foods if rewarded with incentives, such as a stamp card? (Note: low ecological footprint food is sustainable, local, and organic, contains little meat and dairy, and has undergone little processing.)
 Never Once a month Once a week Once a day More than once
9. How often do you eat at the Pendulum?
 Never Once a month Once a week Once a day More than once
10. Why?
 Taste Value Quality Atmosphere Location Healthy
Other: _____

Appendix B: Pendulum Survey Responses and Mean Response Values (n=100) for Survey Questions of Likert-Type and Ordered-Catergory Formats

Responses:	Q1
Yes (3)	72%
No (1)	14%
Sort of (2)	14%
Mean Response Value	2.58

Responses:	Q2	Q3	Q4	Q5
Never (1)	11%	19%	7%	2%
Rarely (2)	23%	19%	9%	9%
Sometimes (3)	42%	33%	46%	31%
Usually (4)	16%	22%	28%	32%
Always (5)	8%	7%	10%	26%
Mean Response Value	2.87	2.79	3.25	3.71

Responses:	Q6	Q7	Q8	Q9
Never (1)	10%	1%	8%	13%
Once a month (2)	3%	1%	7%	40%
Once a week (3)	20%	6%	28%	33%
Once a day (4)	46%	46%	25%	9%
More than once (5)	21%	46%	30%	5%
Mean Response Value	3.65	4.35	3.56	2.53

Responses:	Q10
Taste	53%
Value	43%
Quality	39%
Atmosphere	43%
Location	58%
Healthy	33%

Appendix C: Summary of Calculated and Critical Values and Statistical Significance for Chi Square Analysis

Question Number	Degrees of Freedom	X ² Calculated	X ² Critical	Significant Difference?
1	2	67.3	5.99	Yes
2	4	36.7	9.49	Yes
3	4	17.2	9.49	Yes
4	4	56.5	9.49	Yes
5	4	37.3	9.49	Yes
6	4	53.3	9.49	Yes
7	4	113.5	9.49	Yes
8	4	25.1	9.49	Yes
9	4	48.2	9.49	Yes
10	5	11.62	11.07	Yes

Appendix D: Spreadsheet used to estimate EF of food items (See the attached CD for an interactive version)

Directions: input the percentage (by volume) of each recipe ingredient into the appropriate food category.

Category	Composition (%/100)	Fossil Energy			Arable Land			Pasture Land			Sea			Total m ²	Total gha
		(m ²)	(ha)	(gha)	(m ²)	(ha)	(gha)	(m ²)	(ha)	(gha)	(m ²)	(ha)	(gha)		
Fish	0	10.00	0.001000	0.001000	0	0	0	0	0	0	551.75	0.055175	0.019863	0.00	0.000000
Beef	0	8.00	0.000800	0.000800	58.33	0.005833	0.012891	0	0	0	0	0	0	0.00	0.000000
Cheese, Butter, Cream	0	6.50	0.000650	0.000650	0	0	0	199.19	0.019919	0.009760	0	0	0	0.00	0.000000
Pork	0	8.00	0.000800	0.000800	21.83	0.002183	0.004824	0	0	0	0	0	0	0.00	0.000000
Tea & Coffee	0	7.50	0.000750	0.000750	17.67	0.001767	0.003905	0	0	0	0	0	0	0.00	0.000000
Poultry	0	8.00	0.000800	0.000800	12.75	0.001275	0.002818	0	0	0	0	0	0	0.00	0.000000
Beans	0	1.00	0.000100	0.000100	11.73	0.001173	0.002592	0	0	0	0	0	0	0.00	0.000000
Oil & Fat Solid	0	3.92	0.000392	0.000392	5.42	0.000542	0.001198	0	0	0	0	0	0	0.00	0.000000
Oil & Fat Liquid	0	3.08	0.000308	0.000308	4.33	0.000433	0.000957	0	0	0	0	0	0	0.00	0.000000
Milk & Yogurt	0	1.00	0.000100	0.000100	0	0	0	19.92	0.001992	0.000976	0	0	0	0.00	0.000000
Rice, Cereal, Noodles	0	1.00	0.000100	0.000100	3.65	0.000365	0.000807	0	0	0	0	0	0	0.00	0.000000
Eggs	0	6.50	0.000650	0.000650	0.64	0.000064	0.000141	0	0	0	0	0	0	0.00	0.000000
Bread	0	2.00	0.000200	0.000200	2.36	0.000236	0.000522	0	0	0	0	0	0	0.00	0.000000
Sugar	0	1.58	0.000158	0.000158	2.08	0.000208	0.000460	0	0	0	0	0	0	0.00	0.000000
Juice & Wine	0	0.42	0.000042	0.000042	1.00	0.000100	0.000221	0	0	0	0	0	0	0.00	0.000000
Fruit & Vegetables	0	0.50	0.000050	0.000050	0.56	0.000056	0.000124	0	0	0	0	0	0	0.00	0.000000
Total gha per menu item = 0.000000															
Total m² per menu item = 0.00															

Appendix E: Development of food ingredient cut off points

To calculate the EF for each cut-off point, the following percentages were applied to the eco-label calculator for food ingredients (see Appendix C above or the attached CD).

Cut-off point	Method of calculation	Resulting value
Cut-off 1 (Level 1)	Input 11% of each: fruit/vegetables, juice/wine, sugar, bread, eggs, rice/cereal/noodles, and milk/yogurt	≤8.0m ²
Cut-off 2 (Level 2)	Input 9% of each: fruit/vegetables, juice/wine, sugar, bread, eggs, rice/cereal/noodles, milk/yogurt, oil/fat liquid, oil/fat solid, beans, and poultry	8.1-12.0m ²
Cut-off 3 (Level 3)	Input 7.7% of each: fruit/vegetables, juice/wine, sugar, bread, eggs, rice/cereal/noodles, milk/yogurt, oil/fat liquid, oil/fat solid, beans, poultry, tea/coffee, and pork	12.1-18.0m ²
Cut-off 4 (Level 4)	Input 7.1% of each: fruit/vegetables, juice/wine, sugar, bread, eggs, rice/cereal/noodles, milk/yogurt, oil/fat liquid, oil/fat solid, beans, poultry, tea/coffee, pork, and cheese/butter/cream	18.1-24.0m ²

Appendix F: Eco-Label Criteria Application

- Step 1: Primary analysis**

See Appendix D, or the attached CD, to calculate the EF of recipes using the proportion of ingredients.

- Step 2: Determine the need for secondary analysis**

Apply the EF value from step one to the following table.

Primary level	Primary Criteria	Primary analysis
Level 1	Cut-off 1 = $\leq 8m^2$	Label as low EF
Level 2	Cut-off 2 = $\leq 12m^2$	Must meet one of the secondary criteria for label
Level 3	Cut-off 3 = $\leq 18m^2$	Must meet two of the secondary criteria for label
Level 4	Cut-off 4 = $\leq 24m^2$	Must meet three of the secondary criteria for label
Level 5	$> 24m^2$	Disregard; considered high EF

- **Step 3: Apply secondary criteria**

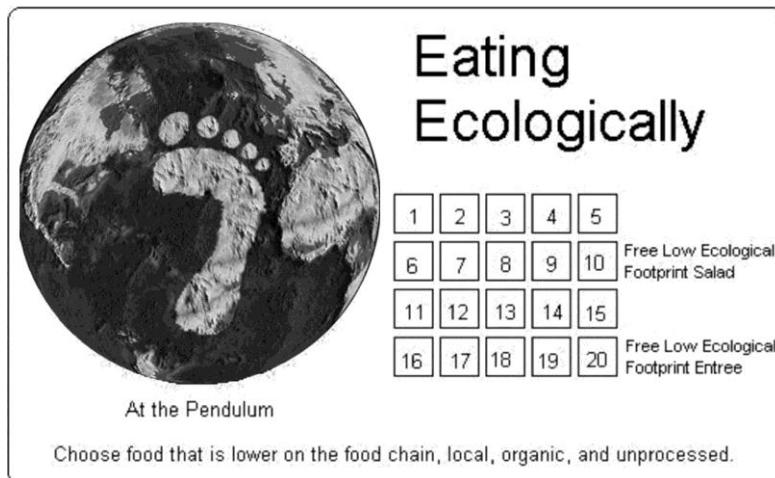
Level	Criteria 1: $\geq 50\%$ local	Criteria 2: $\geq 50\%$ organic	Criteria 3: $\geq 50\%$ unprocessed	Secondary Analysis
Level 1	-	-	-	NA
Level 2	Yes	Or Yes	Or Yes	0 criteria = High EF ≥ 1 criteria = Low EF
Level 3	Yes	And/or Yes	And/or Yes	0-1 criteria = High EF ≥ 2 criteria = Low EF
Level 4	Yes	Yes	Yes	0-2 criteria = High EF 3 criteria = Low EF
Level 5	-	-	-	NA

- **Step 4: Label menu items**

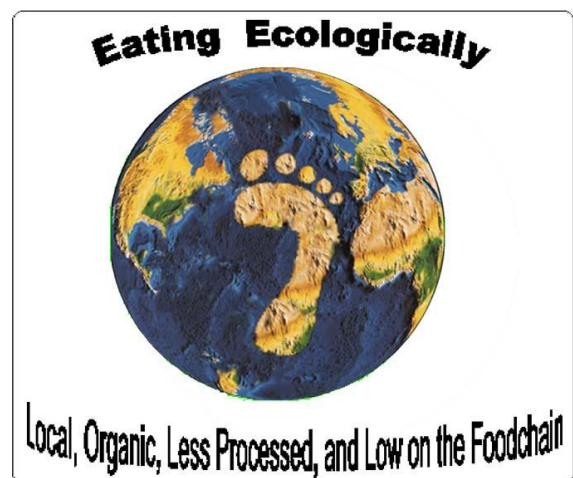
If the necessary criteria are met, the menu item may be labeled as having a low EF.
If the necessary criteria are not met, the menu item is considered to have a high EF and is not labeled.

Appendix G: Sample EF Promotional and Educational Materials

(a) Sample Stamp Card:



(b) Sample Eco-label Sticker:



(c) Sample Information Sheet:

**Eating
Ecologically**



What is my Ecological Footprint?

Your ecological footprint is the area of land and water required to maintain your lifestyle. Ecological footprint size is determined by what is consumed, used and thrown away. If our collective ecological footprint is larger than what the earth can provide in the long term, we are not leading sustainable lifestyles. As Canadians, our ecological footprint is almost 5X the size it should be. We need to make changes to how we eat, live, and travel – as a country, as a community and as individuals. One place to start is with food.

How do my food choices impact the Earth?

- *Type of food*
Meat and cheese production requires much more energy than foods grown lower on the food chain, including vegetables, fruit, legumes, and grains. Choosing less meat and cheese (while consuming other protein and calcium sources) can help reduce your ecological footprint.
- *Locality*
How far your food travels impacts the earth by the amount of fossil fuel used to transport your food. Eating locally also means eating fresher, so choose local and your food will taste better and have less impact on the earth.
- *Organic*
Chemicals and other inputs used in non-organic farming consume more of the earth's resources. Choosing organic is yet another component of eating ecologically.
- *Processing*
With extra packaging, there is extra waste. If you buy food fresh with as little packaging as possible, or if you bring your own Tupperware for takeout food, you will be lessening your ecological footprint.

At the Pendulum, certain foods are labeled as having a lighter ecological footprint. If you choose these options more often you will be eating ecologically. Ask for a stamp-card and get rewarded for your choices!