UNIVERSITY *of*
PRINCE EDWARD ISLAND

University of Prince Edward Island

Campus Sustainability Audit 2005

ENV 202 2004/'05 students

and

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University of Prince Edward Island

Environmental Studies Program

and

Sustainable UPEI

UPEI Campus Sustainability Audit 2005

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semester 2, 2004/'05

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<u>Acknowledgements</u>

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Executive Summary

During spring 2005, the University of Prince Edward Island (UPEI) joined more than 60 other Canadian campuses in the Sierra Youth Coalition's Sustainable Campuses project to conduct its first campus sustainability audit. The audit used an academically developed methodology, the Campus Sustainability Assessment Framework (CSAF), designed specifically for Canadian universities and colleges. It incorporates aspects of more than 20 existing frameworks, including ISO 14000 (environmental management). The CSAF encompasses two major systems – ecosystem and people – to assist tertiary education institutions in accurately understanding their environmental and socio-economic impacts. Within these two systems, ten sections (water, materials, air, energy, land; health & wellbeing, community, knowledge, governance, and economy & wealth) address a total of 169 indicators.

Analysis of these indicators suggests that UPEI has a 'way to go' toward becoming what is considered to be a sustainable university. First steps have been taken, however. The University does not yet achieve most short-term benchmarks, let alone the long-term goals set by the CSAF. As such, UPEI is not among those institutions of higher education which reach best practice in sustainability and sustainable development. While a ranking and comparison with similar-sized Canadian institutions would be premature, the data do allow for an assessment of strengths and weaknesses in the two interacting systems, respectively.

The ecosystem indicators point out that UPEI is doing fairly well with respect to its building location and design, with the majority of buildings on campus having passive solar orientation, despite the age of some buildings. Purchasing, including paper purchasing and food services, shows a considerable neglect of environmental and social justice concerns; more needs to be done to reduce the University's environmental and socio-economic impacts in these areas. While a waste recycling program is in effect, hazardous waste in particular needs to be disposed of more carefully. Air quality, both indoor and outdoor, and water management would benefit from state-of-the-art monitoring technology; this could

then lead to making necessary improvements regarding indoor air quality (via CO_2 monitoring and natural ventilation), conservation of potable water, and reclamation of storm and grey water. The University obtaining more of its energy from renewable sources is an aspect of sustainable energy management. The greatest challenge amongst the ecosystem indicators seems to be the preservation and reclamation of greenspace on campus, and ecological restoration: returning the limited space that remains to a natural state.

Along the same lines, the people system indicators suggest insufficient recreation space, especially outdoors (i.e., sports fields). The absence of certified organic, non-GMO, and fair trade food and beverages, including meal options on campus is sub-standard and corroborates the point made above regarding the need for greater environmental and socio-economic sensitivity in the area of food purchases. Assessing the diversity of the campus community – i.e., dis/abilities, ethnicity, and gender – as well as social equity/disparity was largely hindered by the unavailability and/or alleged confidentiality of data. Amongst university services, the costs of on-campus living at UPEI stand out as being seemingly unacceptably high with respect to the best practice benchmark (and compared to other Canadian universities). Furthermore, availability of on-campus housing falls far short of the desirable goal.

Continuing with the people system indicators: in the areas of sustainability education, sustainability positions for students, and sustainability research, UPEI is at the very beginning. Offering an *Introduction to Sustainability* (ENV 202) course in the undergraduate curriculum [plus continuing ENV 309B *Creating Sustainable Behaviour* in the summer], including an energy awareness/sustainability session in New Student Orientation, creating part-time work-study positions in a UPEI Sustainability Office, and increased transparency regarding research funding will do much to improve UPEI's performance with respect to sustainability knowledge. As in many other universities, governance seems to be the most neglected and most challenging area in which to incorporate sustainability; success in this area – i.e., achieving best practice governance benchmarks and goals – would mean institutionalizing sustainability fully and truly. At UPEI, much remains for both the

University administration and the Student Union (student government) to do until any and all strategic planning and consequently, any and all policies are infused with sustainability criteria. Last but not least, UPEI fails to meet many of the CSAF economic sustainability criteria: financial support for students is below best practice, resulting in a substantially higher than national average student debt load; procurement and investment suffer from the aforementioned lack of attentiveness to environmental impacts and social justice. A highlight regarding economic sustainability is UPEI's income from student fees, which is lower than the national average.

One of the shortcomings of the CSAF is the lack of a transport section. Without analyzing transport, any campus sustainability audit will be skewed, given that transportation issues (i.e., fossil fuel consumption, greenhouse gas emissions, large-scale impermeable parking surfaces) trouble most if not all university campuses. This is particularly so for UPEI, where non-SOV (single occupancy vehicle) alternative transport is one of the major dimensions of advancing sustainability/sustainable development.

The most important learning outcome from conducting this sustainability audit is, perhaps, the necessity and importance of keeping comprehensive, up-to-date records. Frequently, the indicator research was hindered by non-existent records, lack of data, and/or non-transparency or confidentiality of information. Even such seemingly simple items as obtaining the total number of campus community members or faculty and staff employed at UPEI [the figures still vary throughout this report], or receiving a metric scaled/to scale campus map took (at times frustratingly) many inquiries. Knowing what information and data the CSAF requires, outlined in this document and the underlying CSAF Toolkit, will help in setting up and maintaining appropriate records in the various departments and offices across the University. Improved record-keeping will be the basis for future CSAFs/audits to track progress toward a sustainable UPEI.

[Statements in this Executive Summary assume accurate data and their interpretation. - AB]

1.   Introduction

In semester 2, 2004/'05 (5 January – 9 April 2005), students enrolled in ENV 202 *Introduction to Sustainability* at the University of Prince Edward Island (UPEI) conducted a comprehensive sustainability audit of the university campus. The findings of this, the first sustainability audit of UPEI, are presented in this document. The audit project was facilitated by the ENV 202 professor, Dr. Almut Beringer, who serves as UPEI Director of Environmental Studies and Sustainability. The campus sustainability assessment project involved all 36 (initially 40) ENV 202 students – 2nd to 4th year undergraduate Arts, Science, or Business majors.

The UPEI campus sustainability audit relied on the Campus Sustainability Assessment Framework (CSAF), a methodology initiated via a Master's thesis by Lindsay Cole at Royal Roads University, Victoria, B.C. in 2003 and since then developed further for the Sierra Youth Coalition (SYC) by Geneva Guerin and Lindsay Cole of Sustainability Solutions Group. The Sierra Youth Coalition is Canada's only national student environmental coalition; it is an independent non-profit organization loosely affiliated with the Sierra Club of Canada, Canada's largest environmental organization. The Sierra Youth Coalition disseminates the CSAF through its Sustainable Campuses Project, also referred to as the Academia to Action Project (A2A) or, formerly, the Greening the Ivory Towers Project (GITP) [www.syc-cjs.org/gitp].

The SYC Academia to Action Project is a national campaign created and directed by students for students who seek to initiate change toward improved sustainability on their respective university or college campus. To receive support through the SYC A2A, an individual, a student group – for instance a Student Environment Club, or an institution can join the GITP-A2A as a Coalition Partner. By paying the one-off fee of CDN$ 10 (individual) to CDN$ 100 (institution), the Coalition Partner receives the GITP Toolkit as well as access to the GITP-A2A project resources. The GITP Toolkit comprises the CSAF, including detailed instructions on how to conduct a campus sustainability audit, and additional

materials, Lindsay Cole's thesis amongst others. In addition, a SYC GITP-A2A

Coalition Partnership entails regular project support through one of SYC A2A's

Regional Offices.[1]

As the ENV 202 professor, I selected the CSAF as the preferred

methodology for the UPEI sustainability audit for two reasons: first, the CSAF

analyses the ecosystem as well as the human system of an institution; as such, it

extends the concept of 'greening the campus' beyond the environmental into the

social and economic aspects of sustainability. In other words, the CSAF

acknowledges the 'three pillars of sustainability' – ecology/environmental integrity,

society/social justice, economy/economic prosperity – which have become widely

respected dimensions of sustainability. As such, and based on sabbatical research

into campus sustainability audit tools conducted at the University of Victoria in

2003, I consider the CSAF the most comprehensive and holistic campus

sustainability audit tool available to date.[2]

Second, the CSAF had been used and was being used on other Canadian

university and college campuses, for instance at Concordia University in Montreal.[3]

As such, precedents existed or were happening simultaneously to the UPEI

process, providing the opportunity to build a database of experience and allowing

for professional exchange. Using such a standardized methodology across the

country will eventually also allow for ranking Canadian institutions of higher

learning with regard to their sustainability performance.

As it turns out, UPEI was the first and to date only tertiary education

institution to request and initiate the CSAF via a faculty member. While an

Environmental Studies minor has been in place since 2001 and a (small) Student

Environment Club has been affiliated with the Student Union for appr. two – three

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[1] The SYC GITP-A2A head office is in Ottawa, with regional offices in B.C., the Prairies, Ontario, Quebec, and Atlantic Canada.

[2] Sustainability assessment has since evolved, and can now draw on tools such as the Global Reporting Initiative (GRI) and others [www.globalreporting.org; see also http://sustainability.berkeley.edu/assessment.html]. Some of these have been or are currently being adapted for academic institutions. How the CSAF might fit into or complement such sustainability reporting initiatives is a work in progress.

[3] http://web2.concordia.ca/sustainability/ For additional Canadian tertiary education institutions working with the CSAF, see www.syc-cjs.org/gitp/en/resources.

years, UPEI has only recently begun a more formal 'Sustainable UPEI' initiative – including an Energy Awareness Program (since October 2004) and appointing a part-time campus sustainability director (in January 2005). UPEI is a fairly small campus – close to 4000 mostly undergraduate students – which seems not to have a strong and widespread student activism base (the reasons for which appear numerous and complex; I won't explicate them here).

As it turns out further, the UPEI CSAF project had several other 'firsts:'

• the CSAF was conducted in its entirety in Atlantic Canada for the first time

Aspects of the CSAF had been used previously, or had been adapted for similar campus audit purposes, for instance at the University of New Brunswick, Fredericton by Dr. Michelle Gray in winter 2004 (BIOL 4861) and Dr. Gary Bowden in fall 2003 (Sociology) (M. Gray, personal communication 26 January 2005). Dr. Tarah Wright at Dalhousie University, Halifax, Nova Scotia has also done similar work in her Environmental Programme classes.

• the UPEI CSAF was the first CSAF for the SYC A2A Atlantic Regional Coordinator

In contrast to the other regional A2A offices, the Atlantic Office was only set up in October 2004, with the incumbent holding a part-time position. This comparatively late 'eastern expansion' of the SYC A2A seems to mirror other aspects of Canadian society and politics, where the Maritimes/Atlantic Canada frequently seem to lag behind the rest of the country.

• the ENV 202 semester 2, 2004/'05 CSAF was the first time I, as the professor, have used the CSAF as a class project

While I had experience teaching sustainability via a project-based approach, I had not previously facilitated a comprehensive campus sustainability audit.

• according to anecdotal evidence, quite a few students, in particular many second year students, experienced project-based teaching and learning for the first time

The CSAF research and written work comprised much of the semester, both in terms of time committed as well as in value/weight of marks. Students' CSAF work was accompanied by lectures, small group sessions, and individual consultations. [An ENV 202 syllabus is attached in Appendix 12.4.]

• semester 2, 2004/'05 saw ENV 202 taught as part of the core Environmental Studies curriculum for the first time

   Introduction to Sustainability had previously been part of the summer offerings.

• semester 2, 2004/'05 was my first semester at UPEI

   I arrived at UPEI from overseas as a new faculty member 4 January; on 5 January, I started teaching ENV 202, including the CSAF. I can think of no better introduction to my job of directing campus sustainability than conducting a CSAF!

   The SYC A2A recommends the CSAF be conducted over two consecutive years: the first year sees the research and data analysis for the ten (10) sections and 169 indicators of the audit [five (5) ecosystem sections, five (5) human system sections – see Appendix 12.2]. Year two, the CSAF authors advise to spend on developing recommendations, conducting feasibility studies, and implementing change (GITP Backgrounder p. 4, see Appendix 12.2). At the outset of the UPEI project, and despite some experience with the CSAF across the country, it was somewhat unclear how many person hours would be needed to conduct a solid CSAF. As such, and given the many 'firsts' (most of which were – thankfully! – not known at the onset of the project), aiming to conduct a CSAF within one semester was nothing less than very ambitious.

   It is in this light of the many 'firsts' and the ambitious nature of the UPEI project that this report, the findings of the UPEI CSAF 2005, the quality of research, and completeness of data analysis have to be judged. Supervising 40 students doing a CSAF in a second year/200-level class within 13 semester weeks was an experiment – I was very aware of that and communicated this to my students at the outset. I leave it to the reader to assess whether this experiment succeeded.

   To share my view: working with and through the SYC A2A was a wonderful and somewhat unexpected support; I found the (then) Atlantic Regional Coordinator, Kristen Howe, herself a 4th year student, an absolute pleasure to work with: very professional, very capable, very dedicated. I was pleasantly surprised by the quantity and quality of student work – the research and data analysis phase comprised a mere four weeks, from 21 February – 23 March. While more and

better can always be done,[4] UPEI now has at least some baseline data and a benchmark document regarding campus sustainability from which sustainable development and the 'Sustainable UPEI' project can proceed.

I have edited the students' reports for spelling and grammar, and, in some cases, for language to clarify communication. I have also checked whether the chapter and section numbering is in accordance with the CSAF document, and I have adjusted the numbering of tables, figures, graphs, and appendices to be compatible with the entire document. I have <u>not</u> edited the reports with respect to content – i.e., to the extent of double-checking the data, following up on missing data, and/or adjusting the write-up to ensure statements are in the correct chapter section (e.g., the description of methods appears under 'Methods,' not in the 'Discussion' section). The responsibility for the research and its reporting – the in/completeness of data, the quality and in/correctness of data analysis, and the in/coherence of the write-up, including the in/correctness and in/completeness of references, remains the students'. While I believe it makes more sense, and would have thus preferred, to present and discuss the ecosystem sections prior to the human system sections (the human systems are embedded in the ecosystem, after all), we have kept the numbering of the chapters, sections, and subsections to follow and coincide with the CSAF Toolkit.

I extend my sincere thanks to the ENV 202 students, Kristen Howe, my UPEI colleagues, and UPEI senior management for their contributions to and support of the CSAF - UPEI campus sustainability audit 2005.

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Charlottetown, PEI 28 May 2005

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[4] Some of the more time-consuming indicators could not be assessed. Also, the CSAF is undergoing a revision, in part based on feedback from UPEI. In particular, an 11th section on transport (including indicators on commutes to/from campus, number and type of bicycle parking facilities, etc.) seems a necessary and valuable addition.

2.   Health and Wellbeing

Jennifer Conrad, Collette Francheville, Johanna Privett, Rebecca Roggeveen

Abstract

The Health and Wellbeing section, under the 'people system' of the Campus Sustainability Assessment Framework (CSAF), is made up of 19 indicators which assess recreation, food, safety, health services, and environment. 17 of these indicators were researched. We feel that health and wellbeing are two key factors which contribute to campus sustainability. Sustainability, as defined by the Brundtland Commission, is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Hart, 1998).

There is a positive outlook for the sustainability of UPEI, using this framework, as it is a small community. David Orr suggests that "a larger population would have to live with almost less of everything per capita than a smaller society drawing the same resource base" (Orr, 1992). This leads us to feel hopeful that UPEI will be able to reach these benchmarks in the near future.

Sustainability cannot be achieved without first having a safe, active, and healthy campus. Results indicate a strong sense of campus safety and security. Recommendations are made to increase recreation space as well as to hire more personnel for the Health Centre.

2.1 Recreation

Introduction

Health and wellbeing is an important issue to anyone taking part in anything on the UPEI campus. Recreation plays a very important role in setting the stage for wellbeing, both physically and emotionally. Health and wellbeing are both very important issues in sustainability because we have to learn to take care of our own bodies and minds before we can take care of others.

Methods

On March 15th, we met with Laurie Eveleigh at Facilities Management to discuss the size of the recreation space on campus (HW-1). We were given an aerial view of campus [Editor's note: aerial view map] (Appendix 2.1) and used a computer mapping program to measure the size of East and West field, the CARI Complex, and the Young Sports Centre. As there were no measurements of the small beach volleyball court on the computer program, it was measured manually using a measuring tape. Clicking on the desired space gave the square footage of the region, which was then converted into square metres. To get the percentage of recreation space on campus, we took this number and divided it by the total number of square metres on campus (see Appendix 2.2: Recreation space and participation).

On March 5th, we met with Janice Robertson, Program Director of the Chi-Wan Young Sports Centre, to inquire about gym memberships and participation (HW-2). All full-time students of UPEI have a membership to the gym that they have paid for through their student fees. Using the HERA computer system, which is a database that connects all campus community members (CCMs) with the Office of the Registrar, we were able to bring up names of all staff, community members, and part-time students who have paid (within the last school year) to use the gym facilities. All non-campus community memberships were discarded and left out of the count. After all staff and part-time students' numbers were counted, they were added to the number of full-time students. The total number of CCMs to give us the percentage of recreation participation on campus then divided this number.

Results

The recreation indicator measured the total square metres (%) dedicated to recreation on campus, and the total number of CCMs (%) participating in one or more on-campus recreation programs. Results indicate that the UPEI campus has 32,858 square metres dedicated to recreation space on campus (0.3%). Results

also indicate that 3632 CCMs out of 4844 participate (75%) in recreation on campus (see Appendix 2.2: Recreation space and participation).

Discussion

The recreation indicators displayed results that portrayed obvious problems that need to be addressed. It is quite evident that there is an insufficient amount of recreation space available on campus. Just this year alone, a large field has been dedicated for a new residence. Although it is important to house the students, valuable green space and recreation space has been given up. Two years ago, a large field hockey/soccer field was paved over, and today, a larger parking lot stands where the field once was. It is important to expand the University and its facilities, but it appears the expansion results in a loss recreation space. The existing fields are not used enough by CCMs but mostly by individuals who are participating in an organized team sport. We recommend that the University conserve the amount of recreation space that is left and refuse to do any more construction that will decrease this percentage further. We also suggest that the University make use of the land between the East and West fields and the Charlottetown Mall (see Appendix 2.1: Campus map) by September 2006, and establish it as recreation space. It is quite evident that with a 75% participation of CCMs in recreation activities there is obviously not enough space dedicated to recreation on campus. "Exercise is great way to combat stress, it helps reduce anxiety, stabilize sleep patterns, relieve muscle tension, and relax the mind and body" (Davis et al., 2003). We need more recreation space so that the majority of the CCMs have the opportunity to relieve stress. The benchmark for participation is 40%, so it appears as if UPEI has reached this goal; however, this percentage may be somewhat inaccurate, as all full-time students have gym memberships but do not necessarily participate.

Dedicating unused space as recreation space would be beneficial, although the changes that would be needed may be money and time-consuming. If the

funds were available we speculate that it would be in the best interest of all CCMs if there was more recreation space on campus.

2.2 Food

Introduction

Food and nutrition is very important for a healthy lifestyle. The food we choose can play a large role in how we feel about ourselves. If the proper food choices are not available, campus community members may suffer as a result.

These indicators deal with the percentage of food on campus that meets all diet types (HW-3), the percentage of meals prepared on campus that allows for known nutritional value (HW-4), and the dollar value of organic, non-GMO, and fair trade food spent on campus per year (HW-5).

Methods

In an interview with Marc Braithwaite, General Manager - Residence, Food and Conference Services, on March 1st 2005, we discussed the food indicators and our options on campus.

Results

Much of this information was, unfortunately, unobtainable for a number of reasons. To obtain results for diet types, significant calculations and paperwork would need to be done, but because of time constraints Braithwaite would not be able to have it available for this report. Nutritional value of food prepared on campus is known, but this information is not made available to the public. Organic, non-GMO, and fair trade food has never been considered for UPEI, and therefore no results could be obtained [Editor's note: this is the result].

Residence students fill out information at the commencement of their term pertaining to diet types, so that Food Services can provide a menu that will accommodate if necessary. This is not the case in all food venues on campus. Results were unobtainable to present a percentage of these meals because the

University states that a question or concern of this matter has never been posed. It is, however, encouraging to know that this information will now be researched, and this data may be more easily acquired in the future.

Organic, non-GMO, and fair trade food is an issue that is of little to no interest on the UPEI campus. There is no information on this topic because there have been little attempts to make these available on campus.

Discussion

Healthy eating plays a very important role in our health and wellbeing. Food provides us with the nutrients and vitamins we need to work, to study, and to be active. According to research done in Canada, the leading cause of death is heart disease resulting from unhealthy diets and lack of exercise (Davis et al., 2003). Although the University can not force campus community members (CCMs) to maintain an active lifestyle, by providing nutritious diet options, this could help reduce the risk of heart disease and other health illnesses. Braithwaite states that the nutritional value of food prepared in residence is acquirable, but it is made unavailable to students and those eating in that facility. It has been speculated that providing nutritional information of prepared food would potentially lead to the development of eating disorders. Although this may seem odd, we can see why this may become an issue. We recommend that the University look into providing nutritional information on selected foods on campus. For example, providing nutritional value of the day's special will make people aware of the healthy choices available, but it will also result in at least one healthy selection being offered.

Our recommendation to the University in regards to organic, non-GMO and fair trade food is that awareness be raised on this issue. People have the right to know what is available to them. These are all feasible suggestions because the awareness of these issues carries little cost.

2.3 Safety

Introduction

Campus safety is an important component that contributes to the overall health and wellbeing of the campus community. A strong sense of security while on campus contributes to the productivity of students, faculty, and staff. Safety and security are two very important aspects for achieving campus sustainability. When people feel safe they will enjoy spending time on campus and will have a positive effect on the campus community. When people's feeling of security is taken from them, their attitudes may be destructive and may result in negative effects on their personal health and wellbeing. The overall health and wellbeing of the campus community depends on each and every CCM.

Methods

To determine the number total number of motor vehicle accidents (HW-6), workplace incidents (HW-7), and the incidents of assault on campus (HW-8), an interview was conducted with Allen Veale, Assistant Manager Parking and Building Security, on March 14th. This interview yielded no information for the total number of workplace incidents on campus (HW-7) and so the Human Resources Department was contacted at UPEI. No records with this information are kept at UPEI that are accessible by students.

Results

According to Veale, 16 motor vehicle accidents occurred on campus between May 2004 and February 2005. Of the 16 accidents, 8 involved students. The remaining 8 accidents involved staff, faculty, and campus visitors. 6 of the 16 accidents that occurred on campus took place in January 2005 and were all attributed to poor road or weather conditions. 16 CCMs of the total 4844 CCMs (0.3%) were involved in accidents in the given time frame (see Appendix 2.3: UPEI Security Services).

According to Veale, 7 common assaults occurred on campus between May

2004 and February 2005. Of the 7 assaults, 6 involved students. The remaining 1 assault involved a visitor to the campus. There were no sexual assaults that were reported to the UPEI Security Department during this time frame. 6 CCMs of the total 4844 CCMs (0.1%) were involved in incidents of assault in the time frame stated above.

Discussion

The findings regarding motor vehicle accidents on campus may be higher in the past year and in future years due to the increase in traffic flow on campus roads. This increase is primarily attributed to the CARI Complex located on campus which brings many more visitors to UPEI on a daily basis. Construction of the Food Technology Centre and the new student residence on campus are two factors which also contribute to the higher flow of traffic. We recommend that UPEI look into developing another entranceway to the University to decrease traffic flow entering campus via Belvedere Avenue and University Avenue. We also recommend that the University should consider making wider shoulders on roadways, increasing safety for pedestrians.

The findings regarding incidents of assault on campus are more of an approximation than an exact representation. Many assaults go unreported because the victim is embarrassed and feels that he/she is somehow responsible. Although there were no sexual assaults reported, Veale confirmed that this does not mean that they do not occur. He said the most common reason why they go unreported is because of privacy issues. Veale also added that the UPEI Security Department may not be notified of assaults that occur off campus involving CCMs. Charlottetown City Police is always called in for incidents of sexual assault. We recommend that UPEI look into hiring more guidance counselors to encourage victims of assault to come forward.

2.4 Health Services

2.4.1 Physical

Introduction

      The physical wellbeing of our campus community members is an important part of determining sustainability. Within this section we will review such aspects of our campus as access to healthcare on campus (HW-9), amount of sick days taken by staff and faculty (HW-10), and percentage of campus community members who smoke daily (HW-11).

Methods

      To determine the number of healthcare professionals available on campus (HW-9) and the percentage of CCMs who smoke (HW-11), an interview was conducted with the Head Nurse at the Health Centre, Maureen MacInnis-Wheatley, on March 18, 2005. During this interview we were able to determine the number of healthcare professionals available on campus. No records are kept to track the amount of campus community members who smoke.

Results

      According to the Head Nurse at the Health Centre on campus, there is one nurse working 15 hours a week (0.5 FTE) and another who works at 3 days a week (0.4 FTE) for a total of 0.9. There are 3 physicians available who work at 0.4, 0.3, and 0.3, totalling 1.0 FTE physician. There are two full-time physiotherapists who work out of the Chi-Wan Young Sports Centre (2.0 FTE). The total number of physical health care professionals FTEs on campus is 3.9. There are 1242 CCMs per FTE health care professional (assuming all CCMs use the Campus Health Centre exclusively) (see Appendix 2.4). The Campus Health Centre does not service campus community members other than students and so by only including students in our calculation there are 1038 students per healthcare professional. They are available 8 months of the year.

After many e-mails and visits to the Human Resources Department we were unable to attain any information concerning the number of sick days that faculty and staff took during the last academic year. This information is concluded to be confidential to members of the student body.

There are no records kept on campus concerning the amount of campus community members who smoke daily.

Discussion

Our Health Centre does not serve faculty or staff members on campus. A sustainable campus would accommodate all of its members. When we asked if the Health Centre would consider allowing staff and faculty to use its services we were told that their funding would not permit that. We were also told that at one time they had considered closing the Health Centre but that our nursing faculty felt it was a priority on campus. "A Statistic Canada survey on health found that on average 92 percent of the total population in Canada accesses routine healthcare services through the universal health care system" (Statistics Canada, 2005). Members of the nursing faculty are the reason the Health Centre is still open. We feel that it would be beneficial to have more funding to allow more physicians available for the campus community and that the Health Centre should be made more available by being open for longer hours and during more days the week (it currently operates Mon 9-4:30, Tues & Thurs 9-5, and Wed 9-5). "An estimated 4.3 million Canadians reported difficulties accessing first contact services and approximately 1.4 million Canadians reported difficulties accessing various physical and mental health services such as specialist visits, non-emergency surgery and selected diagnostic" (Statistics Canada, 2005).

We were unable to attain information concerning the amount of sick days staff and faculty members take. We are aware that they are reported but were unable to locate anyone who had that data. One staff member of the HR Department also told us that it is confidential information after being given many different contacts that were unavailable.

We were not surprised to find that there were no records available concerning the percentage of campus community members who smoke. This information is difficult to attain unless each smoker presented himself or herself. However, it would be useful to keep track of the amount of smokers to determine how healthy our campus community members are.

2.4.2 Mental

<u>Introduction</u>

In order for the campus community members to deal with the high stress situations often provided by a university lifestyle they must be in a healthy mental state of being. In order to have a sustainable campus community, members need to be able to recognize and deal with these problems in order to live well and stay healthy. This set of indicators examines the number of mental health care professionals on campus (HW-12), the retention rate of CCMs (HW-13), the amount of CCMs who participate in a spiritual service on campus (HW-14), the amount of CCMs who suffer from a mental illness (HW-15), and the suicide rate observed among students (HW-16). When members do not have a healthy mental state, they may not be able to function or participate well within the campus community. These indicators will help us assess how many CCMs are using the outlets provided on campus to deal with mental health.

<u>Methods</u>

To determine the number of mental healthcare professionals available on campus (HW-12) and the number of people reporting depression, alcohol and/or drug abuse (HW-13), we conducted an interview with the Head Nurse at the Health Centre, Maureen MacInnis-Wheatley, on March 18, 2005 (see Appendix 2.4).

Another visit was made to the HR Department and the Registrar's Office to determine retention rates of students, faculty, and staff which measure how many CCMs leave the campus community (HW-13).

On March 21, 2005 we interviewed Father Charlie Cheverie to discuss the kinds of spiritual services that are offered on campus and how many people regularly attend (HW-14) (see Appendix 2.5: Interview with Father Charlie Cheverie).

An interview was conducted with Allen Veale, Assistant Manager Parking and Building Security of Facilities Management, on March 14, 2005 to determine the student suicide rate at UPEI (HW-16).

Results

According to MacInnis-Wheatley at the Health Centre you do not need to be certified in Canada to provide mental health care. There are currently no psychologists or psychiatrists working on campus. The nurses at the Health Centre as well as supportive counsellors who are available through Student Services regularly provide supportive counselling. There are two full-time counsellors and one part-time counsellor working out of the Student Centre along with the nurses who work in the Health Centre. There is a total of 3.4 FTE staff who provide supportive counselling to students only. There are 1350 students per FTE counsellor. If we were to include all CCMs there would be 1615 CCMs per FTE counsellor (see Appendix 2.4).

The head nurse takes records concerning the amount of students who visit the Health Centre reporting depression or alcohol and/or drug abuse. She reports that during the last academic year she saw roughly 20 visits per month.

Attempts to achieve a number for the amount of CCMs who leave their jobs or drop out of school at UPEI, we were met with another roadblock. This information was unavailable for us to attain.

The interview with Father Charlie proved more successful. The Chaplaincy Centre on campus provides a place for anyone of any spiritual background to come in and use it whenever they wish. There is a daily mass for Catholics that can see anywhere from 3-14 people. Roughly 50-70 people attend Sunday mass. Baptists have a regular service every second Thursday and see 20-25 people (see

Appendix 2.5). [Editor's note: there also seems to be an interfaith student group on campus, no more details are known.]

Allen Veale revealed to us during the interview that there have been no reported student suicides within the last 17 years he has worked with the University.

Discussion

During the Health Centre interview we were told that although MacInnis-Wheatley records the amount of students who report a mental illness she does not record those who visit solely for counselling. Between 30%-70% of men and women in Canada report being depressed for at least two months of the year (Davis et al., 2003). Due to time constraints we were unable to visit Student Services to determine how many students they see each year for the purpose of counselling.

The amount of students reporting mental illness is approaching our benchmark compared to the amount of students we have. [Editor's note: the CSAF does not state a short-term benchmark for HW-15, the long-term goal is 'zero' CCMs reporting mental illness.] The Health Centre sees about 160 students a semester. This is not very representative of the entire campus community because it does not include staff and faculty or those students who visit centres off campus.

The Chaplaincy Centre does a good job reaching out to all religions that are prominent on campus and seems to be open to any other groups who would like time to worship. Father Charlie also mentioned that he regularly sees people for private confession and prayer groups. There are also many groups in which the Chaplaincy Centre is involved in such as an annual retreat that sees roughly 50 students as well as the Catholic Students Association conference, which had 75 participants. He said that he is seeing an increasing number or participants in these events as well as in regular services. The Chaplaincy centre also celebrates Ash Wednesday with 200 CCMs who join (see Appendix 2.5).

Although there have been no reported suicides on campus it is difficult to assume that none have occurred away from the campus community.

2.5 Environment

Introduction

These indicators link issues within our immediate environment with issues of wellbeing. The area of greenspace that is accessible on campus is measured (HW-17) as well as the amount of noise (HW-18) and light (HW-19) that is given off on campus. [Editor's note: HW-18 and HW-19 measure noise and light pollution.] This is vital to determining our sustainability because it examines factors that affect us as well as the ecosystem.

Methods

We went to see the Planning Assistant for Facilities Management, Laurie Eveleigh, on March 15, 2005, to discuss the greenspace that is available on campus. On March 10, 2005 we received a pdf document from Eveleigh through Dr. Beringer of a map of the campus (see Appendix 2.1). We measured each area of greenspace in inches and converted it to meters to obtain an approximate value for the total area of accessible greenspace on campus (HW-17).

The indicators measuring noise and light pollution (HW-18, HW-19) were left out of our research because of time and money constraints. [Editor's note: they also require a fairly substantial technological set-up.]

Results

After long hours of calculating we determined that there is 177227.6m^2 of available greenspace on campus. This works out to roughly 61.8% of the total campus (see Appendix 2.1).

Discussion

After calculating the greenspace that falls on the part of campus that is used the most (not including the area past the CARI Complex, before the Charlottetown Mall), we determined that the amount of greenspace left is roughly 38.6%. We feel that the area that sits between the University and the mall should not be included in a greenspace calculation because none of the campus community members use it. Since it does not fall in our everyday surroundings it does not benefit us in any way to have that area included as a measure of sustainability. By examining the space we have left we have determined that there should be more area devoted to greenspace on campus. We feel that a reasonable goal would be to have 45-50% of the space green.

Conclusion

This section of the CSAF report provides us with a basis of determining how healthy our CCMs are. The sustainability of our campus is reliant on the health and wellbeing of the campus community members to actively participate as members of the campus.

The information that we found concerning the Health Centre is not as campus-friendly as we would like to see. We encourage the Health Centre to accommodate to staff and faculty as well as students and to have a larger staff to accommodate our campus community. In our opinion this would contribute a great deal to the sustainability of UPEI.

Since UPEI is one of the smaller universities across the country, we should have a safer campus than some of the larger ones. We strongly urge those responsible at UPEI to continue making money available to the Campus Security Department so that they are able to continue to provide protection and a feeling of security to all students, staff, faculty, and campus visitors. We believe that protecting the personal safety of all CCMs while on campus will lead to benefits inside and outside of the classroom.

The amount of greenspace on campus was surprising until we realized that half of it falls in an area that is not accessible on a regular basis. We recommend that some of this area be used to contribute to the amount of recreation space. A larger area of greenspace on the main campus could largely benefit the campus community.

This study will raise awareness to such issues as diet types and nutritional information. We would have liked to have had the time to include a research of the noise pollution. As students, we have experienced an excessive amount of noise over the last year with all of the renovations that are happening around campus.

Appendix 2.1: Campus map

[Editor's note: the original is too large to be included here; please contact UPEI Environmental Studies and Sustainability to see the original, including the students' calculations. NB: scale on map of 1:3300 means 1mm = 3.3m]

UNIVERSITY OF PRINCE EDWARD ISLAND SITE PLAN

May 30, 2005
1:3300

Appendix 2.2: Recreation space and participation
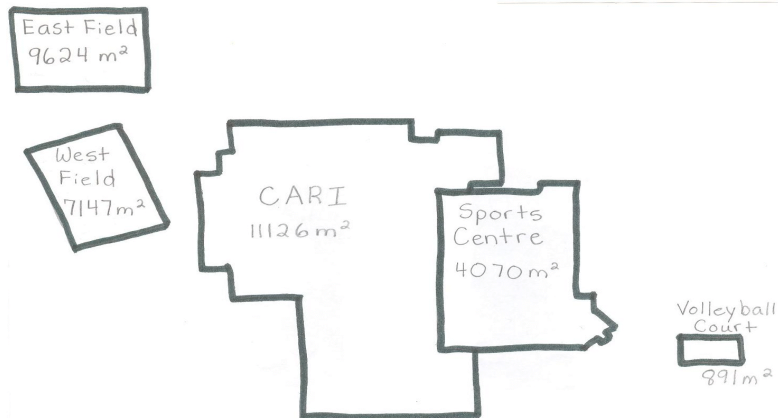
$9624 \text{ m}^2 + 7147 \text{ m}^2 + 11\,126 \text{ m}^2 + 4070 \text{ m}^2 + 891 \text{ m}^2 = 32\,858 \text{ m}^2$

$\dfrac{32\,858 \text{ m}^2}{10952\,667\text{m}^2} = 0.003 * 100 = 0.03\%$

–> there is 0.3% of space dedicated to recreation on campus

Recreation participation

2004 full-time student gym members: 3455

staff and faculty: 155

part-time Students: 22

Total: 3632

$\dfrac{3632 \text{ members}}{4844 \text{ CCMs}} = 0.75 * 100 = 75\%$

–> recreation participation is 75% on campus

Appendix 2.3: UPEI Security Services

Month	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Total
Motor Vehicle Accidents	1	0	0	0	0	2	1	1	3	0	8
Motor Vehicle Accidents: Students	0	0	0	0	0	1	4	0	3	0	8

16 motor vehicle accidents / 4844 CCMs = 0.003 x 100 = 0.3%

6 assaults involving CCMs

Appendix 2.4: Health Centre interview with Maureen MacInnis-Wheatley

UPEI Health Centre

566-0789

mmacinniswhe@upei.ca

Full-time nurses employed at the Health Centre

    1-0.5 (15 hours/week)

    1-0.4 (3 days/week)

Physicians

    1-0.4

    1-0.3

    1-0.3

Physiotherapists

    2-1.0

Total

    3.4 FTE health care professionals

    4844 CCMs / 3.9 FTE healthcare professionals = 1242 CCMs/HC professional

    4059 students / 3.9 FTE healthcare professionals = 1038 students/HC prof'al

    The Health Centre sees roughly 1500 students/semester.

Appendix 2.5: Interview with Father Charlie Cheverie

Chaplaincy Centre

ccheverie@upei.ca

Visitors to the Chaplaincy Centre on a regular basis:

Event	Number of participants
Daily Mass:	3-14
Weekly Mass	50-70
Baptist Service	20-25

Visitors to the Chaplaincy Centre for other events:

Event	Number of participants
Ash Wednesday	200
Cath. Student Assoc.	75
Annual Retreat	50

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3.   Community

Ryan Driscoll, Lacey Gallant, Mark McCarthy, Susanne Thompson

Abstract

The Community section is found under the 'people system' in the Campus Sustainability Assessment Framework (CSAF) and is the largest of all the different sections in the Toolkit. Comprised of 25 indicators broken down into 'involvement and cohesion,' 'diversity,' and 'services,' these indicators were researched via interviews, data collection, and surveys. Results of our analysis indicate that campus community members (CCMs) feel a sense of belonging to the University, although the University of Prince Edward Island is lacking diversity and services for its campus community members. In order for the University of Prince Edward Island to maintain a sustainable campus community it must foster a creative, supportive environment that will nurture diversity of thought, culture, gender, and ethnicity.

3.1 Involvement and Cohesion

Introduction

The Involvement and Cohesion section includes indicators C-1 to C-6, which measure volunteerism on campus (C-1, C-2, C-3), sense of belonging (C-5) and also it measures the strength of the local and campus community involvement (C-4, C-6). Involvement and cohesion is important for a strong, successful community, which is vital in attaining campus sustainability (Cole and Guerin, 2003).

With community involvement comes the chance for individuals to have a say in the social, economic, and environmental aspects in the community. An individual can make the choice to live sustainably and, through community involvement, they can increase the effects and success of their choice (Warner, 2003).

Methods

The measurement of volunteerism on campus was reached using three indicators (C-1 to C-3). The first indicator concerned the amount of volunteerism done on-campus by campus community members (CCMs). We initially contacted Wendy Murphy, Administrative Assistant Human Resources, by e-mail on March 13, 2005, as well as Student Services to obtain the total annual number of CCMs who volunteer at least two hours per week. They were unfortunately unable to provide us the information. Clare Henderson of the Student Union was then contacted on March 22, 2005 and was able to provide an estimation of the required number of campus community members who volunteer at least 2 hours per week. Wendy Murphy was also contacted on March 15, 2005 in order to obtain the total number of campus community members at the University of Prince Edward Island. A reply was issued by Ryan Johnson, Human Resources Manager of Employee Services on March 15, 2005 with an estimation (see Appendix 3.1 and Appendix 3.2).

Indicator C-2 dealt with the financing of volunteer groups on campus. The Accounting and Finance Offices were both contacted by phone on March 15, 2005, without obtaining any information. Our group was told to contact the Student Union, and we received a reply from Clare Henderson, Student Union President by e-mail on March 22, 2005.

Alumni volunteerism (indicator C-3) was found by taking the average number of hours of volunteer work done by alumni members. Alf Blanchard of Advancement Services was contacted on March 22, 2005 and provided an estimation of needed numbers (see Appendix 3.1 and Appendix 3.2).

For indicator C-4, graduates in the community, the percentage of local students that still lived in the Charlottetown area one year after graduation had to be found (see Appendix 3.1 for calculations). First, the local community was established as Charlottetown and the greater area, including the C1A, C1B, C1C, and C1E postal codes (see Figure 3.1). Marion Hannaford, Associate Registrar,

was contacted by e-mail on March 23, 2005 and was able to provide us with the necessary information (see Appendix 3.1 and Appendix 3.2).

Indicator C-5, sense of belonging, was omitted from data collection due to lack of time and the absence of the referred Appendix X of the CSAF Toolkit.

Voter turnout in student elections (indicator C-6) was obtained by e-mail from Clare Henderson, Student Union President, on March 22, 2005. This information was readily available due to the recent completion of the 2005 student elections.

Figure 3.1: Map of Charlottetown and surrounding area
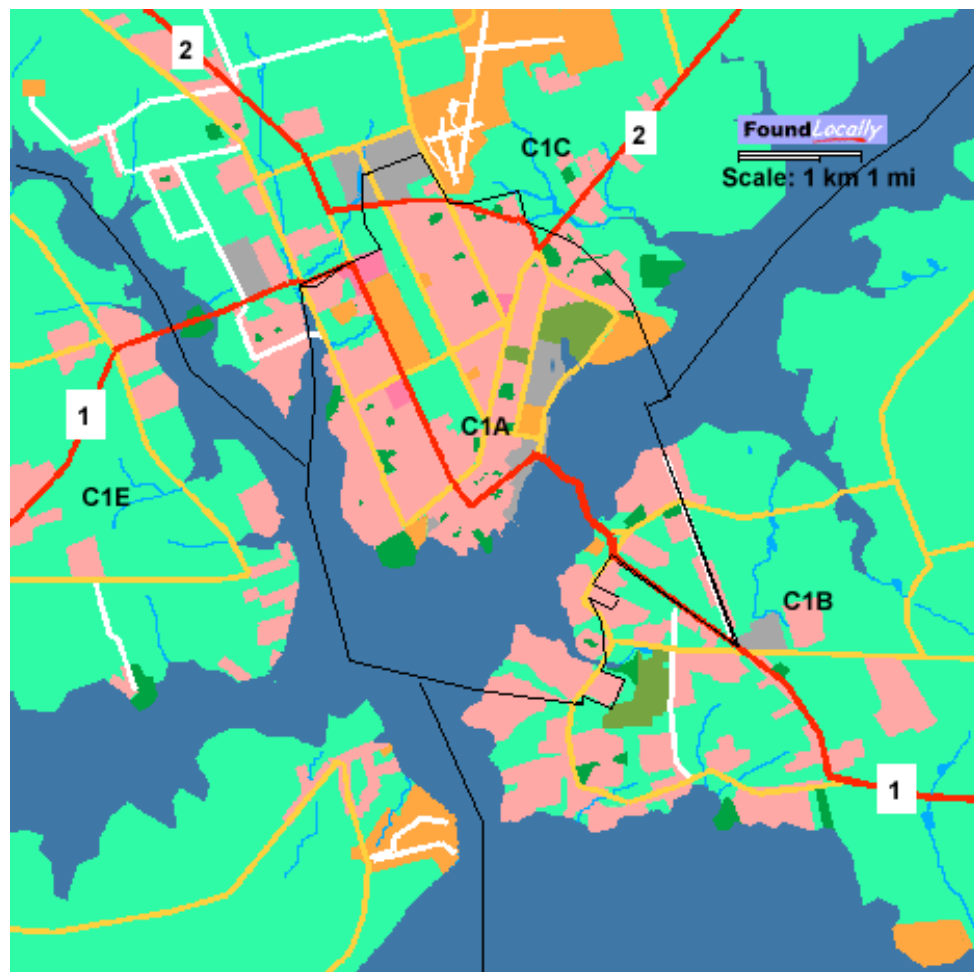
<u>Results</u>

Data obtained from the Student Union and Employment Services at the University resulted in 10.21% of CCMs volunteering at least two hours per week (see Appendix 3.1 for calculation). The total number of CCMs was found to be approximately 4899 (R. Johnson, personal communication, March 15, 2005) with a total of 500 CCMs volunteering at least two hours a week (C. Henderson, personal communication, March 22, 2005). The latter value is a large estimation due the lack of records kept on volunteer activity at the University.

We were unable to obtain a numerical value for indicator C-2, financing volunteer groups. Clare Henderson, Student Union President, commented that there is money given out but it varies considerably from year to year and no further information was available (C. Henderson, personal communication, March 22, 2005).

It was found that of the approximately 15,000 living alumni, the total average annual hours of volunteer work done was 0.033 hours per individual per year (see Appendix 3.1 for calculation). That is, there was a total of 500 volunteer hours worked by all alumni (A. Blanchard, personal communication, March 23, 2005).

Research on graduates in the community (indicator C-4) indicated that 31.12% of local students continue to live in the surrounding community one year after graduation. The information required (see Appendix 3.1 for calculations) was obtained from Marion Hannaford, Associate Registrar. She reported that 572 students residing in the local community were accepted at UPEI in September 2005, and approximately 750 graduating students reside in the community one year after graduation (M. Hannaford, personal communication, March 23, 2005). This is a somewhat unreliable calculation due to students retaining a permanent address in the local community when they have moved elsewhere (Guerin and Cole, 2003).

Indicator C-5, sense of belonging, was omitted from data collection due to lack of time and the absence of the referred Appendix X of the CSAF Toolkit.

The voter turnout was easily obtained from Clare Henderson, Student Union President, as 40.27% of eligible voters took part in the March 2005 election (C. Henderson, personal communication, March 22, 2005).

Discussion

The amount of volunteer work done by CCMs is relatively low (10.21%), compared to the CSAF short-term benchmark of 30% (Guerin and Cole, 2003). Volunteerism is something that everyone knows is an option, but it still has a need to be advertised. There is a lack of encouragement to join volunteer organizations at the University of Prince Edward Island. We recommend that there be more advertisement of volunteer options on campus. This should be easy and relatively cost free to do.

We were unable to obtain a numerical value for indicator C-2, financing volunteer groups, due to lack of records. Providing funds for volunteer groups is essential for volunteer continuation and success since they are usually profit-free organizations. Without the financial support, the organization's opportunities will be limited, or the organizations might be unable to operate.

Research indicates that there is an average of 0.033 hours of volunteer work done by each individual alumni member per year. This is far below the short-term benchmark of 12 hours per year (Guerin and Cole, 2003). This lack of involvement likely results from the same problems as the lack of other CCM volunteerism. We recommend that alumni members be kept updated (possibly by a seasonal bulletin) on possibilities for volunteerism and involvement. Since these people are no longer present on campus, it would be best to provide them with the information needed to be well informed about any volunteer possibilities.

Indicators C-1 to C-3 all deal with volunteerism. For all three of these indicators, all values obtained were estimates due to the lack of records. A recommendation that covers all three indicators, as well as many others, is for UPEI to keep updated and more extensive records on volunteer activities, including times, names, and duties.

The value of 31.12% of local students living in the local community one year after graduation is also under the short-term benchmark stated in the Campus Sustainability Assessment Framework, by almost 20%. This was expected since we were aware that many graduates move away from PEI after graduating, in search of work, experience, or travel. Because of Prince Edward Island's small size, there is a limited number of job opportunities for graduating students. This is something that goes beyond the campus community and incorporates the entire local community. Anything done to improve this value would have to be a joint effort by the University and the Province. It is difficult to make a practical recommendation in this case since it is difficult to produce more jobs and career opportunities in such a small Province.

Unfortunately, we were unable to complete the sense of belonging indicator (C-5). In spite of the unassailability [Editor's note: inaccessibility] of a numerical value, UPEI is well set up to enable students to feel a sense of belonging at the University due its small size.

The voter turnout (indicator C-6) value of 40.27% is relatively close to the short-term benchmark of 50% (Guerin and Cole, 2003). To increase this number, we recommend there be more encouragement aimed at students to get out and vote. A primary concern should be to inform students that voting enables them to have a say in what happens on campus, and it gives them the opportunity to have their personal concerns addressed.

Conclusion

The research on involvement and cohesion has made us aware that there is a lack of records kept on many aspects of the University's campus community. This is an important aspect of a healthy community because with records comes the awareness of what exactly is going on and what needs to be improved. Without records, it is impossible to really know if sustainable matters are advancing, going backwards, or remaining neutral. All values were calculated as being below the Campus Sustainability Assessment Framework's short-term

benchmark, indicating a lack of community involvement and cohesion. Overall, we feel that an increase in benchmarks could be acquired through appropriate record keeping, and student and alumni awareness of opportunity to participate in activities offered by the University.

3.2 Diversity
3.2.1 Disabilities

<u>Introduction</u>

There are many ways to take campus diversity into consideration. This subsection of diversity covers the community indicators of C-7, C-8, and C-9, which respectively research the disabilities of faculty, staff, and students who have been diagnosed and evaluated. The University of Prince Edward Island acts on this premise according to their equity. Employment equity here at the University of Prince Edward Island concerns ensuring equality within their hiring and their employment on campus. Having a disability should not prevent a person from attending or even working at the University and will ultimately promote diversity among individuals and allow these individuals a chance to interact socially with others.

<u>Methods</u>

In preparation to research the number of faculty, staff, and students with disabilities (indicators C-7, C-8, and C-9), a short survey was manipulated (see Appendix 3.3) from the guidelines within the Campus Sustainability Assessment Framework (CSAF) Toolkit and it was sent on March 5, 2005. Once regarded, the survey was sent via e-mail to Denise Bustard of the Human Resource Department (Health & Safety Advisor), Marion Hannaford, Associate Registrar of the Registrar's Office, and Joanne McCabe of Student Services, Disabilities Coordinator [Editor's note: Accessibility Coordinator].

Results

After some indecision, the assessments of students diagnosed with disabilities (C-9) are as follows: Arts: 58, Science: 11, Business: 4, Computer Science: 2, Family Science: 3, Nursing: 1, Education: 2, Vet College: 10, Music: 1. Of the ninety-two people documented, the Arts category outweighs other faculties with 63% of all students diagnosed with disabilities in their faculty. The Faculty of Arts is one of the largest faculties at the University so it seems right that it has the most students who have a disability. All other information seems to fall in place accordingly to the respective size of the faculty. No names or further information pertaining to the University's staff or faculty with disabilities could be assessed as this was classified as confidential information. Also, it is to be noted that this information is about those who have been diagnosed only and that this information is considered current to the date of March 30, 2005. Many people on campus may be considered to have some type of disability; however, they are not accounted for unless evaluated and properly diagnosed at UPEI's Department for Students with Disabilities. [Editor's note: a medical certificate, rather than assessment by the Accessibility Coordinator, seems more likely.]

Discussion

The data obtained from the research on these indicators suggest that having a disability is not necessarily an open subject. Those who are classified as having a disability are able to seek professional help to aid their disability. Anyone with a disadvantage such as a disability is usually considered socially to be a minority. A minority is a statistic that singles those out of the norm (Dasguta, S). This information is usually confidential and closed to the public. There was not enough data available to compare them to the benchmarks for the CSAF indicators; however, there are various programs in place at the University of Prince Edward Island to aid the individuals who have disabilities. These programs include the ACE Program and Student Services.

We recommend that the University make the campus buildings more accessible to individuals with physical disabilities. Buildings such as Dalton Hall, Blanchard Hall, Marion Hall, and Bernadine Hall do not have elevators. Also, we recommend that more programs be put in place similar to the ACE program to aid individuals who have disabilities in their learning and provide them with a form of social interaction with their peers.

Conclusion

The research on individuals with disabilities made us aware of the need of the University to provide more services to them. The University, however, is on the right track but by making the programs more publicly known the University may get more participation from other students. Also, not having elevators in some of the campus buildings is a major concern for people with disabilities. This may stop individuals from attending or even working at the University so if these problems are corrected the University may be more desirable to these people. As new buildings are built on campus, builders should keep in mind that the University of Prince Edward Island should accommodate every type of person, including those with disabilities.

3.2.2 Ethnicity

Introduction

Campus diversity can also involve people of an ethnic background. By increasing diversity of this type, we as a University can enhance and improve fair installments for all people involved with our campus community. Having individuals with different ethnic backgrounds interacting in the same learning and working environments can create a great sense of multi-culturalism. Different countries have different views regarding sustainability, so with their input new ideas and thoughts can be expressed.

Methods

In preparation to research the number of faculty, staff, and students of ethnic minorities (indicators C-10, C-11, and C-12), a short survey (see Appendix 3.4) was manipulated from the guidelines within the Campus Sustainability Assessment Framework (CSAF) Toolkit. Once regarded, the survey was sent via e-mail on March 7, 2005 to Denise Bustard of Human Resources, Darcy McCardle of Enrollment Services-International, Marion Hannaford, Associate Registrar of the Registrar's Office, and Joanne McCabe, Accessibility Coordinator.

Results

With our CSAF research being introduced to UPEI only in January of 2005, The University of Prince Edward Island's campus departments were not prepared to answer such questions about ethnic minorities at this time. The survey sent via e-mail came back in two different forms. The Human Resources Department, which we went to for information on staff and faculty ethnicity, directed us to the Registrar's Office for some institutional analysis. With doing so, the Registrar's Office also denied keeping such statistics on students as well as on staff or faculty. The Registrar's Office also stated that UPEI does not keep track of the racial or ethnic background of their campus community members.

Discussion

With little or no information returned in this portion of the assessment, it is difficult to determine exactly how much diversity the campus at UPEI actually has. Visibly, the diversity of ethnic minorities on the campus is easy to notice, but statistically, we have no information, probably due to the introductions of such a framework only in January of 2005. Although UPEI is a small university it is growing at a tremendous pace, and can easily obtain more and better measurable standards with the use of this sustainability audit in the future.

The University does have an international student recruitment officer whose job focuses on the recruitment of students from around the world. Having

students of ethnic minority in the campus community provides an opportunity for diverse, ideas, and opinions regarding sustainability.

[Editor's note: UPEI's aim is to increase the international student population to 10% of the student body (President's Newsletter, 26 January 2001).]

Conclusion

The beginning of the Campus Sustainability Assessment Framework at UPEI is a stepping-stone for future research. This is a well-developed program, which is new to our campus. If this program is extensively used, over a lengthy period of time, UPEI and its sustainability of diversity of ethnic minorities will only grow and intensify. This assessment will show how sustainable our campus actually is, and the improvements needed to be made in future years. With the placement of more time, and campus recognition of such a project, the UPEI campus can record more statistical information about sustainability and be made an example of by other universities in our region. We feel that the University of Prince Edward Island is on the right track in creating a diverse community, rich with people of all ethnicities.

3.2.3 Gender

Introduction

Community depends strongly on the involvement of both male and female genders. The University of Prince Edward Island's campus community would not be sustainable without gender diversity, thus enabling a more diverse, exciting, and equitable working, teaching, and learning environment for everyone. Gender diversity can lead to more alternating views and ideas on different ways that campus sustainability can be achieved at the University of Prince Edward Island. Without differing views and ideas sustainability would remain at a standstill and would not improve.

Methods

       In order to determine the percent of women faculty, staff, and students (C-13, C-14, and C-15) at the University of Prince Edward Island, interviews were conducted with both the University's Registrar's Office and the Human Resource Department on March 15, 2005. For the indicator that deals with student gender (C-15) we talked specifically with Dr. Marion Hannaford, Associate Registrar of the University of Prince Edward Island. The interview with the University's Human Resource Department regarding the percentage of women faculty and staff (C-13 and C-14) yielded little information regarding staff gender as we were told that these records were confidential.

       The questions asked regarding faculty gender (C-13) and the results can be found in Appendix 3.5. For information pertaining to student gender (C-15), the questions and answers are noted in Appendix 3.6. We could not find the gender ratios of the students for each department on campus due to time restraints but the total number of UPEI students who were female was achieved. Since no information was given to us regarding staff gender (C-14) the answers to our questions will not be available in this report but the questions can be viewed in Appendix 3.5.

Results

       According to Dr. Marion Hannaford, Associate Registrar (16 March 2005), out of the 3999 students registered at the University in September 2004, 1879 were females (47%). The results for the percentage of female faculty members for each department was also not available due to time constraints but the total number of female faculty members was 121 out of the total 347 faculty positions available. This data indicates the percentage of female faculty is only 35%. Since there was no data available by the deadline for the percentage of female staff at the University of Prince Edward Island, no results could be concluded on this indicator (M. Hannaford, personal communication, March 15, 2005).

Discussion

The results regarding gender diversity on the campus of the University of Prince Edward Island seems to be comparable to other universities in this region. There is, however, a bigger difference between the number of female and male faculty (C-13), with the males occupying 65% more positions than females. [Editor's note: "65% more" would be 200 positions. Correct is to say men hold 226, or 65% of the positions, women 121, or 35%.] Reasons for this may be that in the past it was more accustomed for males to work and receive higher educations while the women stayed at home. Even though this trend is diminishing, there are still more men in the workforce than there are females. [Editor's note: short-term benchmark is "gap of 10% or less above or below zero" (CSAF Toolkit 2003, p. 53).]

The student gender indicator (C-15) found that there was in fact a gap of less than 10% between the ratios of males to females attending classes at the University of Prince Edward Island. This provides the students a campus community that is diverse and integrated to learn and interact in. It enables the students to attend and participate in gender diverse classes and to communicate in an environment in which thoughts and ideas vary greatly between individuals.

Although there was no available data to be collected regarding staff gender diversity (C-14), we were able to conclude that there is a greater number of women staff working in offices doing administrative work than there are males. However, there are a much greater percentage of men doing more labor-intensive work on campus than was expected.

We recommend that the University of Prince Edward Island keep improving on their gender diversity with emphasis on maintaining the close ratio of male to female students while trying to decrease the gap between faculty gender. Having an equal number of male and female faculty members will benefit the University's students by giving them a much more diverse environment to learn in. This is a great goal for the University to try to achieve and is definitely within reach.

Conclusion

Gender diversity is probably the most important indicator regarding community diversity and is probably the easiest to achieve. Over the past 20 years, females have gained respect they deserve in the workforce and in educational institutions. This provides both males and females with equal opportunities and rights. We do not believe that there is a problem with gender equity in the number of students attending the University of Prince Edward Island but we do feel that there is a problem with the lack of female faculty members. The University should realize this and try to work on gradually improving the gap between the numbers of male to female faculty members.

3.2.4 Indigenous Peoples

Introduction

Indigenous faculty, staff, and students are an integral part of a sustainable campus community. Having representatives of Indigenous Peoples around the University's campus provides many people with a sense of diversity that would not be there without their involvement. Individuals of indigenous descent can provide us with alternative views and opinions on sustainable matters and concerns. Indigenous people have a history of interconnectedness to the earth and respect for all living things. So if they bring even a small portion of these values to the University with them it will greatly help with creating and maintaining a sustainable environment.

Methods

In order to determine the percentage of students, faculty, and staff who are of indigenous descent we conducted interviews with the Registrar's Office and the Human Resource Department. We talked with Dr. Marion Hannaford on March 16, 2005 and with the Human Resource Department on March 14, 2005. The interview with the Human Resource Department regarding the percentage of faculty and staff who are of indigenous descent (C-16 and C-17) yielded little

information. They did not have records available of the number of faculty and staff who are of indigenous descent (see Appendix 3.7).

Results

    According to Dr. Marion Hannaford, Assistant to the Registrar, out of the 3999 full and part time students enrolled at the University of Prince Edward Island, there are approximately 200 students who classify themselves as being of indigenous descent (C-15) (see Appendix 3.8). This is only 5% of the student population attending the University (M. Hannaford, personal communication, March 14, 2005).

    Since there were no records available for the percentage of staff and faculty who are of indigenous descent, no data could be collected on these two indicators (C-16 and C-17).

    [Editor's note: UPEI has an some kind of Indigenous Students' Association, though no further information could be found.]

Discussion

    The results of the data collected for the percentage of students who classified themselves as being of indigenous descent was relatively small compared to the total number of students who attend the University. These numbers may be deceiving, however, because there is no section on the University of Prince Edward Island's application form where it is asked if the applicant is of indigenous descent.

    The University of Prince Edward Island is currently working on trying to improve multi-cultural diversity on campus and is putting a lot of effort into the recruitment of these individuals. Having individuals of such descent participate in classes with other students provides significant multi-cultural dimensions to the campus at UPEI and to the entire Province of Prince Edward Island as well. In order to try and raise these total numbers of indigenous students, a recruitment campaign could be put forth aimed specifically at these individuals promoting the

University. If recruiting campaigns were initiated for students of indigenous descent, it could result in higher enrollment and greater diversity, leading ultimately to a more sustainable, diverse campus community.

Conclusion

Since there was lack of data to be analyzed for the Indigenous Peoples indicators it is hard to know if the University is moving in the right direction towards sustainability concerning this form of community diversity. This lack of record keeping and research has made us aware of the immediate need for this knowledge. Without records stating the number of faculty, staff, and students who are of indigenous descent, community diversity cannot fully be calculated. We advise that the University create a position on its staff to conduct this research. Summer or part-time positions for students on campus could even be created to fulfill this task.

3.3 Services

Introduction

As a member of a larger community, the University of Prince Edward Island campus must provide services for not only its students, staff, and faculty, but also to the surrounding community to ensure a good relationship between the two. The relationship between a campus and the community surrounding it is pivotal in sustaining an environment with a sense of belonging. If the surrounding community becomes separated from the campus less people will feel welcome there. Providing services on campus, such as indoor community spaces (C-19) which promote community members to gather, helps encourage the sharing of ideas and goals for the campus community as a whole. Offering affordable on-campus housing for students, staff, and faculty (C-20) is another way to promote a sense of belonging, and to strengthen the relationship with the community. Another way of enhancing the sense of belonging on a university campus is to provide student jobs in which members of the student body can apply for

employment and gain useful skills and knowledge on the job. [Editor's note: C-22: On-campus employment services: "Total number of full-time jobs posted annually by an on-campus student employment centre, divided by the total number of students graduating in that year (…)" (CSAF Toolkit 2003, p. 61).]

To encourage members of the surrounding community to be involved with the campus, a system that issues community library cards (C-23) was implemented to allow non-university members of the community an opportunity to use the resources that the library holds. Also, in order to maintain a sustainable campus, a portion of every university's budget should be set aside for media expenditures (C-24). The use of newspapers, magazines and radio is a great way of keeping members of the community informed of all of the news and events that may affect them and make them feel closer to the university. The last indicator discussed in this section deals with the affordability of public transit (C-25). This is an important service that allows many members of the campus a low cost and quick method of commuting to and from the campus.

All of the indicators listed above deal with the people who belong to a campus, the community that surrounds it, and the sense of belonging they feel from being involved with the campus. This sense of belonging is increased with every service a campus can provide and helps to promote a sustainable campus by creating an environment which the people who go there enjoy.

Methods

To determine the amount of indoor community space that the University of Prince Edward Island currently has (C-19), a representative at Facilities Management was contacted. On March 22, Laurie Eveleigh, Planning Assistant at Facilities Management, was contacted and asked to provide square footages for indoor community space on the University's campus. Indoor community space was defined as any area where members of the campus and the surrounding community could gather (see Appendix 3.10). All of these indoor community areas are used as gathering areas or have the potential to be used as such. For this

reason, all of these areas were used when assessing the indoor community space at UPEI. The result of this calculation follows in the Results section of this report.

The next two indicators concern on-campus housing and housing affordability (C-20 and C-21). The first indicator looks at the total number of University-owned beds that are offered to students, faculty, and staff as a form of housing both on and off campus. The second indicator questioned the affordability of this housing. To acquire information for these two indicators, the Manager of Residences, Mr. Marc Braithwaite, was e-mailed on March 21 and questioned. Mr. Braithwaite promptly responded by e-mail and the figures he presented will follow in the Results section of this report.

To assess the next indicator, campus employment services offered to students (C-22), two UPEI departments were visited on March 25. More specifically, this indicator determines the number of student jobs offered in the academic year divided by the number of graduating students. The receptionist at the Human Resources Department was asked to determine the number of student jobs offered from May 1, 2004 until April 30, 2005. An official in the campus Registrar's Office, Cathy Toombs, was asked how many graduating students there were in the 2004 graduating class. Information provided by both departments will follow in the Results section of this report. [Editor's note: apparently, the Career Development Officer in Student Services was not contacted.]

To determine how many campus community cards the Robertson Library currently accommodates (C-23), a representative of the library was surveyed by phone on March 20, 2005. The results of this survey will follow.

The University Comptroller, Mr. Phil Hooper, was interviewed on March 25 to determine the on-campus media expenditures (C-24). Questions about the University's budget were asked concerning the amount of money that is set aside for advertising. The total annual budget for the media outlets and the percentage of this funding that comes from on-campus administrations were discussed and the findings from these questions will be addressed in the Results section to follow.

The final indicator that the Services section of this report deals with is the affordability of public transit for campus community members (C-25). This indicator was not addressed because it has no relevance to the University of Prince Edward Island because the city of Charlottetown does not currently have a public transit system in place.

Results

According to the figures attained from the Planning Assistant at the Facilities Management Department, Laurie Eveleigh, there are 65,901 square feet of indoor community space available. When divided by the total indoor space in all campus buildings, which Ms. Eveleigh demonstrated to be 828,053 square feet, we found that 8.0% of the indoor space on campus has potential to be used as indoor community space. This value falls 7.0% below the short-term benchmark of 15%, set by the CSAF Toolkit. This will be discussed later in this report when recommendations for change are made (L. Eveleigh, personal communication, March 22, 2005).

To calculate the on-campus housing indicator, information received from Residence Manager Marc Braithwaite was used. The total number of campus-funded beds was divided by the total number of campus community members to give a value of 6.9% (see Appendix 3.9). This value is far below the long-term benchmark for this indicator of 75% (M. Braithwaite, personal communication, March 21, 2005).

The on-campus housing affordability indicator asks for the average cost of university owned/managed single student housing divided by the total average expenses per single student. The cost of living in a single room in residence is currently $4,032.00 per academic year as of September 1, 2004. This works out to be $504.00 per month to stay in a single room at UPEI. In comparison, the average cost of living off campus for a student living in Charlottetown near UPEI is approximately $330.00 per month for rent. This is not a fair comparison since the fee for residence accommodations includes electricity, cable TV, hot water, and

heat. If these numbers were taken into consideration for off-campus housing, the average cost would be around $400.00 per month per person. When the average of on-campus housing costs is divided by the cost of off-campus housing, we get a value of 126% (see Appendix 3.9). The short-term benchmark is set at 30-35% for this indicator; therefore, the cost of living on campus at UPEI is well above the benchmark set to maintain a sustainable campus community. The long-term benchmark is less than 30%, so a lot of work will need to be done to achieve this goal (M. Braithwaite, personal communication, March 21, 2005).

The total number of student jobs offered from May 1, 2004 to April 30, 2005 is 119 (C-22). This data was collected from the Human Resource Department and divided by the total number of students graduating in May 2004, which were 626 (obtained from the Registrar's Office). The short-term benchmark for this indicator is at least 0.5 jobs per student. The calculated value for this indicator is 0.19 (see Appendix 3.9), which is less than half of the short-term benchmark and one fifth of the long-term benchmark for this indicator which works out to be at least one job per student (C. Toombs, personal communication, March 25, 2005).

The next indicator being assessed deals with community library cards (C-23). The indicator asks how many community members are currently borrowing materials from the campus library. A representative of the Robertson Library stated that this figure could not be given a definite value because there is the possibility of many different people having access to the library. This is because the campus library does not use a traditional library card system, but rather, it allows anyone with a campus identification card to access and borrow materials form the library. Community members can obtain these identification cards at a cost of $20.00 but members of the community who already have a campus card such as recent graduates can use their cards to continue to use the library. For this reason there could not be an exact number put on the community library cards since it would be impossible to know how many campus cards have been issued or how many graduates continue to use the library after graduating. The representative from the Robertson Library also said that there are approximately

1500 off-campus borrowers using the library on average at any given time (see Appendix 3.9). There are approximately 4899 on-campus community members and 1500 off-campus community members using our library. This total gives a 3:1 ratio of student to community members using the library.

Due to time constraints and an inability to properly get in touch with the UPEI Comptroller, Mr. Phil Hooper, for more than a brief moment, the next indicator which deals with on-campus media expenditures (C-24) will show the total annual budget for campus advertising alone. With more time and further consultations with the UPEI Comptroller, Mr. Phil Hooper, this indicator should be very straightforward to assess and would break all media outlets down by individual budgets. This would then be summed and divided by the total annual financial contribution from student and university administrations. With the current time constraints only the following information was attainable. The UPEI campus put $414,176 of its $81,213,852 annual budget for 2004 toward advertising. The amount of the $414,176 that came from various sources was not able to be determined at this time and therefore we could not put a percentage value on the amount that came from student and university administrations (see Appendix 3.9). Without this information, no reference to the short or long-term benchmarks can be made for this indicator at this time. It is also important to note that Mr. Hooper stated that no solicitation is permitted on campus with respect to advertising and that the only areas of the campus that allow corporate advertising are the Chi-Wan Young Sports Centre and The Wave campus bar (P. Hooper, personal communication, March 25, 2005).

The last indicator in the Services section, affordability of public transit (C-25) was not assessed as a result of the absence of a public transit system in the city of Charlottetown.

Discussion

Upon calculating the results for the Services section of the community indicators for this assessment, it can be said that UPEI does not meet the

benchmarks set for the seven indicators discussed. The indicator which deals with community library cards (C-23) does not have a benchmark set by the CSAF Toolkit; however, it seems to be the only indicator where there seems to be a good relationship between the campus and the surrounding community. The other six indicators either fell below the short-term benchmark or were not assessed at all do to time constraints and other factors.

The indoor community space indicator (C-19) was calculated to include 8.0% of the total indoor community space for indoor community areas. This value falls 7.0% below the short-term benchmark for indoor community space. This is not a problem that a university can change in a short period of time; however, as new buildings are constructed on campus and old ones are renovated and refurbished we recommend that indoor community space should be taken into consideration during the early planning. At the current time, March of 2005, there are two new buildings being constructed on campus while another is being completely renovated. There are also plans to erect new buildings and renovate many more in the near future as a part of UPEI's Building a Legacy Campaign that intends to expand and beautify the existing campus.

The next indicator assessed deals with on campus housing (C-20). From data collected we found that there are enough beds in on-campus housing to accommodate 6.9% of the campus community members. The long-term benchmark for this indicator is set at 75%. This means that there is a large gap between the current situation at the University of Prince Edward Island and a sustainable campus. To address this problem, the University should look into increasing their total number of beds, both on and off campus, which they manage. To compare, the University or Prince Edward Island had 337 beds available to campus community members in 2004 while Concordia had only 144 beds available to campus community members in 2003 (Davis, Lamarca, Guerin and Larson, 2003). The University is currently in the process of constructing a new residence facility that is to be opened in September, allowing an increase in the total number of campus-owned housing that it provides for its students, faculty, and staff.

Unfortunately, we were unable to obtain exact numbers with respect to how many new beds this building will create but it is certainly a step in the right direction. In the future, the University should also look into funding off-campus housing for students. This is one area that UPEI does not currently budget toward while many other campuses in Canada do fund off-campus housing for their campus community members.

Subsidized housing is an important factor when recruiting students, faculty, and staff. Many of the people recruited are from away and require a place to live that is affordable to them while attending our University. The affordability of on-campus housing is dealt with in the next indicator. Currently, UPEI charges $504.00 per month to live in residence. This accounts for about 126% of the cost of living in similar off-campus housing which is located near to UPEI. This is four times the short-term benchmark for this indicator that is 30-35%. The long-term benchmark is less than 30%, so there is a lot of work to be done to get the cost of living in on-campus housing down to the local cost of living. In comparison, students at Concordia University pay $350.00 per month to live in residence. This is a savings of $154.00 per month if a student went to Concordia and lived in a single room (Davis, Lamarca, Guerin and Larson, 2003). UPEI is a small university that has been quickly growing in the past fifteen years and Charlottetown has one of the lowest costs of living in Canada. The recent growth of UPEI and the cost of doing so may be the cause of the high cost of living in residence; however, this is no excuse for having such a high cost of living. The University of Prince Edward Island's Residence Department must seek more government funding and explore any other avenues that may help them to reduce the current cost of living if they wish to have a sustainable campus community. Government funding and corporate gifts toward buildings (such as the one given to the K.C. Irving Chemistry Building) should be acquired to offset the cost of living to students.

The Human Resources Department at UPEI states that there have been 119 jobs posted for students in the past year (C-22). This accounts for 19% of the graduating class for the previous year (626 graduates). The short-term benchmark

for this indicator is 50% and the long-term benchmark is 100% or one job per student. To bring the total up from 119 jobs, UPEI will have to look for more research grants and government funding to allow more researchers to hire assistants. Doing so will help more students find jobs while in school that will help them learn through a more hands-on approach in their given field of study. These employment opportunities also help the student to offset the ever-rising cost of attending university and give students of smaller income families the chance to attend university.

The number of community library cards (C-23) could not be given a definite value as was discussed in the Results section of this report. An approximate value of 1500 off-campus borrowers accounts for approximately 23.4% of the total number of community members borrowing from the Robertson Library (see Appendix 3.9). In the CSAF Toolkit there is no benchmark for community library cards, but 23.4% of the total borrowers come from off-campus community members. This appears to be a reasonable number of off-campus exposure for the library. This number may be increased by advertising the library in the community to ensure all community members are aware they are able to use the library without being members of the student, faculty, or staff body of UPEI.

There was a problem with assessing the next indicator, which deals with on-campus media expenditures (C-24). This problem was a result of time constraints and as a consequence, the information received for this indicator could not be compared to a benchmark from the CSAF Toolkit. UPEI allocated $414,176 of its budget to advertising in 2004, but we were unable to determine how much of this funding came from student and university administrations because no value could be found for how much of the advertising came from other members of the community. Further research will need to be done on this topic to be able to determine where UPEI stands with respect to the current benchmarks set by the CSAF Toolkit.

The final indicator for the community section of the CSAF Toolkit concerns the affordability of public transit in Charlottetown (C-25). There is currently no

public transit system in Charlottetown; however, the city of Charlottetown released a press release in the spring of 2005 stating that they were committed to putting such a system in place in the near future. [Editor's note: on 27 May 2005, the City of Charlottetown announced that a public transit system will be in place by 1 October 2005.] We recommend that UPEI back the city of Charlottetown in getting a public transit system established. [Editor's note: a U-Pass was proposed to the University and the public transit operator 28 May 2005.] In the long run, the campus should be able to profit from such a system. It will also allow the campus to expand to other locations within the city by allowing students to commute between areas, if need be, at a low cost. Promoting a public transit system will promote not only a sustainable campus at UPEI but a more sustainable city as well.

Conclusion

The indicators in this section all dealt with the services that a university campus should offer and promote to ensure a good relationship with the community. As you can see from the results of each of these indicators, with the exception of off-campus borrowing at the Robertson Library, much work needs to be done to improve the relationship between the campus and the community. This relationship is important to a university from a business viewpoint because a strong relationship with the community means more of the community members are going to want to be involved with the university and a strong sense of belonging will follow. This sense of belonging is important because it makes recruiting new students, faculty, and staff easy and effective and promotes a more vibrant campus community and this is the goal of any sustainable campus.

<u>Appendix 3.1:</u> Calculations for indicators C-1 to C-5

Indicator C-1: Volunteerism

(Total annual number of CCMs who volunteer at least 2 hours per week / total number of CCMs) * 100%

(500 / 4899) * 100% = 10.21 %

Indicator C-2: Financing volunteer groups

Total annual amount of money the university gives to each on-campus volunteer driven organization / Total number of organizations

No numerical value obtained.

Indicator C-3: Alumni volunteerism

Total annual hours of volunteer work done by university alumni / Total number of living alumni

500 / 15000 = 0.033

Indicator C-4: Graduates in the community

(Total annual number of incoming students from the local community – students still living in the community one year after graduation) / Total number of incoming students from the local community * 100%

(572 – 750) / 572 * 100% = 31.12%

Indicator C-5: Sense of community -- omitted

Indicator C-6: Voter turnout

Formula provided in CSAF:

(Number of student voters in most recent election / Total number of eligible voters) * 100%

It was unnecessary to calculate this value because voter percentage was directly given from source.

Appendix 3.2: Question list for indicators C-1 to C-6

Following is a list of questions asked of various personnel at UPEI:

1. What is the total number of CCMs that volunteer at least 2 hours per week?

2. What is the total number of CCMs?

3. What is the total amount of money the University gives to each volunteer organization on-campus?

4. What is the total number of volunteer organizations on-campus?

5. What are the total annual hours of volunteer work done by alumni for the University?

6. What is the total number of living alumni?

7. What is the total number of incoming students from the local community, including C1A, C1B, C1C and C1E postal codes?

8. What is the total number of students who graduate and are still living in the community after one year?

9. What is the number of students that voted in the most recent student election?

10. What is the total number of eligible voters?

Appendix 3.3: Question list for indicators C-7 to C-9

1. How many faculty in the academic or fiscal year being considered in the assessment were living with physical and/or mental disabilities? For each individual living with a disability, what was the nature of their employment: tenured, non-tenured, or sessional?

2. How many staff in the academic or fiscal year being considered in the assessment were living with physical or mental disabilities? For each individual living with a disability, what was their level of pay: top 33%, mid 33%, or bottom 34%?

3. How many students in the academic or fiscal year being considered in the assessment were living with physical or mental disabilities? If you could, list the students in academic order of their department of study.

4. How are the academic departments organized on campus?

Appendix 3.4: Question list for indicators C-10 to C-12

1. How many faculty in this academic year are there who self-identify as belonging to an ethnic minority? For each individual in this group, what was the nature of their employment: tenured, non-tenured, sessional?

2. How many staff in this academic year are considered as belonging to an ethnic minority? For each individual in this group, what was their level of pay: top 33%, middle 33%, bottom 34%?

3. How many students in this academic year self-identify as belonging to an ethnic minority? List these students according to their academic department of study.

4. Does your campus have a policy that shows commitment to equity of people of ethnic minorities?

5. Does the campus have a recruitment program that encourages and supports applications from students of ethnic minorities?

Appendix 3.5: Questions asked to UPEI's Human Resource Department regarding indicators C-13 and C-14, and answers

Questions:

1. What was the gender distribution of the University of Prince Edward Island's faculty in the academic year of 2004-2005?

2. What was the gender distribution of the University of Prince Edward Island's staff in the academic year of 2004-2005? For each individual group, what was their level of pay: top 33%, middle 33%, bottom 34%?

3. How are academic departments organized on campus?

4. Does the campus have a hiring program that encourages and supports applications from both men and women that works towards equity in all academic departments, all faculty types, and all salary types for staff?

5. Does the campus have a policy that shows commitment to gender equity?

6. Have there been any reported incidents of oppression related to gender issues in recent years?

Reply to questions from Human Resource Department for indicators C-13 and C-14:

1. There are roughly 347 faculty at the University. Of these 347, 121 are female.

2. This data is not able to obtained due to confidentiality.

3. Academic departments are organized in 6 main departments: Faculty of Arts, Atlantic Veterinary College, School of Business, Faculty of Education, School of Nursing, and Faculty of Science.

4. This data was not able to be obtained.

5. This data was not able to be obtained.

6. This information was confidential.

Appendix 3.6: Questions asked to Registrar's Office regarding indicator C-15, Student Gender, and answers

Questions:

1. What was the gender distribution of students in the academic year of 2004-2005? List these students according to their academic department of study.

2. How are academic departments organized on campus?

3. Does the University of Prince Edward Island have a recruitment program that encourages and supports applications from students of both genders for all departments, and works to achieve equity in all departments?

4. Does your department have a policy that shows commitment to gender equity?

Reply to questions from Registrar's Office regarding indicator C-15:

1. In this academic year the enrolment of students was 3999 in September 2004. 1879 of these students were female. Because of time constraints it is not possible to break them up into departments. (47%)

2. Academic Departments are organized into Faculty of Arts, Science, and Education, Schools of Business and Nursing and also the Atlantic Veterinary College.

3. No, UPEI does not have a recruitment program of this kind.

4. No there is no policy for student gender equity formally in place.

Appendix 3.7: Questions asked to the Human Resource Department regarding indicators C-16 and C-17, and reply

Questions:

1. What was the number of indigenous faculty members in the academic year 2004-2005 employed by the University? For each individual group, what was the nature of their employment: tenured, non-tenured, sessional?

2. What was the number of indigenous staff in the academic year 2004-2005 employed at the University? For each individual group, what was their level of pay: top 33%, middle 33%, bottom 34%?

3. Does the campus have a hiring program that encourages and supports applications from Indigenous Peoples that works towards equity in all academic departments, all faculty types, and all salary types for staff?

4. Does the University have a policy that shows commitment to equity of Indigenous Peoples?

5. Have there been any reported incidents of oppression involving Indigenous Peoples in recent years?

Reply:

1. There are no records of indigenous faculty for the University available at this time.

2. There are no records of indigenous staff for the University available at this time.

3. The University does not have a hiring program of this type.

4. This information could not be found.

5. This information is confidential.

Appendix 3.8: Questions asked to the Registrar's Office regarding indicator C-18, and reply

Questions:

1. What was the number of indigenous students enrolled in the academic year 2004-2005 at the university? List these students according to their academic department.

2. Does the campus have a recruitment program that shows commitment to the equity of indigenous students, and works to achieve equity in all departments?

3. Have there been any reported incidents of oppression involving Indigenous Peoples in recent years?

Reply:

1. There are approximately 200 students enrolled in classes at UPEI that classify themselves as indigenous students. (5%)

2. There is a recruitment program in place at the University for the recruitment of students but it is not specific for only indigenous students. It also focuses on international students, students of ethnic minorities, etc.

3. This information is confidential.

Appendix 3.9: Calculations of all data for indicators C-19 to C-25

Indicator C-19: Indoor Community Space

Space type	# of buildings	# of spaces	Space (square feet)
Auditorium seating area	4	9	7931
Auditorium stage	4	5	2717
Cafeteria dining area	3	3	6237
Chapel support rooms	1	3	522
Conference room	12	30	7051
Exhibit area	1	1	607
Interview room	2	2	199
Lobby	2	4	1013
Lounge - Staff/Faculty	12	28	7407
Lounge - Student	14	46	21770
Lounge - Study	5	11	3923
Office common use area	11	21	6066
Retail lounge	1	2	458
Total Indoor Community Space			65901
Total Indoor Community Space			828053

(65,901 sq. ft. / 828,053 sq. ft.) * 100 = 7.9 %

Short-term benchmark = >15%

Long-term goal = >25%

Indicator C-20: On-campus Housing

Totals as of September 2004

337 beds in on-campus housing

3999 students

700 faculty and staff

[337 / (3999 + 900)] * 100 = 6.9%

Long-term goal = 75%

Indicator C-21: On-campus Housing Affordability

Cost of living on campus $4032/single room/academic year = $504.00/month

Cost of living off campus $400.00/month

($504.00 / $400.00) * 100 = 126.0%

Short-term benchmark = 30-35%

Long-term goal = <30%

Indicator C-22: On-campus Employment Services

Number of graduates in 2004 = 626

Number of student jobs posted from May 1, 2004 to April 30, 2005 = 119

119 / 626 = 0.19 per student

Short-term benchmark = 0.5 per student

Long-term goal = 1.0 per student

Indicator C-23: Community Library Cards

Number of community library cards = appr. 1500 off-campus borrowers

Short-term benchmark = none set

Long-term goal = none set

Indicator C-24: On-campus Media Expenditures

Amount of University budget devoted to advertising in 2004 = $414,176.00

Amount obtained from student and university administrations = unattainable

Indicator C-25: Affordability of Public Transit

Not applicable due to lack of a public transit system in the city of Charlottetown.

Appendix 3.10: Question list for indicators C-19 to C-25

Facilities Management

1. Where are the indoor community spaces located on campus? What is the floor area of these spaces?

Residence Life Office

1. How many beds are there in campus owned and managed housing? Divide into number of students, staff, and faculty.

2. What is the cost for campus owned and managed single-student housing?

3. What is the average amount that single students pay for housing in our region?

4. Is there any student, staff, and/or faculty housing that is privately owned and/or managed, but provided solely for the use of the campus?

Registrar's Office

1. How many students graduated in 2004?

Human Resources Department

1. How many jobs did an on-campus employment centre post in the same year?

Robertson Library

1. What was the total number of library cards issued in 2004?

UPEI Comptroller

1. List all of the on-campus media outlets on your campus.

2. What was the total annual budget for all of these media outlets?

3. What was the total annual contribution to these media outlets by on-campus administrations in the fiscal or academic year being considered?

4. Do any/all of your on-campus media outlets have any policy preventing or discouraging corporate advertising?

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4. Knowledge

Matthew Keeping, Christopher Long, Justin MacArthur

Abstract

The Knowledge indicators evidence the University's ability to create and present knowledge observed to be sustainable in the environment, community, and economy. These twenty-one indicators investigate orientation and ongoing training, research, and curriculum. Results indicate that too little time is spent informing students, faculty, and staff on campus, local community, and global sustainability issues through orientation and training, and that research projects directed at sustainability issues are few and far-between. Some promise is shown in UPEI's commitment to applied learning in the curriculum, but a great deal of future course development will have to focus on how to teach sustainability issues. Recommendations regarding improvements in the areas of training, research, and curriculum are supplied in this section.

4.1 Training

4.1.1 Orientation

Introduction

One of the goals of a university is to generate and store knowledge; ideas, theories, proof of theories, and solutions to problems. A university's primary objective, however, is to share this knowledge with members of the campus community through education programs.

One of the most effective ways to involve new members into a community and aid their integration is to make them feel welcome and help them understand the way the university operates. Orientation is an important instrument in this respect, and allows the chance to introduce important social and environmental issues to the largely transient student population, as well as new staff and faculty, helping create a more informed and conscientious campus citizen.

Methods

In determining the levels of New Faculty (K-1) and New Staff Orientation (K-2) to local social/environmental issues and New Student Orientation (K-3), interviews were conducted with the Human Resources Department on March 24th, Dr. Richard Kurial, the Dean of Arts, on March 30th, Dr. Tony Couture, the Chair of Philosophy, on March 30th, and Student Union Representative Mark O'Halloran on April 2nd.

The statistics were not readily available for a purely accurate gauge of K-3 due to a lack of record-keeping regarding students involved in the available non-mandatory programs available to new students.

Results

According to Dr. Richard Kurial, the Dean of Arts, and Dr. Tony Couture, the Chair of Philosophy, there is no official program available for the orientation of either new staff or new faculty. K-1 stands at 0% and K-2 also stands at 0%. Of the approximately 4000 full- and part-time students, approximately 310 students partook in the previous New Student Orientation (NSO). This works out to approximately 28% of first-year students [Editor's note: 310 students = 7.75%, 28% = 1120 students]. NSO does involve orientation to social issues during seminars available to NSO participants,

Conclusion

The lack of programs for new faculty and staff regarding local social/environmental issues needs to be modified immediately as 0% is well below even short-term benchmark standards of 50%. These are important programs which help to make new faculty and staff both conscientious regarding local issues, as well as good examples to the students of UPEI.

The Student Union, although well below benchmark levels, has performed significantly better than faculty in orientation issues in its NSO programs.

4.1.2 Ongoing

Introduction

       The ongoing training of faculty and staff is of the utmost importance when trying to create a sustainable campus. Issues in sustainability are in constant flux as science and research determine what may be detrimental to our environment, economy, or society, and also find new ways of repairing or improving and fortifying these pillars of sustainability. An informed campus community is capable of recognizing areas where changes must be made and enabled to make those changes themselves, to the benefit of the whole campus.

Methods

       In determining the levels of Faculty Sustainability Training (K-4) and Staff Sustainability Training (K-5), interviews were conducted with the Human Resources Department on March 24th, Dr. Richard Kurial, the Dean of Arts, on March 30th, and Dr. Tony Couture, the Chair of Philosophy, on March 30th. Regarding On-campus Student Sustainability Jobs (K-6), the Human Resources Department and Mark O'Halloran were interviewed on March 24th and April 2nd, respectively.

Results

       According to Dr. Richard Kurial, the Dean of Arts, and Dr. Tony Couture, the Chair of Philosophy, and the Human Resources Department, ongoing faculty or staff sustainability training does not take place. K-4 stands at 0% and K-5 also stands at 0%.

       On-campus sustainability positions focused on sustainability also do not exist, and the indicator K-6 stands at 0%.

Conclusion

       The lack of on campus positions focused on environmental issues may be due to a lack of local knowledge regarding what needs to take place in order to

make sustainability a part of continued knowledge and training. As well, a lack of ongoing staff and faculty training regarding environmental/social issues is not surprising as new faculty and staff orientation does not exist either.

Orientation of new staff and faculty regarding sustainability issues is clearly deficient, and New Student Orientation to local environmental/social issues requires additional work as well before reaching the benchmark of 50%. We strongly urge that a program be put into place offering a one-hour orientation to new staff and faculty regarding local social and environmental issues.

Ongoing orientation of staff and faculty regarding these issues is clearly not up to benchmark levels, and student positions focused on local environmental/social issues requires substantial gains before reaching the 10% short-term benchmark. We strongly urge that a program be put into place offering additional sustainability training and discussion regarding local social and environmental issues.

4.2 Research
4.2.1 Collaboration
<u>Introduction</u>

The collection and creation of knowledge is one of the most important tasks of a university. Research conducted on campuses are often some of the most creative and progressive projects. A sustainable campus will inevitable run into challenges when trying to reach its goal of sustainability. It is important that research tracked on campus reflects, to a great extent, the mission of the University to be sustainable, and that some research be directed at improving the campus community.

One way to ensure that all campus stakeholders are represented when trying to solve multi-faceted and complicated problems is through research collaboration. Collaboration also helps generate knowledge that can be applied to the broader community of government, industry, community, and institutions.

<u>Methods and Results</u>

To find the information asked by the knowledge indicators K-7 Research Collaboration: On-campus, K-8 Research Collaboration: Non-Profit, and K-9 Research Collaboration: Full Profit, we decided to contact the Office of Research and Development (ORD) on April 4th, 2005. We managed to arrange a meeting with Cheryl Wartman who is one of the two research grant coordinators at the ORD. Unfortunately, all information which had to do with collaboration and funding was private and therefore inaccessible due to contracts with sponsors. It was possible to access information about some of the non-profit research projects, but this does not tell us about the whole picture which is what is needed to assess these indicators. As a recommendation, it would be very helpful to make this information more accessible. However, we are not suggesting that UPEI should violate its contracts with those research sponsors. Instead, if the general overall sum of the for-profit and non-profit were accessible this would suffice.

4.2.2 Funding

<u>Introduction</u>

The amount of research in sustainability indicates the support that an institution gives its faculty in supporting the area of sustainability. On-campus research is also a valuable tool for a changing campus as it can offer solutions for specific problems being encountered by the University and to problems that many campuses and organizations may be dealing with.

[Editor's note: the students' report gives this introduction for section 4.2.3 Practice. I have moved it to section 4.2.2 Funding, as the students' report did not include an introduction for this section; furthermore, the students' section 4.2.3 seems to have nothing but an introduction.]

<u>Methods</u>

For indicator K-10 Sustainability Research Expenditures, we were able to access adequate information. This information was found on the ORD website

which indicated which areas of research grants were being spent on (accessed on March 12). There were two areas of research that had content specifically relating to sustainability. These were Aquatic Sciences and Environmental Studies; both indicated a strong level of sustainability content in their descriptions. Since the only information available was given in five-year terms, we estimated the average annual amount by dividing this sum by 5. This data was divided by the rough estimate of 'total research dollars spent,' which was found in the President's Annual Report.

Unfortunately, it was not possible to find any information for indicator K-11 For-profit Research Contribution in February - March 2005 for reasons described in the comments on 4.2.1 above.

Results

The total finding for the last five years for the Aquatic Sciences was $7.59 million, which was added to the total funding for Environmental Studies which was $800,000, making a grand total of $8.39 million. This was then divided by 5 to find the average for the last year, giving a result of $1 678 000. The total average dollars spent on sustainability in the last five years was then divided by the rough estimate of the total annual research dollars ($9 million) to equal 18.74% (see Appendix 4.1).

Conclusion

While it is unfortunate that indicator K-11 could not be assessed, it is impressive to see the statistics for indicator K-10. There are no benchmark or long-term goals given within the CSAF Toolkit, but 18.74% is certainly a good start to a growing area of focus in research at UPEI. However, if one were to look just at the Environmental Studies funding, it would not seem at all adequate. The Aquatic Sciences research, while dealing with and attempting to solve issues of sustainability, does not claim to conduct research for the purposes of sustainability. Instead, the fishing industry is the main focus of this research. Regardless of the

intentions of this research, as long as sustainability is still an issue it is a move in the right direction with concern to sustainable development. A recommendation here would be for the research goals to significantly include sustainability, rather than just industry and economy.

4.2.3 Practice

[Editor's note: the students seem to have failed to address indicator K-12 Faculty Sustainability Research, the only indicator in section 4.2.3 Practice.]

4.3 Curriculum

4.3.1 Internalization of Learning

Indicators for this section were not researched during February - March 2005. Indicator K-13 Sustainability Pledge: it was determined through contact with the Student Union and Registrar's Office that no such pledge is offered to students taking part in convocation. Indicator K-14 Sustainability Literacy Survey: due to time constraints, no survey was conducted.

4.3.2 Education for Sustainability

Introduction

The three pillars that support sustainability are a healthy environment, a healthy economy, and a healthy society. The presentation and acquisition of knowledge affects all three pillars of sustainability. A sustainable university's goal is to cultivate community members and leaders with the knowledge, resources, and experience to improve these three important elements.

The availability, quality, and development of sustainability courses offered to students in all disciplines will determine the quality of the students' knowledge of sustainable practices upon graduation. First, if more courses dealing with sustainability are offered, it makes it easier to integrate the content into the curriculum. Secondly, the university strives for the highest standards when creating courses, and checks their progress through external reviews, and it is

important that sustainability courses maintain these high standards. And finally, an efficient, effective, and integrated course development strategy positively affects both availability and quality of sustainability courses.

4.3.2.1 Availability

Methods

In order to determine the number of courses with applied learning element, (indicator K-15), course descriptions from the UPEI 2004-2005 Calendar were cross-referenced with the course offerings for Winter 2004 and Spring 2005 semesters. Courses with applied learning content were deemed to be those with applied learning based on campus or in the community. That is: classes with labs, presentations open to the public, extensive research, field trips, work terms, co-op work, or class work with application to specific jobs.

For determining courses containing sustainability content (indicator K-16), courses were considered if the description indicated concentration on environmental, social, or environmental well-being, holistic or whole system approaches, inclusive initiatives, or environmental responsibility.

It was impossible to conduct surveys of all academic departments or obtain copies of all syllabi in the time available from February – March 2005, so all information was gathered from the University's 2004–2005 Calendar course descriptions.

The information for indicator K-17 Students Taking Sustainability Courses was not available by the deadline and so is not included here.

Results

Out of a total of nine-hundred twenty-two (922) courses listed in the course offerings for 2004-2005 semesters, one-hundred eighty-seven (187) courses offered some applied learning content – 20.2% of classes offered. This relatively high number can largely be attributed to the Biology, Chemistry, and Physics departments, although several other programs have substantial applied learning

content such as Music, Education, and Radiography, and there are numerous co-op and internship programs available to students.

Out of a total of 922 classes offered in 2004-2005, only twenty-six (26) contained sustainability content – 2.8%. Programs with substantial numbers of classes with sustainability content are Education, Environmental Studies, and Nursing. Several departments have one or some classes with sustainability content.

See Appendix 4.2 for classes with applied learning content. For classes with sustainability content offered in Fall 2004 – Spring 2005, see Appendix 4.3.

4.3.2.2 Quality

Due to time restraints, indicators K-18 Faculty Teaching Sustainability Courses and K-19 Quality of Sustainability Courses could not be fully investigated in February - March 2005. However, for indicator K-18, a list of faculty teaching sustainability courses is supplied in Appendix 4.4. Also, for indicator K-19, a copy of UPEI's external review policy for academic development is included. [Editor's note: this was not supplied with the original student report, and is not included in this document.]

4.3.2.3 Development

Methods

For indicator K-20 Collaborative Course Development, a thorough reading of the UPEI Calendar, a call to Edith Carry, Administrative Support in Academic Development, and contact with Dr. Richard Kurial, Dean of Arts, revealed several programs available to students where curricula were developed with input from several professors from several departments.

Information for indicator K-21 For-profit Course Development was not attained.

Results

Out of 922 classes offered in 2004-2005, only forty-nine (49) courses were from curriculum developed by more than one professor from more than one department. The classes were drawn from the following programs:

    Asian Studies – Minor program

    Canadian Studies – Major/Minor program

    Environmental Studies – Minor program

    Island Studies – Minor program/Postgraduate Studies

    Theatre Studies – Minor program

    Women's Studies – Minor program

See Appendix 4.5 for classes developed with collaboration offered in Fall 2004 – Spring 2005 semesters.

Conclusion

All aspects of UPEI's commitment to education must be improved if it is to become a sustainable campus. First, more courses must be offered that introduce and explore the ways that each discipline can become more sustainable in the local and global communities. Since education affects and can also explore all three pillars of sustainability – environment, economy, and society – it is possible to retain a rich and varied offering of courses while empowering students to maintain and improve the quality of these pillars where they can in their own lives. We recommend that every UPEI department look at developing courses in their curriculum that explores sustainability and that these courses be applied in the community and on campus. A valid short-term goal is to have 25% of classes offered at UPEI containing sustainability content, with the long-term benchmark being 75% of classes. Initially, however, every department not listed in Appendix 4.5 should consider developing at least one course that focuses on sustainability content.

Although the matter could not be fully explored, it was indicated by the Academic Development Office that external reviews of courses are not available to

students. Future researchers may wish to pursue the question further. If the reviews are found not to be available, we recommend that they be made public and easily accessible to all members of the campus community.

Although several programs were developed between more than one department, the number of these courses offered was minimal, and only Environmental Studies and Women's Studies programs offer classes that show up on the list of classes with sustainability content. It is important that the information presented in classes at UPEI take multiple stakeholders into account, and collaborative development is a good way to ensure this. Although this means a loss of some autonomy to professors when developing classes, it establishes a community of learning that is thoughtful and mindful of its impact on people and the environment. We recommend that Academic Development encourage professors to collaborate with programs designed to discover and explore the similar interests that different departments might have, and allow them to work together to achieve goals in sustainability and educate the campus community on how to do the same. At 5.3%, collaborative development is far from the 50% short-term goal and 100% benchmark.

Appendix 4.1: UPEI sustainability research expenditures (K-10)

7.59 million (Aquatic Sciences)

+ .8 million (Environmental Studies)

= 8.39 million (Aquatic Sciences + Environmental Studies)

/ 5 = $1 678 000

/ 9 million total research dollars = 18.74%

Appendix 4.2: Courses with applied learning (K-15)

Semester 1 (September - December 2004)

Business

    Business Co-Op 293 Business Co-Op Education

    Business Co-op 393 Business Co-Op Education

    Business Co-Op 493 Business Co-Op Education

    Business Co-Op 593 Business Co-Op Education

    Business 495 Business Research I

    Business 510 Honours Thesis

Biology

    Biology 111 Introduction to Organism

    Biology 121 Human Anatomy

    Biology 204 Animal Diversity

    Biology 206 Microbial Diversity

    Biology 314 Plant Community Ecology

    Biology 326 General Physiology

    Biology 351 Ornithology

    Biology 371 Mammalogy

    Biology 411 Wildlife Biology

    Biology 440A Senior Research - Seafood Waste

    Biology 440B Senior Research - Bird Migration

    Biology 452 Biogeography and Macroecology

    Biology 490 Advanced Research and Thesis

    Biology 800 Thesis

Computer Science

    Computer Science 151 Introduction to Computer Science

    Computer Science 241 Digital Systems

    Computer Science Co-Op 100 Work Term 1

    Computer Science Co-Op 200 Work Term 2

Computer Science Co-Op 300 Work Term 3

Computer Science Co-Op 400 Work Term 4

Computer Science Co-Op 500 Work Term 5

Chemistry

Chemistry 111 General Chemistry

Chemistry 202 Environmental Chemistry

Chemistry 221 Analytical Chemistry

Chemistry 241 Organic Chemistry

Chemistry 243 Organic Chemistry for Life Sciences

Chemistry 331 Physical Chemistry

Chemistry 351 Biochemistry

Chemistry 361 Spectroscopic Methods in Structural Analysis

Chemistry 374 Inorganic Chemistry

Chemistry 482 Advanced Chemistry Lab

Integrated Dietetic

Integrated Dietetic Internship Program 100 Work Term 1

Integrated Dietetic Internship Program 200 Work Term 2

Integrated Dietetic Internship Program 300 Work Term 3

Education

Education 404 Environmental Studies

Education 495 Introduction to Teaching and School Experience

Education 612 Masters of Education, Quantitative Research Design

Education 699 Masters of Education Thesis

English

English 275 Arthurian Legend

English 490 Honours Research and Thesis

English 393 Creative Writing III

Engineering

Engineering 111 Surveying

Engineering 121 Design and Graphics

Engineering 221 Statics I

Engineering 311 Strengths of Metal

Engineering 321 Dynamics

Environmental Studies

Environmental Studies 201 Introduction to Environmental Studies

Environmental Studies 301 Integrating Environmental Theory and Practice

Family Sciences

Family Sciences 111 Introduction to Foods

Family Sciences 261 Communication

Foods and Nutrition

Foods and Nutrition 351 Nutritional Assessment

History

History 498 Honours Graduate Essay

Information Technology

Information Technology 111 Introduction to Microcomputers

Information Technology 121 Introduction to Computer Programming

Mathematics

Math 480 Honours Project

Music

Music 105 Studio Minor

Music 131 Major Instrument or Voice

Music 143 Choral Techniques

Music 231 Major Instrument or Voice

Music 331 Major Instrument or Voice

Music 335 Chamber Music I

Music 347 String Techniques

Music 413 Orchestration

Music 431 Major Instrument or Voice

Music 435 Chamber Music II

Music 445 Brass Techniques

Music 491 Directed Studies, Applied Music

Nursing

Nursing 101 Nature of Nursing

Nursing 203 Nursing Young Families

Nursing 323 Partnerships with Clients and Families

Nursing 401 Nursing and Population Growth

Philosophy

Philosophy 203 Environmental Philosophy

Physics

Physics 111 General Physics I

Physics 211 Electricity and Magnetism

Physics 444 Experimental Physics

Physics 490 Advanced Research Methods and Thesis

Psychology

Psychology 271 Statistics for Behavioural Science I

Psychology 490 Honours Thesis

QEH – Radiography [Editor's note: QEH = Queen Elizabeth Hospital, Charlottetown]

Radiography 211 Radiographic Technique

Radiography 221 Patient Care I

Radiography 231 Physics in Radiography

Radiography 241 Image Recording I

Radiography 321 Radiographic Technique III

Radiography 331 Pathology I

Radiography 353 Specialized Imaging

Radiography 383 Apparatus II

Radiography 391 Clinical Radiography I

Sociology/Anthropology

Sociology/Anthropology 490 Honours Research

Spanish

Spanish 101 Introduction to Spanish

Theatre Studies

Theatre Studies 231 Introduction to Theatre

Veterinary Health Management

Veterinary Health Management 801 Veterinary Biostatistics

Veterinary Health Management 811 Clinical Epidemiology

Veterinary Pathology/Microbiology

Veterinary Pathology/Microbiology 101 Intro to Microbiology for Nurses

Veterinary Pathology/Microbiology 811 Diseases of Cultured Fish

Semester 2 (January - April 2005)

Biology

Biology 101 Environmental Biology

Biology 102 Human Biology

Biology 112 Introduction to Cell and Molecular Biology

Biology 122 Human Physiology

Biology 202 Plant Diversity

Biology 206 Microbial Diversity

Biology 324 Comparative Vertebrate Anatomy

Biology 331 Communications in Biology

Biology 341 Biology of Insects

Biology 412 Wildlife Biology

Biology 441 Pathobiology

Biology 444 Investigative Plant Anatomy

Biology 490 Advanced Research and Thesis

Biology 800 Thesis

Business

Business 510 Honours Thesis

Canadian Studies

Canadian Studies 410 Research and Tutorial Seminar

Computer Science

Computer Science Co-Op 100 Work Term 1

Computer Science Co-Op 200 Work Term 2

Computer Science Co-Op 300 Work Term 3

Computer Science Co-Op 400 Work Term 4

Computer Science Co-Op 500 Work Term 5

Chemistry

Chemistry 112 General Chemistry

Chemistry 231 Physical Chemistry

Chemistry 242 Organic Chemistry

Chemistry 247 Inorganic Chemistry

Chemistry 322 Analytical Instrumentation

Chemistry 342 Advanced Organic Chemistry

Chemistry 352 Biochemistry II

Chemistry 490 Honours Research and Thesis

Chemistry 800 Thesis

Dietetics Internship

Dietetics Internship 100 Work Term 1

Dietetics Internship 200 Work Term 2

Dietetics Internship 300 Work Term 3

Education

Education 473 Communications

Education 498 Alternatives in Teaching and School Experience

Education 699 Thesis

English

English 392 Creative Writing

English 495 English Honours Essay

Engineering

Engineering 122 Engineering Design and Graphics II

Engineering 222 Statistics II

Engineering 241 Introduction to Professional Practice and Ethics

Engineering 312 Material Science

Engineering 332 Thermodynamics

Engineering 352 Fluid Mechanics

Environmental Studies

Environmental Studies 202 Introduction to Sustainability

Foods and Nutrition

Foods and Nutrition 302 Advanced Food

Foods and Nutrition 422 Quantity Food Production

Foods and Nutrition 490 Honours Research

History

History 484 Applied Public History

Information Technology

Information Technology 111 Introduction to Microcomputers

Information Technology 121 Introduction to Computer Programming

Music

Music 132 Major Instrument or Voice

Music 144 Choral Techniques

Music 232 Major Instrument or Voice

Music 331 Major Instrument or Voice

Music 332 Major Instrument or Voice

Music 335 Chamber Music I

Music 336 Recital Performance I

Music 348 String Techniques

Music 413 Orchestration

Music 432 Major Instrument or Voice

Music 435 Chamber Music II

Music 436 Recital Performance II

Music 446 Brass Techniques

Music 462 Teaching Internship I

Music 464 Teaching Internship II

Music 491 Orchestral Excerpts

Music 492A Applied Music

Music 492B Directed Studies

Nursing

Nursing 102 Nursing in Healthcare

Nursing 223 Nursing Individuals and Families - Wellness & Illness

Nursing 305 Health Teaching

Nursing 313 Developing Partnerships with Clients

Nursing 402 Advanced Nursing Focus

Physics

Physics Co-Op 200 Work Term

Physics Co-Op 300 Work Term

Philosophy

Philosophy 370 Community Based Ethics

Physics

Physics 112 General Physics II

Physics 122 Physics for Life Sciences

Physics 272 Electronics and Instrumentation

Psychology

Psychology 312 Brain and Behaviour

Psychology 333 Ecopsychology

Psychology 432 Research in Psychology

Radiography

Radiography 212 Radiographic Techniques II

Radiography 242 Image Recording II

Radiography 272 Image Quality

Radiography 282 Apparatus 1

Radiography 332 Pathology II

Radiography 341 Radiographic Technique II

Radiography 362 Quality Control

Radiography 392 Clinical Radiography II

Spanish

Spanish 101 Introduction to Spanish

Spanish 102 Introduction to Spanish

Theatre Studies

Theatre Studies 235 Introduction to Theatre Studies II

Appendix 4.3: Courses with sustainability content (K-16)

Semester 1 (September – December 2004)

Business

    Business 483 The Natural Step for Business

Education

    Education 415 The Inclusive Classroom

    Education 417 The Adolescent Learner

Environmental Studies

    Environmental Studies 301 Integrating Environmental Theory and Practice

Nursing

    Nursing 203 Health Assessment

    Nursing 401 Nursing and Population Health

Radiography

    Radiography 221 Patient Care I

Sociology

    Sociology 412 Sociology of Health

Semester 2 (January – April 2005)

Biology

    Biology 101 Environmental Biology

Education

    Education 402 Meeting the Needs of the Young Learner

    Education 415 The Inclusive Classroom

    Education 415 The Adolescent Learner

    Education 451 Integrating Aboriginal Themes into the Curriculum

    Education 581 Inclusive Classroom

Environmental Studies

    Environmental Studies 202 Introduction to Sustainability

    Environmental Studies 311 Understanding Climate Change

Foods and Nutrition

Foods and Nutrition 332 Community Nutrition

History

History 483 History of the Environmental Movement

Nursing

Nursing 223 Nursing Individuals & Families

Nursing 305 Health Teaching

Nursing 402 Advanced Nursing Focus

Philosophy

Philosophy 370 Community Based Ethics

Physics

Physics 261 Energy, the Environment, and Economy

Psychology

Psychology 333 Ecopsychology

Psychology 442 Holistic Psychology II

Women's Studies

Women's Studies 302 Women and the Politics of Difference

<u>Appendix 4.4:</u> Faculty teaching sustainability courses (K-18)

Almut Beringer – Environmental Studies

Diane Bernier-Oulette – Education

Gordon Bird – Physics

Ann Braithwaite – Women's Studies

Barbara Campbell – Nursing

Pamela Courtenay-Hall – Philosophy

Ian Dowbiggin – History

Basil Favaro – Education

Mae Gallant – Nursing

Daryl Guignion – Biology

Donald Mazer – Psychology

Mary-Jean McCarthy – Nursing

Clara Morrison – Radiography

Fiona O'Donoghue – Education

Robert Patterson – Business

Terrance Percival – Psychology

Judy Richards – Sociology

Jennifer Taylor – Foods and Nutrition

Mary Walsh – Environmental Studies

Appendix 4.5: Collaborative course development (K-20)

Semester 1 (September – December 2004)

Asian Studies

    Asian Studies 101 Intro to Japanese

    Asian Studies 201 Intro to West Asia

Canadian Studies

    Canadian Studies 201 The Atlantic Region

    Canadian Studies 301 The Canadian Experience

    Canadian Studies 401 Canada and the World

    Canadian Studies 410 Research Tutorial and Seminar

Environmental Studies

    Environmental Studies 201 Introduction to Environmental Studies

    Environmental Studies 301 Integrating Environmental Theory and Practice

Island Studies

    Island Studies 601 Advanced Topics I: Themes and Perspectives

    Island Studies 612 International Relations of Small Island States

    Island Studies 616 Directed Studies: Island and Environmental Studies

    Island Studies 699 Thesis

Theatre Studies

    Theatre Studies 231 Introduction to Theatre I

Women's Studies

    Women's Studies 103 Myths of Love, Sex and Marriage

    Women's Studies 211A Special Topics: Women's Life Writing

    Women's Studies 211B Special Topics: Gender, Health and Medicine

    Women's Studies 211C Special Topics: Sexuality and Representation

    Women's Studies 261 Sex, Gender and Society

    Women's Studies 333 Lucy Maud Montgomery

    Women's Studies 381 Women, Economics and the Economy

    Women's Studies 385 Women in 19th Century Canada

Women's Studies 391 Psychology of Women

Women's Studies 435 Gender and Sexuality

Women's Studies 491B Directed Studies - History of Nursing

Semester 2 (January – April 2005)

Asian Studies

Asian Studies 101 Introduction to Japanese I

Asian Studies 102 Introduction to Japanese II

Asian Studies 202 Introduction to East Asia

Canadian Studies

Canadian Studies 202 The Atlantic Region

Canadian Studies 302 The Canadian Experience

Canadian Studies 402 Canada and the World

Canadian Studies 410 Research Tutorial and Seminar

Environmental Studies

Environmental Studies 202 Introduction to Sustainability

Environmental Studies 311 Understanding Climate Change

Island Studies

Island Studies 201 Introduction to Island Studies

Island Studies 602 Advanced Topics II: Comparative Public Policy

Island Studies 603 Graduate Seminar

Island Studies 604 Research Methods and Designs in Island Studies

Island Studies 611 Strategies for Economic Development for Small Islands

Island Studies 699 Thesis

Theatre Studies

Theatre Studies 232 Introduction to Theatre II

Women's Studies

Women's Studies 101 Introduction to Women's Studies

Women's Studies 302 Women and the Politics of Difference

Women's Studies 352 Kinship and Family

Women's Studies 386 Women in 20th Century Canada

Women's Studies 392 Men's Experience

Women's Studies 403 Feminist Theories

Women's Studies 453 Gender and European History

Women's Studies 461 Contending Approaches in Comparative Politics

Women's Studies 491B Directed Studies: Media, Sex and Power

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5.   Governance

Shaun Coady, Colin MacBeath, Mitchell Whitlock

Abstract

The Governance section under the 'people system' section of the Campus Sustainability Assessment Framework (CSAF) comprises 21 indicators which assess how the university government and student government make decisions on policy, implementation, and monitoring toward sustainability (Davis, Lamarca, Guerin and Larson, 2003). Only 14 of these indicators were researched successfully. Results indicate a lack of government consciousness in the area of sustainability and sustainable development. Both student government and University government policies do not reflect the growing awareness towards sustainable movements on campus. Recommendations are made towards government planning, budget allocations, and staffing for the ultimate achievement of a sustainable campus at the University of Prince Edward Island (UPEI).

5.1 Policy

5.1.1 University Government

Introduction

Policy is a reflection of university government awareness and planning in various aspects of the university agenda. A branch of this planning should be directed towards sustainable development and university management. This section measures the UPEI government policy structure and its relevance to sustainable campus development.

Methods

To gather the University government policy (G-1), we contacted the President's Office of UPEI on 15 March. Our contact, Leo Cheverie, handed over the University Mission Statement and Goals and the University Government

Structure. [Editor's note: the students did not include these as appendices in their report.] These records provided an outline of University government policy; however, more information was needed. Additional information was gathered from the document that Mr. Cheverie recommended, the UPEI President's Annual Report for 2003-2004. This report also contained the University Mission Statement and Goals and the University Government Structure (L. Cheverie, personal communication, March 15, 2005).

Results

    According to the UPEI President's Annual Report for 2003-2004, there is little government policy toward sustainability, with the exception of programs directed toward health and safety and strategic planning. There is little mention of water management, transportation, or sustainability in education (L. Brinklow, 2004).

Discussion

    The findings regarding university government policy show little or no commitment by the University governing body in the area of campus sustainability. Their mission statement does not reflect strategies for academic and administrative planning (L. Brinklow, 2004). Essentially, the University government should be more focussed on sustainable development at the policy and planning level. This focus should be communicated through their mission and goal statement and their publication of annual reports.

Conclusion

    This section has provided insights towards the breadth of the university government policy at UPEI. Their planning seems to be inadequate for ensuring the growth of UPEI and the opportunities of future generations.

5.1.2 Student Government

Introduction

Student government policy is an indication of the awareness of the student population in the area of sustainable practices. As the student government is a representation of its respective constituencies across campus, it showcases the diverse needs of UPEI's student population. This section represents the student government planning on behalf of the campus population.

Methods

Information regarding G-2 Student Government was retrieved from the Chair of Council, Ryan McDermott, on 7 March. Contained in this documentation was a collection of UPEI Student Union government policies. Included in this documentation was referencing to specific student government groups, and their respective agendas in the field of sustainable planning.

Results

With the exception of the Student Union Health and Benefit Plan, there is no reference in the forwarded documentation of efforts toward the achievement of a sustainable campus and government structure (R. McDermott, personal communication, March 7, 2005).

Discussion

This lack of findings is a clear indication that commitment to the future of sustainable government practices is being ignored. This ignorance may be caused by the lack of knowledge and education in the realm of sustainability and environmental awareness.

Conclusion

This revelation to the lack of student government responsiveness to sustainability proves that sustainable development is not at the forefront of the

student government hierarchy. An increase in commitment to sustainable practices is required. This is achieved through the formulation of policy that reflects sustainable planning.

5.2 Implementation

5.2.1 University Government

5.2.1.1 Committees

Introduction

University government working groups are a direct reflection of the university government commitment to implementing its policies. After all, the university policies are only as strong as their implementation and enforcement (Davis et al., 2003). This section measures the amount of active working groups dedicated toward sustainable policies (G-3), their diversity (G-4), and their reporting methods (G-5).

Methods

Through e-mail correspondence with the Director of Environmental Studies and Sustainability, Dr. Almut Beringer, 10 March, we received a list of members belonging to the Energy Awareness Program Committee. This is the only known working group directed toward sustainable causes at UPEI. This contact also communicated the diversity of the committee members and their reporting methods. [Editor's note: included in that communication was also a reference to the Energy Awareness Program Activities Sub-Committee, including a list of members.]

Results

The Energy Awareness Program Committee, the only known working group directed toward sustainable causes at UPEI, consists of 11 members, including one member of the student body and one off-campus liaison. All members of the Committee dedicate only a small portion of their work week to this group. Only the

Chair of the Energy Awareness Program Committee, Anna Sawicki, reports directly to the President of UPEI (A. Beringer, personal communication, March 10, 2005). We were unable to access any information on further working groups at UPEI.

Discussion

An inability to access further information on these standing committees reflects poorly on the University government's organization of sustainable working groups. However, the structure of the Energy Awareness Program Committee shows the multi-disciplinary concern for sustainability issues on campus. Also, its direct line to the President is an indication of effective communication between working groups and the governing body.

Conclusion

As indicated earlier, there is inadequate referencing of both the results and recommendations of the working groups in the University government policy. However, the means of communication between the active working group and the governing body shows that concern for sustainability lies within a select few members of the university government.

5.2.1.2 Staff and Funding

Introduction

This section identifies the university staffing dedicated towards sustainable causes (G-6). Staff who act as members of various working groups are responsible for implementing the policies set by the University government. Some staff at UPEI are dedicated to sustainable development more so than others (P. Hooper, personal communication, March 15, 2005). This section also identifies the financing of salaries of staff dedicated to these causes (G-7), and their reporting methods (G-8).

Methods

Phil Hooper, UPEI Comptroller, was contacted and forwarded information regarding the University operating budget. Included in this information was a total dollar amount for all employees of the University. Almut Beringer, Environmental Studies and Sustainability, also forwarded information regarding a list of acting members on the Energy Awareness Program Committee.

Results

Results regarding staffing dedicated towards sustainability were inconclusive because the received information included only a total dollar amount for all employees. Exact dollar amounts and time dedications toward sustainability issues were impossible to determine (P. Hooper, personal communication, March 15, 2005).

Discussion

The fact that there was only one known working group devoted to sustainable issues on campus was disappointing.

Conclusion

More information should be made available in the area of staffing toward sustainability, including professors and administrators, as well as non-faculty members.

5.2.2 Student Government

5.2.2.1 Committees

Introduction

Student government committees for sustainability issues consist of students working towards implementing student government policies in sustainability. This is important because the students act as the administrators of student government policy.

Methods

In conversation with Heather Love, General Manager of Student Operations, 17 March, the number of active student working groups in relation to sustainable development (G-9) was discussed.

Results

In direct correlation with the student government policy, the only working group on sustainability issues is the Health Planning Committee. This committee only entails the work of two student members. These are non-paying positions. This committee reports directly to the General Manager of Student Operations, who in turn reports to the UPEI Student Government (H. Love, personal communication, March 17, 2005).

Discussion

In direct correlation with the student government policy, it is felt that this level of student involvement in sustainability is inadequate. It is believed that this issue is the direct result of a lack of planning, rather than an implementation problem.

Conclusion

An increase in sustainability issues in student government policy would be reflected in student working groups. This begins at the planning stage, as this must occur before implementation.

[Editor's note: it is unclear whether the students included indicators G-10 Diversity of Student Government Working Groups and G-11 Reporting of Student Government Working Groups in their research. They seem to be missing.]

5.2.2.2 Staff and Funding

Britt Burns, Vice-President of Finance, Student Union Inc., conveyed on March 17 that there is no staff or funding allocated to sustainability issues in the student government. The mentioned student working group is on a volunteer basis (B. Burns, personal communication, March 17, 2005).

5.3 Monitoring

Due to time constraints, these indicators were not further researched.

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6.   Economy & Wealth

Wesley Johnston, Neil Mader, Ben Moore, Devin Stevenson

Abstract

This report will examine the economics of the University of Prince Edward Island and determine how it relates to campus sustainability within the framework of the Sierra Youth Coalition's *Campus Sustainability Assessment Framework Toolkit*. We will examine the individual economic situation and how it pertains to accessibility, which focuses on costs and financial support for students at the University, and diversity, which focuses on minorities and pay equity. We will also examine the economics of the institution in regard to revenue, expenditures, and investments. Each of these five sections, accessibility, diversity, revenues, expenditures, and investments will include an introduction providing background information on the subject, a methods section determining how the information was collected, a result section stating our findings, and a discussion portion where we make brief conclusions and recommendations. The report will also include a final conclusion where we state some highlights and make some general recommendations. The paper ends with references and a large appendix section.

6.1 Individual

6.1.1 Accessibility

6.1.1.1 Costs and 6.1.1.2 Financial Support

Introduction

By the end of the 2004-05 academic calendar, according to the Comptroller's Office, UPEI will have provided its FTE students with $2,063,727 in financial support. At the present time, the Comptroller's Office has also indicated that the total amount stated above is unevenly divided into 1,640 parts (Heather Keoughan, personal communication, March 31, 2005). These parts come in the form of bursaries, awards, scholarships, or some other form of financial support.

Some forms of support are only available to students if specific conditions or requirements are met (e.g., business majors, students with disabilities, etc.). Therefore, not all students meet eligibility for awards and this could result in some students being at an advantage or disadvantage for receiving support.

The federal and provincial governments, on the other hand, provide students with $10,807,330 worth of loans, each of which averages just under $8,000 annually. Obviously, these loans must eventually be repaid. So at the outset, Island post-secondary students rely on loans provided by the government to cover about 80% of their tuition costs, not including the interest.

It is an unfortunate, although unavoidable, aspect of the Canadian education system that requires students to often pay upwards of $30,000 or more in order to obtain a university degree. Students here often rely heavily on financial support in order to be able to cover their tuition costs. Having the university cover most, if not all, costs would therefore alleviate much of the stress and economic burdens that students face. This, in turn, allows for pristine educational development on the individual level which would promote and possibly stabilize sustainable development in the future. Sustainable practice begins with education. Eliminating student fees would open the door to more individuals willing to obtain a good education, but are otherwise unable to. Creating better educated individuals will inevitably lead to a better educated society, which can only benefit sustainable development.

To further emphasize the previous statement, it is worth noting that student financial support within our University is also important on a long-term economic scale. As graduates, we are expected to 'get a real job' and contribute to society. However, based on the current system, a majority of these graduates enter this transitional phase with massive debts, which often leaves little or no choice as to how their money is spent, as most of it goes back into the banks or loan collectors. Since most pro-sustainability lifestyles or products tend to be more expensive than their convenient, cheap, and environmentally harmful counterparts, even those

who are educated and wish to live a sustainable life are often unable due to financial restraints that stem from tuition costs and high debt loads.

What we need to determine first, is whether UPEI is providing its FTE students with enough financial support. Doing so will not only give UPEI students the best educational opportunities, but it will also provide the most feasible probability for long-term sustainable development. Also, we must examine the magnitude and effect of student loans and the debts they leave on individuals. If tuition fees and loan amounts are much higher than financial support provided by the University, we may be facing a problem. To summarize, by providing financial support to students and eliminating student debt, we are essentially creating the best conditions to cultivate future sustainable practice, in our society, and on our campus.

Methods

In order to gather information regarding indicators students with loans (EW-1), student debt load (EW-2), and student fees (EW-3), we contacted Student Financial Services and spoke to Mary Simpson on March 22, 2005. [Editor's note: Financial Services Counsellor in Student Services?] She was able to provide information about the number of student loans obtained on campus. She was, however, able to determine the amount students owed in student lines of credit from local banking institutions. [Editor's note: 'unable'?] The other information regarding student loans and national percentages was obtained from http://www.statcan.ca/Daily/English/030812/d030812a.htm on March 19.

To determine the figures for indicators EW-4 Number of Financial Awards, EW-5 Value of Financial Awards, and EW-6 Allocation of Financial Awards, calls were first made on March 21, 2005 to the UPEI Registrar's and Accounting Offices. Eventually, we were directed to Heather Keoughan from the Registrar's Office, who was on leave at the time and unavailable for contact. The following week, on March 29, an e-mail was written to Mrs. Keoughan to which she replied the next day. In her e-mail, Mrs. Keoughan explained that with about 98% accuracy, she

could state how many financial awards were given to FTE students in the 2004-05 academic year (EW-4) and what the total dollar amount was for these awards (EW-5). The following day, after a reply had been made to her original e-mail, Mrs. Keoughan indeed provided the specific information that was requested for indicators EW-4 and EW-5, stating that she had received the data from the Comptroller's Office. She was unable, however, to obtain the data needed to answer EW-6.

Results

For EW-1, the total number of UPEI FTE students with loans, as of April, 2004, is 1,364. The total number of FTE students during this time was 2,996. Divide these figures and multiply by 100 to get 45.5%, the percentage of FTE students at UPEI that have loans. According to Statistics Canada, the national average in the year 2000 was 45%, only a 0.5% difference from the UPEI average. Therefore, it is safe to say that UPEI is about even with the national average.

EW-2 compares the average debt of UPEI students and the national average student debt. Students at UPEI can receive loans from up to three different sources. First, the federal government provides Island students with $6,049,420 annually. Second, the provincial government contributes $2,378,955 annually. Finally, $87,225 is set aside for students with dependants. This totals $10,807,330. Divide this total by the number of FTE students with loans (1,364), and you have an average loan of $7,923. The average student loan in Canada is $4,695. Dividing the national average by the UPEI average leaves a 59% differential.

EW-3 determines the average amount of university fees for students, compared to the national average. A full course load at UPEI costs $4,350 (10 courses), plus a $1169 Student Union fee, a $179 medical plan, and a $158 sports fee, with the administration fee included, totalling $4,606. The national average, as of 2003-04, is $4,025. The difference between these two figures is only about 13%, far less significant than the result in EW-2.

As mentioned earlier, the total annual number of bursaries, scholarships, and other awards available to FTE UPEI students, as of April 2004, is 1,640 (EW-4) (Heather Keoughan, personal communication, March 31, 2005). The long-term goal for this indicator is one per student, which translates into an answer of 1.00. Last year, there were 2,996 FTE students at UPEI. Using this information, by dividing the number of awards available by the number of FTE students, we get the figure 0.55. Based on this data, UPEI falls well short of the one per student goal proposed in the GITP Toolkit, with just over half of the students receiving some type of financial support from UPEI.

EW-5 determines whether or not the student fees equal the awards given. The total annual dollar value of bursaries, scholarships, and other financial awards available specifically to UPEI students is $2,063,727 (Heather Keoughan, personal communication, March 31, 2005). This number is divided by the number of FTE students at UPEI (2,996) which gives us an average of $688.83 per student. This figure needs to be subtracted from the answer from EW-3 ($4,606) which leaves us with $3,917. In other words, the student fees outweigh the awards by an average of $3,917 per student.

Finally, due to time constraints and unavailable resources, no information regarding allocation of financial awards (EW-6) is available at the present time. This indicator is calculated first, by obtaining the total annual dollar value of available bursaries, scholarships, and other financial awards allocated, then dividing by the total number of awards available (EW-4) and multiplying by 100. The short-term benchmark for EW-6 is 75% and the long-term goal is 100%.

Discussion

Based on the findings in this report, it is safe to say that in terms of financial support for its students, UPEI is quite far behind the projected benchmarks set forth by the GITP Toolkit. UPEI currently provides financial support for approximately half of its FTE students, which is coincidentally half of where it should be, according to the GITP Toolkit. On top of that, it appears that UPEI does

not contribute nearly enough to how much it puts into its financial support. In fact, if UPEI wanted to meet the benchmarks set forward by the GITP Toolkit, the University would have to nearly double the amount of financial awards issued and contribute about $13.8 million annually (about 6.7 times the current amount) towards student financial support.

While these findings may seem somewhat outrageous, as it would most certainly be nearly impossible to see such a drastic increase in the not-so-distant future, it should also be noted that this report only includes financial support that comes directly from UPEI. What the GITP Toolkit seemingly fails to measure are the outside sources of financial support. For instance, many businesses, organizations, and institutions provide students with bursaries, scholarships, and awards. In retrospect, a list of all external sources of financial support would be quite useful in accurately assessing how much financial aid students actually receive. This would also give UPEI some relief in terms of being expected to cover all financial costs. [Editor's note: the research questions under 6.1.1.2 Financial Support, EW-4 to EW-6, refer to "number of internal and external financial awards offered through your institution" (CSAF 2003, p. 112)].

Compared to the national average, UPEI fairs reasonably well in EW-1 and EW-3. The only major problem lies in our student debt load. Students from PEI obtain almost 60% more in student loans than the average Canadian student. This is also interesting because the average UPEI and national tuition costs are relatively similar. Why then are students from PEI taking out much larger loans? It could be transportation costs or living expenses. Perhaps students from other provinces tend to have financial awards more readily available to them. I believe the best way to determine the cause is through further analysis. That being said, I believe UPEI could make some improvements. When it comes to paying for tuition in this day and age, $688 is not a lot of money. Here at UPEI that will get you one class, the cost of your books, and not much else. In a sense, it is like paying for nine courses and getting your tenth for free.

The problem that arises becomes, 'where does this money come from?' How could UPEI annually put approximately $10 million more into financial awards? Unfortunately, neither we nor the GITP Toolkit has the answers. Presently, it would take extreme budget cuts to solve this problem. We believe UPEI would be committing financial suicide by putting that much into student financial aid because there would be no tuition for students to pay for. If students do not pay, the university does not make money and everything is squandered.

Therefore, we feel that in order for this to work, universities need to have greater funding from the federal and provincial governments, and greater amount of private scholarships and sponsorship. UPEI cannot be expected to cover the costs for students, simply because it is not feasible. At the same time, students across the country are faced with only slightly smaller tuition fees and most come out of university with nearly half of the debt load. Again, it seems that the real problem lies in the amount of financial support that students receive.

6.1.2 University as Employer

Introduction

As an employer, the University of Prince Edward Island must provide a workplace that is diverse and respectful towards its employees. When employees at a workplace are of diverse backgrounds and are respectful towards each other, the overall operation of a faculty will run smoothly. Diversity is important at a university. The more diverse the faculty and staff is, the more a student will take away from his/her educational experience. Students will learn topics in a variety of different ways creating a better rounded person upon graduation.

Methods

To find out what UPEI was like as an employer with regards to wage gap (EW-7), gender pay equity (EW-8), ethnic minority/Caucasian pay equity (EW-9) and indigenous peoples/Caucasian pay equity (EW-10), Human Resources was contacted on March 7, 2005. During this conversation I was told to leave my name

and number and somebody else in the Human Resource Department would get back to me.

On March 8, 2005, Debbie McKie (Departmental Secretary, Employee Services, Human Resources) returned my call. She was not sure if she could give out the information I required and a conclusion was reached that I would e-mail the question I needed answered. When my e-mail was returned on March 11, 2005, she informed me that her colleagues and she came to the decision that this information could not be given out and to check the Human Resources website for other information. Upon searching through the UPEI Human Resources website (http://www.upei.ca/humanres/index.html), a small amount of information was obtained.

Results

For indicators EW-7 to EW-10 salaries for faculty and staff could not be disclosed for confidential reasons and because of this, indicator results were unable to be calculated.

Although no specific numbers were given out about the University's employment equity, further research showed that equity is a very important aspect of the University. At the University of Prince Edward Island, employment is about ensuring gender equity in employment and the hiring process. There is a policy in place at the University that is designed to address any gender imbalance with regards to faculty and staff, which would be implemented if gender imbalances were noticed. The University of Prince Edward Island's long-term goal is to have faculty and staff that reflects gender balance (UPEI Human Resources, 2005).

At UPEI there are four unions which represent different groups of employees, and they are:

   CUPE 501- representing the security police on campus

   CUPE 1870 - representing all public employees at the University

   IBEW - International Brotherhood of Electrical Workers

   UPEI Faculty Association - representing faculty

These four unions represent employees at the University and are involved in bargaining agreements for the faculty and staff (UPEI Human Resources, 2005).

Discussion

Our research was unable to provide us with any information regarding the indicators about wage gap (EW-7) or pay equity (EW-8 to EW-10) at the University of Prince Edward Island. These indicators are needed in order for the University to become more sustainable and meet social and economic needs for the present and future generations (The Sustainability Report, 2004).

Although no specific numbers were found on pay equity, it is good that UPEI has a policy in place on gender equity and that it will implement this policy when gender imbalance is noticed. It is also good that there are unions in place at the University faculty and staff so that everyone will receive fair benefits and wages (UPEI Human Resources, 2005).

In the future we would recommend that more information be given out at Human Resources to researchers. This would greatly help in future research when trying to create a more sustainable campus. When benchmarks and long-term goals are met for these indicators, the University will become a much better place for both employees and students.

6.2 Institutional
6.2.1 Income
Introduction

In the year ended April 30, 2004 the University of Prince Edward Island had revenues totalling $81,346, 401 (Grant Thornton, 2004). The largest revenues came from government grants, student fees, and ancillary sales. Income from private sources, though not nearly as significant as those mentioned before, were also a considerable factor in the University's revenue.

It is important to understand where the University's income is coming from in order to understand if it will continue to be sustainable into the future. Universities

are very large institutions and involve a large amount of money (Guerin and Cole, 2003). This money has to come from somewhere and it has to go somewhere as well. Understanding this idea will help us understand the future stability of the university. If part of the money leaving the university does not stay in the local community, then the community may deteriorate. If the community around the university dies, then there is no future for the university. However, if the university helps further the development of the local community, it in turn stabilizes its own future.

Understanding where money is coming from is just as important as understanding where it is going. The federal and provincial governments have been cutting grants to universities across the country in recent years. This poses the risk of fewer government dollars going to university institutions and jeopardizing the tradition of government partially funding post-secondary education. The more universities show their ability to survive without government funding, the less willing government will be to fund post-secondary education. It is important to keep tuition fees low and government grants high to ensure that students are financially able to attend university.

In any sort of environment, from an entire country to a small university, the economy is directly linked to sustainability. As long as we live in a capitalist society that uses some sort of currency, economics will always factor into sustainability. If a Canadian university becomes too dependant on its own sources of revenue, then it threatens government funding provided to post-secondary education.

Methods

On March 8th and 9th, phone calls were made to Advancement Services, Student Accounts, and Finance and Facilities in regards to income from students fees (EW-11), income from government (EW-12), and income from private sources (EW-13). Advancement Services said that they could not give out any information, and recommended the President's Annual Report for 2003-2004; however, the numbers indicated there were not relevant to the indicator. There was also no

relevant information from Student Accounts. Finance and Facilities provided us with the Comptroller's e-mail address. After a week of e-mailing back and forth with the Comptroller's Office a personal interview was set up.

On March 22nd, Phil Hooper, UPEI Comptroller, was interviewed. Mr. Hooper provided the University of Prince Edward Island 2004-2005 budget. He also explained how it was laid out and how to interpret the graphs and statistics. He also printed off a chart of UPEI's revenues from 2003-2004. This is because the chart in the University of Prince Edward Island 2004-2005 budget was using a similar chart, except for the year of 2002-2003. Information was also gathered from the UPEI Consolidated Financial Statements April 30th, 2004 which is produced independently by the accounting firm Grant Thornton. National statistical information was attained from the Stats Canada website.

Results

The University of Prince Edward Island receives revenues from the following areas: Operating and restricted grants, student fees, foreign seat fees, ancillaries, sales and service, investment income, donations, and a category labelled miscellaneous (Grant Thornton, 2004). The breakdowns for some of these are attainable. The University of Prince Edward Island Consolidated Statement of Operations shows the figures for each and can be found in the appendices section (see Appendix 6.4).

The income indicators measured where the University of Prince Edward Island receives its revenues from. EW-11 measures the amount of income received from student fees, EW-12 is income from government, and EW-13 is the income received from private sources.

According to the UPEI Consolidated Financial Statements, UPEI received $15,376, 325 from student fees in the year ended April 30th, 2004. UPEI's total income for 2004 is $81,364,401 (Grant Thornton, 2004). This means that 18.9% of UPEI's revenue comes from student fees. The national average is about 20.5% (Stats Canada, 2005).

The UPEI Consolidated Financial Statements obtained income from government sources totaling $45,327,393. This number is the combined total of grants $36,475,972 and restricted grants $8,896,421. Those totals combined make up 55.8% of UPEI's total revenue. The average income from government across Canada is 60% (Stats Canada, 2005). There is no actual formula that the government uses to determine how much funding will be issued to the University (P. Hooper, personal communication, March 22, 2005).

According to the chart printed off by Mr. Hooper, donations and non-governmental contributions totalled $4,096,000. This is considerably higher than the previous year, which had $2,919,000 in donations (University of Prince Edward Island 2004-2005 budget). This is about 5% of UPEI's total revenues. This is less than the national average which is about 6.4%.

Discussion

Income from student fees (EW-11) is below the national average. It is better for universities to find income from other sources than student fees. This keeps student debt down and allows more students the opportunity to attend university. It also helps students work less at part-time jobs, allowing more time for studies and university involvement.

Income from government (EW-12) is similar to the national average. This is good, but it could be better. It is important to reverse the current trend of universities becoming less dependent on government grants. As stated in the introduction, it puts our current publicly funded post-secondary education system at risk. If this trend continues, it could jeopardize future generations of Canadians' ability to attend a university.

The lack of a funding formula for the government at UPEI can be seen as a good thing and a bad thing. It puts future security of funding at risk; it could change during a bad economic period. It would also be safe to say, however, that during a bad economic period, a government could change its funding formula, too.

The positive aspect of there being no funding formula is that UPEI is not restricted by the amount of funding it can receive from the government.

Income from private sources (EW-13) is lower then the national average. This is a good thing because it shows that UPEI is not becoming independent, thus securing the opportunity for future students to attend UPEI.

6.2.2 Expenditures

<u>Introduction</u>

In the year ended April 30th, 2004 the University of Prince Edward Island had expenditures totalling $81,213,852. Some of the major expenses of the University included salaries, supplies, research, and utility costs. $42,009,347 was spent on salaries and benefits, $7,766,798 was spent on supplies such as electronic supplies and stationary supplies (Grant Thornton, 2004).

Considering the institution's large economic clout, UPEI has a unique opportunity to contribute to the sustainability of the Island economy. Since it is an institution of higher learning it should be a leader and set the example of preferential spending in the local economy.

The UPEI Procurement Office is associated with a number of cooperative organizations. This enables the University to purchase goods as a larger group in order to get quantity discounts. There is presently no policy in place that gives preference to local purchases.

The money the University is essentially spending is a symbol of what the University supports and values. If it is purchasing only on the criteria of price and quality, and doesn't consider the criteria of purchasing locally purchased goods, it is missing an opportunity to take a vital and important role of strengthening local economic sustainability. By supporting local economic sustainability, the University helps to support social institutions such as small local businesses and rural family farms. This translates into supporting local environmental concerns.

<u>Methods</u>

The information needed to calculate the departmental expenditures per FTE students (EW-14) was not found in the proper form to determine the indicator. We did get some relevant information concerning this indicator; however, it was structured in a way which prevented us from calculating the indicator. We discuss this issue in more detail further in the report. The information we did gather was obtained in an interview which was first conducted with Phil Hooper, UPEI Comptroller, on March 9th, 2005. During this interview, Mr. Phil Hooper provided the UPEI Consolidated Financial Statement for the year ended April 30th, 2004. Mr. Phil Hooper helped to explain the pertinent figures which added some light to our research. The complementary information for indicator EW-14 was found on pages 15 – 18 of the UPEI Consolidated Financial Statements document. It was these pages which provided information on the operational expenditures, external research expenditures, and the internal research expenditures. We also contacted Prof. Beringer on Friday April 1st, and she provided us with information on student enrolment in the different departments (see Appendix 6.1).

On March 8th, 2005, Roger Cook, Manager of Procurement Services, was reached by phone to first initiate contact. Later on March 11th, Roger Cook was contacted via e-mail and he later replied to this email on March 17th. Roger Cook was unable to provide information on locally purchased goods and services (EW-15); however, he was able to provide other information pertaining to the present practices of the UPEI Procurement Office.

To determine the Facilities Condition Index (EW-16), Kathy MacKenzie, Assistant Manager of Facilities Services, was contacted first by phone on March 8th, 2005. She was later reached by e-mail, March 11th and replied to this e-mail on March 14th. She was able to provide data concerning the Facilities Condition Index as well as some other relevant information concerning Facility Services.

Results

The expenditure indicators measured departmental expenditures per FTE students (EW-14), locally purchased goods and services (EW-15), and deferred maintenance (EW-16). Departmental expenditures per FTE student is calculated by totalling all academic dollars spent per FTE student in each department on campus and then by dividing the highest expenditure per FTE by the lowest expenditure per FTE. Departmental expenditures were not available for every academic department. The UPEI Consolidated Financial Statement split the departmental expenditures into two categories, Main Campus expenditures and Atlantic Veterinary College (AVC) expenditures. The student enrolment numbers determined how many students were registered in each faculty. This information did not break the students into Main Campus students or AVC students. This meant that we were unable to determine the relationship between the department students and the Main Campus and AVC expenditures.

The information we did acquire revealed that the Main Campus had operational expenses totalling $40,295,827, external research expenditures of $3,107,841, and internal research expenditures of $988,986 for the 2004 fiscal year ended April 30th. We also found that the AVC had operational expenses totalling $25,733,954, external research expenditures of $4,129,956, and internal research expenditures of $681,984 for the 2004 fiscal year ended April 30th (see Appendix 6.4). The official enrolment number for each faculty is provided in Appendix 6.1.

Indicator EW-15, locally purchased goods and services, calculates the total dollars spent on locally provided, harvested, produced and/or manufactured (referred to as *provided* for the remainder of this paper) goods and services divided by the total dollars spent on goods and services, multiplied by 100. This indicator is meant to provide information on the percentage of goods and services which are purchased from local producers and manufacturers. The UPEI Procurement Office does not track these data. It does not calculate the total dollars spent on locally

provided goods and services; therefore, this report is unable to determine indicator EW-14, locally purchased goods and services.

The Procurement Office has a vendor list of approximately 6,000 vendors. There is no purchasing policy in place which gives preference to locally provided goods and services. Purchasing decisions are based primarily on cost, quality, and vendor reliability. Roger Cook, Manager of Procurement Services, states, "other aspects are considered, but (they are) not primary and do not often change the purchase decision" (Roger Cook, personal communication, March 17, 2005).

UPEI is a member of Interuniversity Services Inc, and the Canadian Association of University Business Officers Association. Both groups perform purchasing functions on behalf of its institutional members. This allows UPEI to purchase services and supplies at a monetary discount. UPEI is also a part of the Atlantic Procurement Agreement (ATA) and the Agreement on Internal Trade (AIT). These agreements are both government-initiated projects which provide supplies with an opportunity to do business with universities regardless of their location. Neither agreement has a policy which illustrates preference to local suppliers (Roger Cook, personal communication, March 17, 2005).

The last indicator in this subsection is EW-16 Deferred Maintenance. This is calculated by dividing the total amount of deferred maintenance for all buildings on campus by the total replacement cost for all building multiplied by 100. This indicator is commonly referred to as the Facilities Condition Index (FCI). The UPEI Facilities Management department does track this indicator. The Facilities Condition Index was given as 0.09 or 9% (Kathy MacKenzie, personal communication, March14, 2005).

The annual budget for deferred maintenance is approximately $350,000. The insurance replacement estimates for all buildings on campus are $201,335,000 (Kathy MacKenzie, personal communication, March 14, 2005); however, this figure should be increased by 30% in order to more accurately replicate its value (Guerin and Cole, 2003). According to the Facilities Condition

Index definition which is provided in the CSAF Toolkit page 118, the Facilities Conditions Index should total 0.13 or 13% (see Appendix 6.5).

Our research also discovered that the acceptable payback period at UPEI is approximately 10 years (Kathy MacKenzie, personal communication, March 14, 2005). What this means is that if UPEI was building a 'green' building or purchasing more energy efficient technology for its buildings, UPEI would look to get the savings in energy and water conservation within a 10-year period. Kathy MacKenzie, Assistant Manager of Facilities Services, states the explanation for this reason being, "… simply because it would be difficult to predict the efficiency of any system beyond 10 years." That being said, she also states, "any long-term operating savings versus capital expenditure analysis would be considered" (Kathy MacKenzie, personal communication, March 14, 2005).

Discussion

Without the proper information, it is difficult to assess the data regarding departmental expenditures per FTE students (EW-14). This being said, we have calculated the total Main Campus and AVC research dollars in proportion to the operating expenses of each section. We have concluded that Main research expenditures are 9.23% of the total Main Campus expenditures while AVC research is 15.75% of total AVC expenditures. One could speculate that operational expenses would be representative of the total number of students in the Main Campus and AVC. If this is the case, it is clear that the AVC gets relatively and aggregately more research funding compared to the rest of the University (see Appendix 6.5). This statement may be presumptuous, so we recommend that further research be done in this area before making any policy or funding recommendations.

In regards to locally purchased goods and services (EW-15), we suggest that UPEI start tracking this figure and start to implement policy changes which would encourage the purchase of locally provided goods and services. UPEI could be a leader in this area and set an example for other universities in the Atlantic

Region. It may be more feasible to consider 'local' as meaning the Atlantic or Maritime region and to help create an initiative to get all Atlantic universities on board with this 'localizing' policy. A study may have to be done to determine how much of the goods and services needed by a university can actually be supplied by local or Atlantic providers. Maybe the policy can state something like 25% of all goods and services will be supplied by local providers [Editor's note: the CSAF short-term benchmark is 50% minimum, the long-term goal is 100%]. Our primary recommendation regarding this indicator is to at least have this information and data tracked.

There is little suggestion towards EW-16 as the FCI is already being tracked by the Facilities Management department. The long-term goal is to get this figure under 5%. What would it take to do this? This would involve constructing new buildings which would require less maintenance. It would appear that the University is going in this direction. Currently two new buildings are being constructed which are expected to use 25% less energy than standard new buildings. Another project is also under way which is expected to be LEED Silver certified, meaning it will meet minimum environmental standards in order to get this certification (Kathy MacKenzie, personal communication, March 13, 2005) [Editor's note: the project/building referred to is the new Centre for Enterprise and Entrepreneurship/School of Business]. These projects reflect that the University is taking the necessary steps to construct new buildings which are more environmentally sustainable.

6.2.3 Investments

Introduction

The University of PEI's Endowment Fund and a Pension Plan Fund is administered by the Comptroller's Office. The Endowment Fund is used to provide financial assistance to the University. The Pension Plan is for the employees of UPEI to provide defined retirement benefits, partially integrated with the Canada Pension Plan. As of December 30, 2003, the Endowment Fund held assets

totalling $14,291,000 while the Pension Plan held assets totalling $101,174,000 (Phil Hooper, personal communication, March 9, 2005). Also refer to Appendix 6.2 through 6.4.

The Endowment and the Pension Plan Funds help to provide essential financial benefits to attract valuable faculty and staff members. The Pension Plan helps to secure retirement planning which is an important consideration in job security for both campus faculty and staff members. This helps to strengthen the stability of the campus employment base which is essential to continued operation of the University. The Endowment Fund is essential in providing additional funds for the University to strengthen the long-term financial health of the University.

The Endowment and Pension Plan Funds help to promote economic and social sustainability as we have already mentioned. There are, however, further aspects of sustainability including economical, social, and environmental issues which could be further addressed. Taking these further steps can help to strengthen the sustainability of the University and the surrounding Island community. These issues will be addressed in the Discussion portion of this section.

Methods

To determine the ethically and environmentally sound investments indicator (EW-17) and the local investments indicator (EW-18), an interview was conducted with Phil Hooper, UPEI Comptroller, on March 9th, 2005. During this interview, Mr. Phil Hooper provided charts for the year ended December 31, 2003 (see Appendix 6.2). Mr. Phil Hooper explained that the information our report was looking for was not currently tracked by his department or by the third-party investment firm which operated the Pension Plan and the Endowment Fund. He did, however, provide us with the UPEI Investment Policy Statement (see Appendix 6.3). This document helps to illustrate the role of the Investment Review Committee and the objectives of the funds. This information can be found on page 2 and page 6 of the document, respectively.

The total assets held by the Endowment Fund and the Pension Plan are found in the appendix. The Endowment Fund total was available on page 22 (Appendix 6.2) while the Pension Plan total was found on page 56 (Appendix 6.2). There was also other information which was made available by these sheets which pertains to asset mix of the funds which will be discussed further. Due to time constraints, however, we were unable to get the names of the companies and financial assets which are held in the funds.

The indicators also asked about financial holdings of any student administrations. We were unable to contact the UPEI Student Union to determine if it held any financial assets.

Results

The investment indicators measure ethically and environmentally sound investments (EW-17) and local (Island-wide) investments (EW-18). To determine the ethically and environmentally sound investments indicator, we take the total annual dollars invested by the University (excluding the UPEI Student Union) in ethically and environmentally responsible companies, and then divide that by the total annual dollars invested. As stated earlier, the information needed to calculate this indicator is not monitored by the Comptroller's Office.

The local investments indicator (EW-18) can be calculated by taking the total annual dollars invested by the University (again, excluding the Student Union) in locally owned and operated companies, and then divide that by the total of annual dollars invested. Again, as stated earlier, the information needed to calculate this indicator is not monitored by the Comptroller's Office.

The Endowment Fund and the Pension Plan are overlooked by the Investment Review Committee. It is the Committee's responsibility that the funds meet investment and asset allocation objectives. Currently, the Endowment Fund has 57% of its assets in equities while the remaining 43% is being held in fixed income. The Pension Plan presently has 59% of its assets held in equities while the remaining 41% is being held in fixed assets (see Appendix 6.2).

On page 6 of the UPEI Investment Policy Statement (Appendix 6.3) the investment objectives are listed. The primary objective of the Pension Plan is to satisfy the Plan's financial liabilities, and to provide, at a reasonable cost, an acceptable level of retirement income to Plan members. A further objective of the fund is to maximize investment returns while assuming a level of risk deemed appropriate by the Committee. There is currently no policy in place which gives preference to local investments or socially responsible investments (see Appendix 6.3).

Although the proportion of funds held in local investments is not tracked, information was provided to indicate the proportion of funds held in Canadian equities. The Endowment Fund has 38% of its assets held in Canadian equities while the Pension Plan has 29% of its assets in Canadian equities. The long-term expected return of the targeted asset allocation is an average annual return of 3% - 5% above inflation (UPEI Investment Policy Statement, 1999).

Discussion

The formal indicators did not provide us with any indication of what percentage of assets are invested in local or ethical and environmentally sound investments. What this illustrates is that social responsible investments are not a priority of the Pension Plan or the Endowment Fund. They are looking at solely long-term economic health of the funds. Environmental and social considerations are not part of the equation. The social considerations of the plan members are considered; however, the social considerations of the larger Island community are not addressed.

In order for any real action to take place towards more socially responsible investing, the Investment Review Committee would first need to clearly define ethical and environmentally sound investments, or more commonly referred to as socially responsible investments. The Concordia sustainability audit defines socially responsible investment (SRI) in this manner: "socially responsible investing is an approach towards investing money in financial markets, which integrates

financial goals with social and environmental values in decision making" (Davis, Lamarca, Guerin and Larson, 2003). If the Investment Review Committee had clearly defined terms of a) socially responsible investment and b) local investments, it would have the criteria available to assess whether a company or fund would fit into these categories. This would help provide information to monitor ethically and environmentally sound investments (EW-17) and local investments (EW-18).

Currently there is no investment policy in place which gives preference to local or socially responsible companies. Changing the investment policy would likely be a sensitive issue with UPEI employees who will depend on the Pension Plan for their retirement. Their main concern is to provide secure retirement benefits. Because of these sensitivities, our report suggests implementing an investment policy to invest 10% of the fund assets into local and socially responsible investments, after the terms have been clearly defined. This will provide a starting point to allow employees and Committee members an opportunity to become more comfortable with socially responsible investments, as well as to learn about the advantages and disadvantages of these types of investments in their portfolio.

Conclusion

Based on all of the data collected, UPEI fares reasonably well in some areas and poor in others. In terms of accessibility, costs, and financial support, the results are mixed. The main areas that need improvement are financial awards and student debt loads. For unidentified reasons, students at UPEI are borrowing more money from the government and receiving little in terms of financial support from the University. Further research must be done to determine the root of this problem. If this trend continues, we fear that these results could act as a deterrent from enrolment here at UPEI, thus limiting the potential for sustainable development.

Perhaps the area that needs most improvement is the University as an employer section. This is not because of the results, but due to the fact that results were so difficult to obtain. It is clear that UPEI needs to co-operate with researchers in order to develop quality information. Open communication and easily accessible records would not only be more convenient for researchers, but would also yield more accurate and reliable results.

At the other end of the spectrum, the income section (indicators EW-11 through EW-13) probably yielded the most sustainable results. Income from student fees and private sources should be low enough to stimulate sustainable development. Income from government is also presently in a good position. In terms of sustainability, these three indicators are definitely close to where UPEI should be. Few recommendations can be made in this section.

Indicators EW-14 through EW-16 (expenditures) yielded little results, mainly due to a lack of tracked information and difficult research conditions. Presently, we can only make assumptions on departmental expenditures and more research is required in this field. There is a great deal of potential for UPEI to be a benchmark university in terms of locally purchased goods and services; however, the data are not currently being tracked. This makes is very difficult, if not impossible, to accurately assess. On a good note, current projects set in motion by UPEI indicate that deferred maintenance is headed in the right direction, although little information can be actually obtained.

Finally, the investments section also failed to yield significant numbers. What we did conclude was that there is a lack of clear definition for what is a socially responsible investment and what is a local investment. This ultimately makes it difficult to monitor ethical and environmentally sound investments (EW-17) and local investments (EW-18). Also, we have established that there is currently no investment policy in place which gives preference to local or socially responsible companies. We therefore recommend that the investment policy should be changed. As mentioned above, we suggest implementing an investment

policy to invest 10% of the funds assets into local and socially responsible investments, after the terms have been clearly defined.

Appendix 6.1: UPEI official enrolment statistics as of December 1, 2004 and
compared with December 1, 2003.

Appendix 6.2: Endowments - executive summary, as at December 31, 2003.

Appendix 6.3: Investment Policy Statement: Pension Plan for the employees of the
University of Prince Edward Island (effective 16/02/99).

Appendix 6.4: University of Prince Edward Island Consolidated Financial
Statements, by Grant Thornton (April 30, 2004).

[Editor's note: Appendices 6.1 - 6.4 are original documents or photocopies; they
could not be included in the pdf version of this document. Please contact UPEI
Environmental Studies and Sustainability to view these appendices.]

<u>Appendix 6.5:</u> Assignment 2 calculations

Re: EW-14 Departmental expenditures per FTE student

   Research expenses to total expenses for both Main Campus and AVC

   (see Appendix 6.4 UPEI Consolidated Financial Statements, p. 15, 17 and 18)

      Main Campus research ratio

Main Campus research expenses	$3,107,841
	+ $988,986
	$4,096,827 (a)
Total Main Campus expenses (including (a))	$44,392,654 (b)

        ratio --> ? (a) / (b) = 0.0923 --> ? 9.23%

      AVC research ratio

AVC research expenses	$4,129,956
	+ $681,984
	$4,811,940 (c)
Total AVC expenses (including (c))	$30,545,894 (d)

        ratio --> ? (c) / (d) = 0.1575 --> ? 15.75%

Re: EW-16 Deferred Maintenance

   Facilities Condition Index calculation (CSAF Toolkit, p. 118)

Insurance building replacement estimate	$201,335,000
EW-16 note (CSAF Toolkit, p. 119)	x 1.30
	$261,735,500 (a)
annual budget for deferred maintenance	appr. $350,000 (b)

      FCI = (b) / (a) = $350,000 / $261,735,500 = 0.13 --> ? 13%

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7.   Water

Cory MacDonnell, Christina MacLeod, Ainsley McNeill

Abstract

The Water section, under the 'ecosystem' section of the Campus Sustainability Assessment Framework (CSAF), is comprised of 11 indicators. W-1 and W-2 were under the Consumption subsection (7.1) and dealt with the potable water consumed and the amount of storm and grey water that was collected annually. This information was found by conducting an interview with Calder Campbell, the UPEI's Building Foreman. Recommendations for this subsection are that the campus should build a collection, storage, and usage plan for the storm and grey water. Also, the campus needs to implement and enforce a water conservation policy. In the subsection of Management (7.2), indicators W-3 to W-8 were of importance. They dealt with leaking fixtures, water meters, pressure testing, and motion detectors. This information come from Calder again. Recommendations for this subsection are that the campus starts paying more attention to its water consumption. Under the subsection Storm and wastewater (7.3), there were indicators W-9, W-10, and W-11. These three indicators dealt with wastewater produced, wastewater treatment, and stormwater collection. It was found that this campus does not meter or treat wastewater. Recommendations for this subsection are that the campus starts to meter wastewater and implement a treatment facility on campus.

Introduction

The world is facing a water crisis as we speak. Some of the crisis factors include safe and adequate access to water to meet our basic needs and that we have enough water to secure our ecosystem around us (Davis et al., 2003). Water is important to investigate for campus sustainability because all living things, including us, need it to live. If we did not have clean fresh water coming into our

campus we would not be able to drink safe water, have showers, go swimming, clean, or cook food, etc. Water is very important to us and our daily activities. Only less than 1% of freshwater on this Earth is accessible for human use. That is why the campus needs to come up with a plan to minimize our water consumption, while still maintaining a healthy lifestyle. Canadian universities represent the ideal environment in which to begin this process. If these universities start to assess their water consumption and wastewater production it can serve as a catalyst for other water conservation projects across Canada.

7.1 Consumption

Introduction

This section was concerned about water consumption on campus. This is an important issue because proper monitoring of the water consumed on campus can lead to better environmental choices and a better ecosystem.

Methods

To find out indicators W-1 Potable Water Consumed and W-2 Strom and Grey Water Reuse, an interview was conducted with Calder Campbell from Facilities Management on March 17th, 2005.

Results

Indicator W-1 is about potable water consumption on campus. It asks how much water the campus consumes annually, and at what cost. It was found that the campus consumed 330,000 cubic meters of water in 2004. It was obtained by the municipal water supply at a flat rate of $130,000 (Appendix 7.1 and Appendix 7.3). Indicator W-2 was concerned with storm and grey water. It was found that the only stormwater that is collected is the stormwater that runs off the CARI parking lot. It goes into a retention pond in the back field. It is not reused by the campus.

<u>Discussion</u>

The recommendations in this section for the campus are that they build a collection, storage, and usage plan for the storm and grey water in order to save money by reusing the water they already paid for. They are also helping the environment out when they do this. They also need to implement and enforce a water conservation policy which is responsive to evolving water needs and concerns. We need to monitor the water meters and take readings to determine where it may be possible to save water (Davis et al., 2003).

7.2 Management

<u>Introduction</u>

Management of water is important to help understand the system while it is able to be working at a maximum capacity, while using the smallest amount of water possible. Management deals with leaks (W-3), water metering (W-4, W-5), pressure testing (W-6), efficiency of faucets (W-7), and installation of motion detectors (W-8). Having all of these working at a maximum while using the minimum would help reach the long term goals.

<u>Methods</u>

To determine water management at the University of Prince Edward Island, several interviews were conducted with the staff of the Facilities Management in the Utility Building. First contacted was Greg Clayton, Head of Facilities Management; he was able to provide information to help set up meetings with the right people. First meeting was with Calder Campbell, Building Foreman Atlantic Veterinary College (AVC) on March 16th; this helped answer and determine that many of the questions that concern water were not answerable due to the lack of information available. A second interview was held with Kathy MacKenzie, Assistant Manager of Facilities Management, on the March 23rd. The majority of questions were concerned with motion detectors and fixtures. Finally, a last meeting was held with Laurie Eveleigh on the March 23rd; no information was

retained from this meeting, but days after all the answers were e-mailed. A fourth and final interview was supposed to occur with Bob MacAulay from Facilities Management, but unfortunately he was absent for the whole month of March (Appendix 7.2).

A walk through of the campus was conducted as well; this was to determine the total number of toilets, urinals, and sinks. All twenty-two buildings were counted; it was checked to see if these buildings had low-flow fixtures or motion detectors that were attached to any of their fixtures. While doing this there were a few buildings that were off limits to us, such as the Food Technology Centre, Utility Building, bottom floor of Duffy Science Centre, bathrooms in the dressing rooms at the CARI Centre, men's change rooms at the Chi-Wan Sports Centre; also none of the bathrooms that are in offices were counted as well as the sinks that are in labs and the sinks that are in the kitchen at the W.A. Murphy Student Centre and The Wave (Appendix 7.4).

Results

[Editor's note: this Results section includes recommendations]

At the University of Prince Edward Island, every building is metered for potable water (W-4); the meters are located in the mechanical room in every building, this is measured mostly to have a record of payment (Appendix 7.3). Last year alone 333,000 cubic meters were used on campus.

None of the buildings contain wastewater meters (W-5); the water is measured as it comes in but not as it leaves, causing many numbers to be inaccurate. It is recommended that the University start to monitor all wastewater to help see the different volumes of water that come in as to what is going out. Doing this would help reach the benchmark goal, eventually having noticeable drop in water consumption and price.

There are no routine pressure tests done on campus either (W-6); here there are water mains that are in tunnels that are checked visually. The only time that there is pressure testing done is when there is a major problem; other than

that there are booster pumps that are attached to the water lines to increase pressure where it is needed. The majority of the time city water pressure is not adequate enough to provide for certain buildings here on campus so these pumps help bigger and older buildings such as Main, Bernardine, Blanchard, Marian, and AVC have equivalent water pressure throughout. Pressure tests are not recommended unless there is a major problem that the booster pumps cannot fix.

There are no records available to the general public on how much time elapses between the time that a leak is detected and when it is repaired (W-3). This was because these records are not in any specific order and it would be too time-consuming to look through all the work order forms, which normally average about 300-400 forms a month. These forms can range from something as little as cleaning up a broken beer bottle to repairing a collapsing roof. Calder Campbell believed that it depended on the severity of the leak, if it was something major then it was repaired right away. We are still unsure on how long it takes to repair a minor leak. We recommend that the University repair leaks within 24 - 48 hours and eventually it will be meeting the long-term goal of less than 24 hours. The University also needs an organized system for its work order forms so that if this sort of project were ever to occur again that it would be able to get accurate numbers and more in-depth information.

The efficiency of all new fixtures installed on campus (W-7) is of the highest efficiency rating that can be bought at that time. Again, though these records were unavailable, they are in the work order forms and were unreachable to us. It would benefit the University a great deal if it were to switch all of the fixtures to the highest efficiency available; this would help reduce total costs.

The total number of bathrooms on campus that contain motion detectors (W-8) is well below the benchmark goal. Here on campus there are two bathrooms that we counted that have motion detectors in them, these are the sinks at the W.A. Murphy Centre. Another building that is equipped with low-flow faucets is the K.C. Irving Building, in it there are faucets that have a timer on them and the timer measures how much water is going to be released and the temperature that it is

going to be released at. All other bathrooms on campus contain regular flow or low-flow toilets and the sinks here are all regular flow. The Robertson Library should really be the first on campus to take that step forward and change its toilets and sinks, that is because the toilets at the Robertson Library use about two flushes per flush because they are broken and the handle sticks.

It is recommended that the campus switch all of its toilets to low-flow toilets and that there are motion detectors put on all the sinks to help reduce the amount of waste that would accumulate from people letting the water run as they soap their hands. These low-flow faucets can reduce the total flow of water by 50%. Prices were not found for any of these but we were told that they were very pricey and that the University was not really concerned about this at that point in time. Even if these are too expensive, there is the alternative that the University could instead purchase motion sensor faucets that reduce the total amount by a lot less but they only cost about $50 and it would help reduce wasting unused water.

Discussion

[Editor's note: this Discussion section includes some findings.]

Every building on campus contains a potable water meter, this helps to see how much money is being spent with the amount of water consumption. The largest consumer of all is the Atlantic Veterinary College (AVC), alone it consumes 50% of all water on campus and it is believed that after the new building is finished beside it that the consumption is going to rise to 60% of all water. From July 2003 to July 2004 the AVC alone spent $112,2250.64 on water consumption, and this is expected to rise (Appendix 7.3).

Another idea that is being tested out is the waterless urinals, currently there is one in the Utility Building that is being tested to see if they really are as efficient as they claim, so far it has been a very good buy. The only thing that is keeping the University from replacing all of the regular urinals with the waterless is the expense, they are very expensive and sometimes seem to require more maintenance. The same goes for motion sensors, they cost less than brand new

fixtures and they reduce the water consumption by a great deal as well. UPEI is like any other campus, there are new buildings that are great water savers as well there are others that are old and waste a tremendous amount of water. "To reduce water consumption on campus, all members should be aware of their individual consumption level" (Gray, 2004, p. 201).

7.3 Storm and Wastewater

Introduction

Traditionally storm and wastewater has been considered a problem for campus sustainability. Stormwater needs to be retained on campus for reuse and/or encouraged to infiltrate on-site to model normal ecosystem functions instead of flowing over impermeable surfaces into storm drains. Wastewater, like grey and black water, can be treated on campus and reused for irrigation purposes and other non-potable uses. The more storm and wastewater we treat and reuse the better it is for the environment and for campus sustainability. This subsection looks at the quantity and quality of the storm and wastewater.

7.3.1 Quantity

Introduction

The quantity of the wastewater is directly linked to campus sustainability. If we produce huge amounts of wastewater, we are only harming the ecosystem faster. UPEI Is one of the smallest campuses in Atlantic Canada and it uses 330,000 cubic meters of water every year, spending over $130,000. This is a huge quantity of water that is being used and some sort of intervention is needed. There are many effective methods for reducing the amount of wastewater campuses produce.

Methods

To find out the total volume of wastewater produced annually by the campus (W-9) and the total amount of wastewater treated on campus (W-10), an interview

was conducted with Calder Campbell on March 16th, 2005. It yielded little information. I was not directed to any other people because Calder was the only foreman who possessed my required information.

Results

The storm and wastewater quantity indicators measured the total amount of wastewater produced annually by the campus (W-9) and the total amount of wastewater that is treated on-site (W-10). Results indicate that UPEI's campus does not meter wastewater at all. The only way the campus would know how much wastewater it produced is by how much water it consumed. During 2003/2004, UPEI used 350,000 cubic meters. During 2004/2005, it used 330,000 cubic meters (Appendix 7.5). [Editor's note: it seems the students have confused the years, "2003/2004" in fact being 2002/03 and "2004/2005" in fact being 2003/04 – see Appendix 7.5.] It was also shown that AVC uses 50% of that water. Further records show that in the past nine months the three residences and the dining hall collectively spent $67,843.19 on water (Appendix 7.3). The actual amount of water that these places consumed was not recorded. No other building's water consumption on campus was recorded either.

Indicator W-10 Wastewater Treatment is measured by the total amount of water treated on-site. Form my results it shows that the only water that is treated on campus is KCI's (the Chemistry building) water. A buffer solution is thrown into the water to neutralize the acids in the water before it goes into the city system.

Discussion

As my results stated above, UPEI spends far more money on consuming water than the conservation of water. UPEI does not meter or treat wastewater on campus, therefore the campus is doing nothing positive for the environment regarding wastewater. All of the wastewater that is produced on campus goes straight into the city system or environment. There was no short- or long-term benchmark for this indicator. The result is still 0% (Appendix 7.1). There has not

been any effort from the campus to initiate wastewater metering. If the campus starts to meter wastewater they will be able to see the money they are wasting and the harm they are doing to the ecosystem. It was found the AVC alone consumes 50% of the campuses water annually (Appendix 7.1). This is a target area to start wastewater metering. By implementing this procedure the campus will know where and how much wastewater is being used. This could lower the percentile [Editor's note: percentage] of annual water consumption for AVC in an easy and affordable manner. Once this procedure is effective and underway in the AVC, the rest of the campus then could facilitate this process into other faculties and buildings. This could be UPEI's first method to decrease the amount of wastewater produced.

Once Concordia piloted a wastewater metering program on campus, they tracked and monitored the water consumption rates to prevent the over-consumption of water and production of wastewater (Davis et al., 2003). This is motivation and an incentive for our campus to start this project. Another problem found on campus is that there is no wastewater treatment of any kind. Indicator W-10 was measured by the total amount of wastewater produced annually by the campus divided by the total volume of wastewater treated to tertiary standards. Since the campus does not meter wastewater, this result was 0% (Appendix 7.1). The short-term benchmark was 25% and the long-term one is 100%. We are nowhere near there. This means that all of the wastewater goes straight into the environment or city system untouched! This campus has done nothing to start any treatment of any kind on-site because it has not been required by the municipality. If UPEI starts to treat its wastewater to any standard, it would make it easier on the ecosystem and city system. This process can be very expensive. That is another reason why they have not started it. The University should start fundraising to get financial support for this cause. The campus and ecosystem surrounding will benefit in the long run if UPEI starts metering and treating wastewater.

7.3.2 Quality

<u>Introduction</u>

The quality of storm- and wastewater is an important issue for sustainability and the surrounding ecosystem. The more contaminants and harmful materials that are in the water coming off campus, the more damage the campus is doing to the environment.

It can also be harmful to the campus community members. If the campus does nothing about the wastewater, it could be contaminating its own campus, and produced new sicknesses. The University is not currently taking any precaution towards the quality of the storm and wastewater produced on campus.

<u>Methods</u>

To find out the total number of stormwater drains connected to contaminant separation/collection systems and the total number of drains altogether (W-11), an interview was conducted with Calder Campbell, Facilities Management, on March 16th, 2005. He did not possess this information, so I was directed to Laurie Eveleigh, the Planning Assistant, on March 18th, 2005. She was very helpful and she gave me two campus maps with the information I needed on it, one of the whole campus and one of CARI's parking lot [Editor's note: not included in this report, available through UPEI Environmental Studies and Sustainability]. I counted the drains that were connected to a separation/collection tank and the total amount of drains altogether.

<u>Results</u>

The storm and wastewater quality indicator measures the total number of stormwater drains connected to a contaminant separation/collection tank and the total number drains altogether. Results show that there are 74 drains altogether and 17 of them are connected to a separation/collection system on this campus. All of these are found in the new CARI parking lot. The water is collected in a retention pond in the back field.

Discussion

From my results, it was found that UPEI has only 17 drains that are connected to a collection basin which are found in the new CARI parking lot. 57 drains on the campus are directly connected to the city system. This indicator (W-11) is calculated to be 23% (Appendix 7.1). The short-term benchmark is 50%, so we are still a little ways from the long-term goal which is 100%. All of these drains have mechanisms to remove large debris, but not oil or gas, due to great expenses. The campus needs to start a program to catch and treat the stormwater coming from these separation drains that are not connected to a collection system. This water can and should be reused for non-potable uses. The oil and gas from the storm runoff from parking lots needs to be removed and these residues can be recycled and reused (Davis et al., 2003). If the campus implements this idea, it will cost the University in the forefront, but the campus and the surrounding ecosystem will benefit greatly in the long run.

Conclusion

The University of Prince Edward Island has a great deal of work to do before there are any improvements with the amount of water that is being consumed. It is going to cost a lot of money in the beginning if the University does decide to switch to low-flow and motion sensor fixtures but in the long run with the money the University will be saving in paying for water consumption will exceed the total spent. There were many areas that were left unnoticed in this case, this was mostly due to the fact that many places were not aware that this was going on and they were not prepared to answer all of the questions that were thrown at them.

In all, the University has a great chance of becoming a water-efficient campus; there are just a few adjustments that have to be made to better the total consumption of water. The easiest and most efficient results would be if low-flow or motion sensor fixtures were installed and, again, if the students and staff, etc. start to really watch their personal consumption and try to reduce it.

Appendix 7.1: Results for all indicators

No.	Indicator	Measurement Units	Result	Short-term Benchmark	Long-term Goal
W-1	Potable water consumed	Total volume of water consumed, divided by the total number of CCMs	330,000 cubic metres/4749 CCMs = 69.5l		
W-2	Storm and grey water reuse	Total volume of grey and storm water that is reused on site	0	25%	100%
W-3	Leaking fixtures	Number of hrs between each leaking fixture incident report	0 [Editor's note: this should state 'no records available']	5 working days	24 hours or less
W-4	Water metering: potable	Number of buildings with potable water meters/total buildings * 100	100%	50%	100%
W-5	Water metering: wastewater	Number of buildings with wastewater meters	0	50%	100%

W-6	Pressure testing	Total amount of water distribution system/total length of pipe	0	50%	100%
W-7	Efficiency of fixtures	Total number of fixtures installed that year	0	50%	100%
W-8	Motion detectors	Total number of motion detectors…	1.08%	50%	100%
W-9	Wastewater produced	Volume of wastewater produced	0/4749 CCMs =0 [Editor's note: this should say 'not recorded']		
W-10	Wastewater treatment	Volume of water treated to tertiary standards	0	25%	100%
W-11	Stormwater separation/collection	Total drains connected to s/c system/total drains * 100	23%	50%	100%

Appendix 7.2: Interview questions

Key Questions

        Core Questions:

1. How can I access incident reports to water leaks and repairs?

2. What is the average time elapsed between a reported leak and its repair?

3. How many buildings on campus are individually metered? How many buildings are there on campus in total?

4. How many buildings on campus are equipped to meter wastewater production?

5. Are routine pressure tests conducted on the campus' water distribution system to detect leaks?

6. What portion of my campus' water distribution system is pressure-tested for leaks each year? Every three years? Alternatively: What length of pipe is tested for leaks each year? What is the total length of pipe on campus?

7. How many new fixtures were installed during the previous year?

8. What portion of new water fixtures installed during the previous year possessed the highest possible efficiency rating?

9. How many toilets, sinks, and urinals are there on campus?

10. Of all the toilets, sinks, and urinals on campus, how many of each are equipped with automated motion detectors?

        Supplementary Questions:

1. Is the campus' water consumption metered? Where are the water meters located?

2. Is the wastewater metered on campus? Where are wastewater meters located ?

3. According to what schedule does the campus conduct pressure-testing of the water distribution system for the purpose of leak detection?

Appendix 7.3: Campus water consumption

[Editor's note: some pages of this Appendix are in the form of colour photocopies and could not be included in the pdf version of this document. Please contact UPEI Environmental Studies and Sustainability to see the data. See also http://www.upei.ca/energyawareness/html/consumptionsummaries.html]

UPEI ENERGY AWARENESS PROGRAM

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Campus Electrical Consumption Summary
Campus Hot Water Consumption Summary
Campus Water Consumption

Campus Electrical Consumption Summary

	Campus Total kwhr (incl. AVC) 2002	Campus Total kwhr (incl. AVC) 2003	Campus Total kwhr (incl. AVC) 2004	Total Cost (no GST) 2002	Total Cost (no GST) 2003	Total Cost (no GST) 2004
January	1,203,327	1,252,278	1,272,330	$96,684.46	$106,956	$123,753
February	1,079,355	1,152,168	1,154,610	$87,662.61	$99,753	$117,054
March	1,186,554	1,235,871	1,235,718	$97,327.67	$106,131	$129,201
April	1,101,306	1,095,867	1,083,063	$94,917.70	$108,231	$106,972
May	998,775	1,012,541	1,022,352	$86,948.66	$101,714	$108,071
June	940,575	1,036,935	1,050,898	$83,249.00	$106,731	$113,463
July	1,075,632	1,176,705	1,177,170	$94,283.99	$116,426	$124,776
August	1,106,805	1,140,819	1,198,580	$96,552.66	$113,379	$134,137
September	1,105,661	1,179,201	1,138,575	$98,321.60	$119,289	$129,354
October	1,142,916	1,142,945	1,129,358	$90,659.51	$112,976	$125,614
November	1,148,472	1,111,668	1,138,873	$90,329.59	$106,965	$125,560
December	1,128,912	1,103,772	1,135,326	$98,036.48	$116,018	$126,605
TOTALS	13,218,270	15,640,511	13,766,843	$1,134,972	$1,314,539	$1,464,990

Campus Hot Water Consumption Summary

	Campus Total mwhr (incl. AVC) 2002	Campus Total mwhr (incl. AVC) 2003	Campus Total mwhr (incl. AVC) 2004	Total Cost (no GST) 2002	Total Cost (no GST) 2003	Total Cost (no GST) 2004
January	2143	2753	2998	$128,170	$158,949	$183,616
February	3436	3154	2883	$161,959	$179,310	$171,261
March	2067	2156	2079	$112,395	$157,318	$140,485
April	1977	2065	1836	$110,979	$161,224	$129,369
May	1395	1343	1294	$92,706	$114,505	$111,539
June	1220	1405	1362	$86,357	$104,114	$100,795
July	1842	2095	1896	$86,559	$99,810	$105,559
August	1754	1659	2020	$90,698	$100,112	$100,575
September	1340	1459	1537	$86,655	$106,451	$108,580
October	1506	1385	1579	$92,184	$108,324	$125,573
November	2072	1570	1950	$99,290	$114,309	$140,535
December	2532	2107	2686	$113,410	$122,317	$163,649
TOTALS	22,283	23,170	25,100	$1,261,361	$1,527,773	$1,590,068

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Water Consumption – July 2003 to July 2004 – Atlantic Veterinary College

Period Covered	AVC		AVC Fish	
	Consumed	Amount	Consumed	Amount
July 15-September 15/03	17,760	$4,671.27	24,145	$3,820.38
September 15-November 28/03	22,793	$4,974.61	26,000	$6,111.44
November 28-January 14/04	15,360	$7,526.51	20,000	$3,159.48
January 14-March 12/04	13,967	$10,550.22	20,000	$2,669.76
March 12-May 20/04	13,443	$8,953.31	37,839	$8,916.07
May 20-July 20/04	14,000	$10,473.16	30,000	$7,099.38
July 20-September 17/04	13,849	$10,329.68	26,735	$6,530.33
September 17-November 24/04	14,000	$10,525.51	30,135	$7,138.53

TOTALS		125,152	$69,005.37	314,854	$43,245.37

Water Consumption - July 2003 to July 2004 - Residences

Period Covered	Bernardine Hall		Blanchard Hall	
	Consumed	Amount	Consumed	Amount
July 10-September 15/03	2,900	$1,471.03	2,895	$1,468.67
September 15-November 26/03	5,100	$2,512.63	3,315	$1,670.11
November 25-January 14/04	2,400	$1,207.58	1,625	$842.66
January 14-March 12/04	3,200	$2,447.70	2,360	$1,810.50
March 12-May 20/04	3,700	$2,737.01	2,010	$1,540.49
May 20-July 20/04	2,300	$1,779.35	1,615	$1,294.37
July 20-September 17/04	3000	$2,265.37	2785	$2,113.15
September 17-November 24/04	4700	$3,492.93	3375	$2,554.85
TOTALS	34,500	$17,913.96	19,926	$13,294.39

Water Consumption - July 2003 to July 2004 - Residences

Period Covered	Marian Hall	
	Consumed	Amount
July 30-October 22/03	3,650	$1,808.69
October 22-January 25/04	3,190	$1,604.69
January 25-April 23/04	2,500	$1,904.88
April 23-July 26/04	3,590	$2,893.55
July 26-October 25/04	3,490	$2,607.32
TOTALS	12,880	$10,826.15

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Water Consumption - July 2003 to July 2004 - Dalton, Duffy and KC Irving

Period Covered	Dalton		Duffy		KC Irving	
	Consumed	Amount	Consumed	Amount	Consumed	Amount
July 10-September 15/03	600	$355.43	1,980	$1,036.79	1,405	$765.30
September 15-November 26/03	800	$453.03	2,430	$1,252.29	1,980	$1,036.99
November 25-January 14/04	500	$216.68	1,405	$738.24	1,405	$738.24
January 14-March 12/04	600	$606.90	2,000	$1,598.10	1,500	$1,555.14
March 12-May 20/04	800	$683.81	1,390	$1,101.53	1,125	$813.91
May 20-July 20/04	500	$504.95	1,300	$1,071.35	1,615	$1,294.37
July 20-September 17/04	400	$424.57	3585	$2,751.05	1490	$1,196.29
September 17-November 24/04	500	$519.33	2500	$1,935.33	2195	$1,719.39
TOTALS	4,500	$3,824.70	16,691	$11,486.79	12,719	$9,223.72

Water Consumption - July 2003 to July 2004 - Library, Main, Memorial and Chaplaincy Centre

Period Covered	Robertson Library		Main		Memorial and Chaplaincy Centre	
	Consumed	Amount	Consumed	Amount	Consumed	Amount
July 10-September 15/03	900	$338.23	1,300	$668.63	300	$363.83
September 15-November 26/03	1,200	$571.63	1,800	$955.05	400	$294.23
November 25-January 14/04	600	$358.28	800	$452.68	300	$216.68
January 14-March 12/04	1,400	$1,108.61	700	$613.01	400	$490.61
March 12-May 20/04	1,100	$929.70	800	$717.35	200	$292.55
May 20-July 20/04	1,100	$929.75	800	$717.35	200	$292.55
July 20-September 17/04	1,000	$849.37	600	$556.17	500	$495.37
September 17-November 24/04	1,800	$1,439.73	1,000	$873.33	500	$519.33
TOTALS	8,700	$6,925.53	7,700	$5,563.65	2,800	$2,755.15

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Water Consumption - July 2003 to July 2004 - Sports Centre, Steel and W.A. Murphy Centre

Period Covered	Sports Centre		Steel		W.A. Murphy Centre	
	Consumed	Amount	Consumed	Amount	Consumed	Amount
July 10-September 15/03	1,000	$576.23	1,400	$763.03	254	$222.11
September 15-November 26/03	1,500	$813.43	1,400	$766.23	290	$223.43
November 25-January 14/04	600	$358.28	400	$263.88	331	$231.32
January 14-March 12/04	1,000	$890.10	800	$748.50	400	$465.30
March 12-May 20/04	2,300	$1,745.81	1,200	$967.01	275	$312.11
May 20-July 20/04	1,100	$929.75	700	$646.55	360	$363.35
July 20-September 17/04	1,100	$920.17	900	$778.57	30	$156.53
September 17-November 24/04	1,600	$1,296.13	1,700	$1,368.93	465	$457.47
TOTALS	11,200	$7,529.90	8,500	$6,302.70	2,285	$2,466.62

Water Consumption - July 2003 to July 2004 - Utility Building and Wanda Wyatt Dining Hall

Period Covered	Utility Building		Wanda Wyatt Dining Hall	
	Consumed	Amount	Consumed	Amount

Period				
July 15-September 15/03	364	$226.83	2,075	$1,081.63
September 15-November 28/03	12,883	$6,186.21	2,910	$1,478.95
November 28-January 14/04	403	$365.30	1,200	$641.48
January 14-March 12/04	1,000	$890.10	1,830	$1,477.74
March 12-May 20/04	229	$279.55	2,060	$1,575.89
May 20-July 20/04	350	$398.75	2,070	$1,616.51
July 20-September 17/04	9,483	$6,855.33	2,340	$1,727.29
September 17-November 30/04	1,952	$1,567.35	3,360	$2,564.21
TOTALS	26,564	$16,648.42	17,745	$12,143.70

Water Consumption - July 2003 to July 2004 - Cass, Kelley and Storage

Period Covered	Cass		Kelley		Storage	
	Consumed	Amount	Consumed	Amount	Consumed	Amount
July 30-October 22/03	20	$96.33	1,030	$554.33	14	$56.11
October 22-January 26/04	60	$127.33	700	$608.08	0	$56.42
January 26-April 23/04	60	$177.36	800	$572.23	0	$78.86
April 23-July 26/04	0	$138.43	110	$187.27	0	$79.44
July 26-October 25/04	60	$179.88	350	$254.81	0	$77.72
TOTALS	200	$719.33	2,990	$2,176.72	14	$348.55

<u>Appendix 7.4:</u> Toilets, urinals and sinks with motion detectors

In this table there are a couple of the buildings on campus that are missing. This is because they were either not available, or I was not allowed in them at the time. These buildings include the CARI Sports Centre, I was unable to find anything on this because it was closed up at all times. I was not allowed in the dressing rooms and I was not allowed in the changing rooms at the pool. Then there was the Chi-Wan Sports Centre. Again, I did not do this one because of the different number of changing rooms that were there and that I am not allowed in just any room. Also the basement of Duffy was covered in boxes and there was no way for a person to access the bottom floor. Also this may not be accurate in the AVC as I was not sure exactly where all the washrooms and sinks were there.

Building	Number of toilets	Number of toilets with motion detectors	Number of urinals	Number of urinals with motion detectors	Number of sinks	Number of sinks with motion detectors
Main	18	0	9	0	25	0
Dalton	9	0	1	0	10	0
Wanda Wyatt	8	0	4	0	4	0
Kelley	9	0	10	0	5	0
Bernardine	60	0	0	0	103	0
Marian	7	0	9	0	4	0
Blanchard	65	0	0	0	130	0
Duffy	0	0	0	0	0	0
K.C. Irving	10	0	5	0	10	0

Robertson	24	0	6	0	17	0
AVC	70	0	15	0	65	0
Classroom Centre	12	0	2	0	8	0
Steel	13	0	0	0	12	0
Memorial	7	0	4	0	9	0
Cass	4	0	5	0	1	0
Chaplaincy Centre	3	0	2	0	3	0
W.A. Murphy	18	0	6	0	9	0

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8.   Materials

Kent Chau, Josh Darrach, Marla MacAusland, Mark Zabel

Abstract

The Materials sections of the Campus Sustainability Assessment Framework (CSAF) examines how the university acquires materials (food, paper, equipment, etc.), then how it disposes of this material (compost, recyclables, hazardous waste, etc.). Materials are a subsection of the 'ecosystem' portion of the CSAF. The Materials section is composed of 16 indicators located throughout five sections (buildings, paper, food, equipment, and waste); for this assessment 14 of the 16 indicators were examined. Results for the University of Prince Edward Island (UPEI) showed a lack of environmental planning in paper purchasing, equipment purchasing, and with the facilities on campus. The results also show that UPEI is undergoing a paradigm shift, increasing environmental awareness in all areas concerned with materials and realizing the importance of minimizing its ecological footprint. Recommendations were made to suggest ways to further minimize UPEI's environmental footprint, how to integrate UPEI systems to minimize the amount of materials purchased on campus, and methods to further minimize the outgoing waste stream of UPEI.

8.1 Buildings

Introduction

The buildings and facilities on campus are the largest material investment that the university will make. The integration of environmental design into the original construction or remodelling of existing facilities is paramount to the establishment of a sustainable campus (Canada Green Building Council, 2004). Buildings that meet LEED (Leadership in Energy and Environmental Design) have taken steps to minimize their ecological footprint. Becoming LEED-certified demonstrates a significant investment by the university to minimize the negative

environmental impacts that its buildings are having on the local ecology (Guerin and Cole, 2003, p. 141-142).

Given that many university buildings are old, their interiors need to be maintained to keep up-to-date with current environmental standards. Additionally, since these facilities are often used throughout the day, for the majority of the year, marginal improvements in the efficiency or environmental standards will have a cumulative effect in minimizing the buildings' environmental footprint. New, current, and future construction plans on campus need to follow similar standards so that when they become operational they will impose the smallest footprint possible.

Methods

To determine the number of LEED-certified buildings and/or interiors (M-1, M-2) on campus several interviews were conducted. An initial interview was conducted with Kathy MacKenzie, Assistant Manager of Facilities Management, on March 7, 2005. This was followed with subsequent e-mail correspondences with Wensley Power, Manager of Capital Projects. The information collected from these sources provided insight to the current state of environmental construction on campus.

Additional information was collected on the age of all buildings on campus, recently remodelled interiors, and near-future developments on campus from Laurie Eveleigh, Facilities Management Planning Assistant, on March 18, 2005. This information was then converted into a table (see Table 8.1: Campus construction). From this information it was possible to extrapolate the current and recent investments into the facilities on campus. This information was used to determine the trend of facility growth, expansion, and use throughout campus. Finally, this information provided a scale from which future environmental remodelling priorities should be established.

Table 8.1: Campus construction

Building ages		
Building name	Year constructed	Years old
W.A. Murphy Student Centre	2002	3
Classroom Centre	2001	4
K.C. Irving Chemistry Centre	1996	9
Wanda Wyatt Dining Hall	1990	15
Chi-Wan Young Sports Centre	1990	15
Atlantic Veterinary College	1985	20
Robertson Library	1973	32
Blanchard Hall	1972	33
Central Utility Building	1972	33
Bernardine Hall	1967	38
Duffy Science Centre	1966	39
Equipment Depot	1966	39
Chaplaincy Centre	1965	40
Kelley Memorial Building	1963	42
Marian Hall	1959	46
Steel Building	1950	55
Memorial Hall	1946	59
Cass Science Hall	1939	66
Dalton Hall	1917	88
Main Building	1854	151
Current construction		
Building name	Year of planned opening	
Unnamed new residence	2005	
Neurobiology Research Centre	2005	

Recently remodelled buildings		
<u>Building name</u>	<u>Year remodelled</u>	
Duffy Science Centre	2005	
Planned future remodels		
<u>Building name</u>	<u>Year of planned remodelling</u>	
Marian Hall	2005-2006	

Building design pertaining to environmental awareness or environmental integration was collected and formatted into a table (see Table 8.2: Environmental integration). Observations were made throughout the campus to assess additional sites of environmental integration. Once observational information was collected, an additional interview was conducted with Kathy MacKenzie on March 23, 2005 to discuss validity of observation and other environmental integration on campus. This information provided a backgrounder on environmental integration on campus.

Table 8.2: Environmental integration

Active integration	
<u>Building name</u>	<u>Type of integration</u>
Unnamed new residence	thermal heat-pumps
Neurobiology Research Centre	thermal heat-pumps
Central Utility Building	solar collectors for active heating (non-operational)
Passive integration	
<u>Building name</u>	<u>Type of integration</u>
Unnamed new residence	passive solar
Neurobiology Research Centre	passive solar
W.A. Murphy Student Centre	passive solar
Classroom Centre	passive solar

K.C. Irving Chemistry Centre	passive solar
Wanda Wyatt Dining Hall	passive solar
Chi-Wan Young Sports Centre	passive solar
Atlantic Veterinary College	passive solar, built into hillside
Robertson Library	passive solar, built into hillside
Blanchard Hall	passive solar
Central Utility Building	passive solar
Bernardine Hall	passive solar
Duffy Science Centre	passive solar
Chaplaincy Centre	passive solar
Kelley Memorial Building	passive solar
Marian Hall	passive solar
Steel Building	passive solar
Memorial Hall	passive solar
Cass Science Hall	passive solar
Dalton Hall	passive solar
Main Building	passive solar

Results

According to Mr. Power, no one has come to campus to LEED-certify any of the recently constructed buildings (M-1) or recently remodelled interiors (M-2). He also stated that there have been no plans made to have the two current constructions (Neurobiology Centre and the new residence), the current remodel (Duffy), or the planned remodel (Marian) LEED-certified (W. Power, personal correspondence, March 11, 2005). The University does plan to have the two new constructions Commercial Buildings Incentive Program (CBIP)-certified (K. MacKenzie, personal communication, March 7, 2005). This is a government assistance program offering a financial incentive of up to CDN$ 60,000 for all new construction that meets an energy reduction 25% below the Model National Energy Code for Buildings (MNECB) standards (Office of Energy Efficiency, 2005).

[Editor's note: the new Centre for Enterprise and Entrepreneurship, which is in the design stage, will achieve a LEED Silver rating.]

The University has also taken steps to integrate its systems with natural systems in an attempt to reduce its environmental impact. The majority of the buildings on campus (except the Equipment Depot) are situated to take advantage of passive solar opportunities throughout the building. The remaining heating balance is provided from PEI Energy Systems, specifically the Charlottetown co-generation facility. Hot water under pressure is sent to campus to meet the remaining heating requirements, removing the need for independent heating systems. There will be two facilities on campus not connected to the hot water network. The new residence and Neurobiology Centre currently under construction will receive their heating and cooling requirements from thermal heat pumps, allowing these facilities to work independently of the heating grid. Robertson Library has been constructed into the hillside, leaving approximately 25% of the first floor unexposed. The Atlantic Veterinary College (AVC) was also built into a hillside to minimize exposed walls, leaving approximately 65% of the first floor unexposed, reducing the heat loss in these buildings and acting as a natural cooling agent in the summer (K. MacKenzie, personal communication, March 23, 2005).

Discussion

The findings regarding LEED certification at the University of Prince Edward Island (UPEI) are consistent with the national Canadian university average. Specifically, only one university facility in Canada is LEED-certified; it is the Technology Enterprise Facility III at the University of British Columbia (UBC) (Canada Green Building Council, 2004). Reasons for lack of LEED certification on the UPEI campus may include: lack of financial resources, the size limitations of campus, and the lack of interest on the behalf of campus community members (CCMs).

UPEI demonstrates its environmental awareness and concern for environmental sustainability through its intentions to have the new residence and Neurobiology Centre CBIP-certified. Excluding the economic incentive offered by this certification, this demonstrates the University's commitment to make its facilities more environmentally sustainable. It is also intended that all future construction projects on campus will also be CBIP-certified. The University plans to establish higher environmental sustainability regulations on its new facilities, eventually intending to meet LEED standards (K. MacKenzie, personal communication, March 7, 2005).

A major conflict with UPEI's ability to achieve LEED certification is with the age of the facilities on campus. The majority of the facilities on campus (14 out of 20) are more than 30 years old. For these facilities to reach and obtain LEED certification, they would require a complete remodel. That would require sections of the building to be completely shut down for an extended period of time. This is not feasible due to the current capacity of UPEI's facilities. Additionally, the current remodel of Duffy Science Centre has caused numerous space issues due to the closure of various levels. If such a remodel were to occur in another building (such as Main), the space conflicts would be drastically increased.

Currently, numerous UPEI facilities do embrace environmental concepts in their design. Many of these features have a direct economic impact for the University; moreover, they do minimize the ecological footprint of this campus. The primary example of this can be seen in the orientation of the buildings to absorb passive solar energy. This action minimizes the heating and energy requirements of the buildings, minimizing the building ecological footprint. The benefits of passive solar could be further exploited if professors lecturing in the rooms would open the curtains and use natural lighting instead of light bulbs. Other examples of environmental planning include the integration of Robertson Library and the AVC into hillsides. The hillside fortifications to these buildings offer energy savings throughout the year. These fortifications minimize the heating costs during the winter and cooling costs during the summer through the process of thermal

exchange. The fortifications also act as an excellent source of insulation, helping to minimize energy loss to the outside environment (K. MacKenzie, personal communication, March 23, 2005).

The lack of LEED certification on the UPEI campus may not be surprising, but the amount of environmental consideration on campus is noteworthy. For a campus currently consisting of twenty facilities, having all of them except one taking environmental consideration into their construction is an accomplishment. Especially when considering the age of the buildings on campus. UPEI does show environmental initiative in the CBIP certification of its two current construction projects and future construction projects.

It is strongly recommend that the University embrace one, if not both of the provided recommendations to decrease the ecological footprint of buildings on campus. Recommendation 1: modernize recent construction, starting with the most recent to achieve LEED certification. This option would minimize the economic cost of reaching certification due to modern systems in place within the facility. The overall environmental benefits of this recommendation are minimized due to the age of the facility. This recommendation also includes having the University establish a policy of all new construction on campus be required to meet LEED certification. Recommendation 2: modernize all building on campus to meet LEED certification, starting with the oldest (Main Building) and ending with the newest (W.A. Murphy Student Centre). This option would maximize the reduction to this campus' ecological footprint through the introduction of modern systems into the older buildings. Consequently, this option is far more expensive to the University than the first one, but it also maximizes environmental improvement for the university over the long-term.

Conclusion

This section of the CSAF assesses and examines the environmental sustainability of the UPEI facilities. These buildings represent UPEI's largest economic investment; they also represent one of UPEI's largest obstacles in

achieving campus sustainability. Due to the age of many of these building, there is room for significant environmental improvement, and minor changes in the older buildings may produce significant environmental benefits to the University.

8.2 Paper

Introduction

Paper is very important to consider when monitoring the sustainability of a campus community because it is one of the university's greatest yearly expenses as well as one of its greatest sources of waste. It is used every day, by every department, in great quantities (Guerin and Cole, 2003, p. 144-145). Therefore even a small change in paper consumption policies could mean a significant difference in the sustainability of the UPEI campus. Paper is also an indicator of how the university manages other materials on campus because it such a commonly used material; it is one of the few materials that is used by all CCMs. The paper used on campus comes in many forms, standard white paper, coloured paper, coverstock, and it is used for numerous functions, ranging from course notes and projects to general office use (W. Henderson, personal communication, March 9, 2005).

Methods

To determine the total paper consumption of UPEI (M-3), an interview was conducted with Roger Cook, Manger of Procurement Services, on March 1, 2005. After interviewing Mr. Cook, it was concluded that he did not have some of the necessary information. Mr. Cook recommended consulting with Wendy Henderson who works at the Central Printing Office to determine the recycled composition of paper used on campus (M-4) and the types of paper used on campus (M-5, M-6). Additionally, Mr. Cook later sent an e-mail with the paper purchasing policy of Cascade, the conglomerate that purchases paper for UPEI. Wendy Henderson, Academic Support Associate, was interviewed initially on March 1, with a supplemental interview on March 23, 2005 to resolve additional questions. For the

second interview, Mrs. Henderson had performed some initial research on chlorine-free paper with 'Steve' from Unisource (M-6). Mrs. Henderson's research provided information pertaining to the availability, cost, and variety of chlorine-free paper offered by Unisource.

To determine the number of campus community members (CCMs) (students, staff, and faculty) at UPEI (M-3), an initial interview was conducted with Marion Hannaford, Associate Registrar, on March 23, 2005. Mrs. Hannaford provided information pertaining to the number of students enrolled at UPEI over the past three years. Mrs. Hannaford was unable to provide statistics on the staff and faculty employed by UPEI, but she suggested inquiring at Human Resources. At Human Resources, an interview was conducted with Wendy Murphy, Human Resources Associate, on March 23, 2005. Mrs. Murphy provided information pertaining to the number of faculty and staff employed by UPEI over the past three years.

Results

Paper at UPEI is purchased through a conglomerate called Cascade, which purchases paper for all the Atlantic universities as well as other products such as paper towels, toilet paper, and garbage bags (R. Cook, personal communication, March 7, 2005). At the University of Prince Edward Island, Wendy Henderson from Central Printing sends her requirements to Procurements, Procurements then forwards these requirements to Cascade, which then negotiates a contract for the paper (R. Cook, personal communication, March 7, 2005). Paper is purchased in cartons which contain 10 reams each, each ream containing 500 sheets. Starting in May 2004 (the start of the purchasing year), 240 cartons of standard white paper were purchased. An additional 240 cartons of standard white paper were ordered in September, 240 cartons of standard white paper and 30 reams of coloured paper were ordered in November, 80 cartons of standard white paper were ordered in February, 120 cartons of standard white paper and 20 cartons of 3-hole-punched paper were purchased in March (R. Cook, personal communication, March 7,

2005). Amounting to 4,715,000 sheets of paper purchased so far this fiscal year (M-3). Paper purchasing information has been compiled into a table (see Table 8.3: Paper purchases for UPEI May 2004 - April 2005). There was no older information available about paper purchases of previous years.

Table 8.3: Paper purchases for UPEI May 2004 – April 2005

Month	Type of paper	Number of cartons	Number of reams (10 per carton)	Number of sheets (500 per ream)
May	standard white paper	240	2400	1200000
September	standard white paper	240	2400	1200000
November	standard white paper	240	2400	1200000
November	coloured paper	3	30	15000
February	standard white paper	80	800	400000
March	standard white paper	120	1200	600000
March	3-hole punched paper	20	200	100000
	Total	943	9430	4715000

In 2004, there were 3455 full-time students and 594 part-time students (M. Hannaford, personal communication, March 23, 2005) and there were 500 faculty and 200 staff (W. Murphy, personal communication, March 23, 2005) at UPEI. Based on the information provided, there are approximately 4749 campus community members. Based on the current paper purchase orders for the 2004 fiscal year, there are approximately 740 sheets of paper used per individual, per year, at the University of Prince Edward Island (M-3). This number was assessed by taking the total sheets of paper purchased divided by the total CCMs.

Wendy Henderson at the Central Printing Office stated that approximately 90% of the paper used on this campus had some (20-30%) post-consumer recycled content. Specifically, the standard white paper had 30% post-consumer recycled content (Cascade Resources, 2004, p. 2, 44). The coverstock had 20%

post-consumer recycled content. The post-consumer recycled content of the coloured paper ranged on average from 0-30% (Cascade Resources, 2004, p. 2, 17), the coloured paper used at UPEI had little to no post-consumer content (M-4). The University did not purchase any tree-free paper (M-5) or any chlorine-free paper (M-6) (W. Henderson, personal communication, March 9, 2005).

Discussion

Although most of the paper used on the UPEI campus has some post-consumer recycled content, it is only 30% of the total paper fibre content. Changes to a higher recycled content paper are impeded by its higher cost and its lack of availability. Even the so-called 'environmentally friendly' paper from the paper catalogue is only 30% post-consumer recycled content. Thereby, 30% is the highest percent recycled content paper offered by the Cascade catalogue (Cascade Resources, 2004, p. 2, 27, 44).

Only one type of chlorine-free paper is available through the ordering catalogue, and is not purchased because it has a significantly higher cost than the standard white paper. The chlorine free paper is $11 per 1000 sheets of paper, while the standard white paper is less than half this price at $5 per 1000 sheets (Cascade Resources, 2004, p. 27, 62). Another obstacle from purchasing chlorine-free paper is that some of the faculty do not like the chlorine-free paper because it is grayish and therefore not "crisp" and "clean" looking (W. Henderson, personal communication, March 9, 2005). There are some papers available without chlorine bleach but they use other harmful chemicals such as peroxides instead. Tree-free paper is not purchased by UPEI because it is not available through the ordering catalogue, but cost would probably be an issue if it were available (Cascade Resources, 2004, p. 2, 65).

Some measures are already in place to reduce paper use on the UPEI campus, such as encouraging faculty and staff to do less photocopying and encouraging the use of both sides of a page of paper. The practice of using both sides of the paper is also limited by the faculty's and students' willingness to do so.

Mr. Cook estimates that about 75% of the photocopiers on campus and about 50% of the photocopiers in the Robertson Library are capable of duplex printing, and states that new machines purchased for the campus will be multifunction to save space, energy, and paper resources (R. Cook, personal communication, March 9, 2005).

It is recommended that UPEI develop a program or campaign to encourage the use of both sides of paper. To accomplish this, it would be necessary to inform all campus community members on how to use the duplex feature of the provided printers and copiers. Informative posters should be designed to demonstrate the necessary steps to perform duplex copying/printing, and for these posters to be located at all copiers and printers. Additionally, information should be present at the older machines explaining how to switch the paper manually to perform duplex copying/printing. It is recommended that bleach-free paper is considered for everyday use, and have the chlorine paper be used only used for important documents. Eventually, if this University and other universities purchase chlorine- and tree-free paper in bulk, it will reduce to costs of this resource.

Conclusion

On the UPEI campus, paper is a significant expense with multiple impacts on the environment; there are numerous ways to improve campus sustainability. These improvements may include: changes in paper purchasing policies, changes in the printers and photocopiers, information on paper reduction, and changes in the attitudes toward paper use by all CCMs. There are numerous ways to improve paper conservation and to change paper type on campus. This will not only help the environment, but could also serve as an economic incentive in the long-term.

8.3 Food

Introduction

Agriculture plays a major role in both provincial and national economies. It ranges from traditional farming, marsh-based seaweed cultivation, aquaculture, to

the introduction of genetically modified organisms (GMOs). Agriculture on the surface may appear to be environmentally friendly and a sustainable practice to embrace. Often this is not the case due to commercial agricultural practices, specifically when chemical additives are used to enrich the soil instead of the maintenance of natural biotic processes. These chemical additives may turn once productive soil into dirt, a physical medium for plant growth that is dependent on outside nutrient infusions (Smith and Smith, 2003, p. 418).

With continued use of chemical additives, the soil begins to die and erode away. Erosion reduces the amount of topsoil present; the removal of topsoil requires additional chemical additives to maintain the land's production potential. Erosion also affects the marshes and aquaculture since the eroded topsoil becomes silt in these environments, disrupting the natural processes of these ecosystems, thereby decreasing the abundance of aquaculture products (Smith and Smith, 2003, p. 420).

It is for these reasons local organic farming methods should be endorsed. Organic farming encourages a natural balance within the soil, minimizing erosion and the need for chemical additives. To encourage organic farming and the maintenance of topsoil, organic farming practices must be economically viable. To encourage this type of agriculture, communities should purchase foodstuffs from local producers. This also reduces transportation costs of the foodstuffs which preserves our natural resources and minimizes pollution (Guerin and Cole, 2003, p. 148).

Methods

To determine the percentage of foodstuff purchased from local producers by food services on campus (M-7), an interview was conducted with Marc Braithwaite, General Manager of Residence, Food and Conference Services, on March 16, 2005. Additional Information was collected from the major food providers Amalgamated Dairies Limited (ADL) and Sysco; distribution and production information was acquired from John Corbett, General Manager of ADL, on March

17, 2005, and distribution information from Jackie Werner, Sysco Associate, on March 17, 2005.

Results

      From the information provided by Mr. Braithwaite, Campus Food Services does procure a portion of their food supply from a local supplier. Specifically, all dairy products are purchased from ADL, located in Summerside, Prince Edward Island. ADL accounts for approximately 20% of the total food budget. Food Services also receives additional foodstuffs from local growers/catchers on an 'as needed' basis, this accounts for approximately 5% of the total food budget (M-7). The University's other two major food distributors are Sysco and Pepsi Bottling Group (M. Braithwaite, personal communication, March 16, 2005). The Sysco distribution centre for campus is located in Moncton, New Brunswick, where post-processed foods are sent for redistribution. Food purchased from Sysco is located outside of the local production area, often requiring multiple distributions before reaching the final consumer (J. Werner, personal communication, March 17, 2005). The Pepsi Bottling Group distributor for campus is Dieppe, New Brunswick, where bottled beverages and syrups are sent for redistribution (M. Braithwaite, personal communication, March 16, 2005). Food purchased from Pepsi Bottling Group is located outside of the local production area, often requiring multiple distributions before arriving at the final consumer.

      UPEI has an annual food budget of approximately CDN$ 1.4 million. UPEI also does not directly control food services on campus, they contract out to Chartwells Educational Dining Services via Compass Group Canada. Chartwells provides food and catering services on campus in three locations, the Wanda Watt Dining Hall, the Student Union Building, and the Atlantic Veterinary College (AVC). Chartwells is also responsible for placing food purchase orders on campus. Chartwells does not have any policies/statements encouraging the purchasing of locally produced food products (M. Braithwaite, personal communication, March 16, 2005). As previously stated, Chartwells' major supplier is Sysco with which

they have procurement agreements to establish best prices on food purchases. This does not prevent/restrict purchasing of local food stuffs, but it also does not offer any incentive to purchase locally produced food (M. Braithwaite, personal communication, March 16, 2005).

Discussion

The findings regarding the quantity of locally purchased food are not surprising. Since the campus subcontracts Chartwells for food services, it is logical that Chartwells has purchasing agreements with national suppliers to meet the needs of their locations. Food Services has three major distributors, each providing supplies in a specific area. Pepsi Bottling Company provides the soft drink/carbonated beverages for the campus, ADL provides the bulk, non-novelty dairy products for the campus, and the remaining food supplies come from Sysco, with the exception of specialty catering needs. These special catering needs include, but are not limited to: seafood products, alcoholic beverages, and ethnic food.

The only consistent, local supplier for UPEI is ADL. ADL is a Prince Edward Island-based dairy company, offering products such as: butter, milk, cheese, ice cream, evaporated and condensed milk, and spring water. When necessary, Food Services also purchases food from local growers/catchers, these often include potatoes and lobsters. Food Services places orders to local growers/catchers on an 'as needed' basis (M. Braithwaite, personal communication, March 16, 2005).

With the proximity of the Charlottetown Farmers' Market, it is recommend that the University request that Chartwells purchase food from the Farmers' Market when possible. This provides numerous environmental benefits both on and off campus. It benefits the local farmers and encourages sustainable farming practices, which benefit the local ecology, and it benefits the University because it is using fewer fossil fuels in the transportation, process, and refrigeration of its foodstuffs. This will have the secondary effect of taking action to encourage local sustainable agricultural practices. This would also benefit the provincial economy

over the long-term, specifically since agriculture is Prince Edward Island's largest industry (PEI Government, 2003).

It is also recommend that Food Services has an open discussion with the Biology and Environmental Studies departments in the development of a campus organic farm. This provides benefits to all parties involved. Food Services will receive the freshest possible products with the least amount of harm to the environment and with no middleperson mark-up of food prices. The Biology and Environmental Studies departments will develop a 'living classroom', providing first-hand experience in organic farming, importance of soil maintenance and structure, botanical growth and development, and instruction in sustainable systems.

Conclusion

This section of the CSAF report provides insight into how sustainable are the food practices are on campus. With the amount of agricultural production on Prince Edward Island it should be unnecessary to purchase many fruits and vegetables from off the Island. Consequently, since the University receives the majority of its foodstuffs from major distributors, only dairy products are purchased from local suppliers on a regular basis. This may seem acceptable, until you realize that there is a Farmers' Market across the street from the University, approximately .5 km from the Wanda Wyatt Dining Hall. The Farmers' Market is open year-round every Saturday, providing a variety of locally grown/produced foodstuffs. Given the location of the Farmers' Market, it can offer a consistent source of locally produced foods to meet Food Services' needs, thereby decreasing the amount of food purchased from non-local producers.

8.4 Equipment
Introduction

The equipment choices made by a university have numerous ripple effects in the realm of sustainability. After the buildings on campus, the equipment purchased represents the largest economic and material investment on campus.

Similarly to buildings, these acquisitions will remain on campus for a number of years; therefore it is necessary to look at the life-cycle of these purchases. A life cycle examination considers the equipment from the time that the necessary material is removed from the planet to the time it is eventually disposed of (Guerin and Cole, 2003, p. 151-152). It is also important to look at the cost of the equipment through its entire life, not just at the time of purchase. If only the purchase price is examined, numerous environmental and economic factors will not be fully considered.

Methods

To examine the life-cycle cost assessment of equipment on campus (M-8), a two-prong approach was used: an interview was conducted to establish equitation protocols on campus with Roger Cook, Manager of Purchasing, on March 9, 2005, then e-mail surveys (see Appendix 8.1: Life-cycle survey) were sent out to all department heads on campus. From there, the returned surveys were compiled into a table for analysis (see Appendix 8.1: Table 8.4: Life-cycle survey summary).

Results

According to the Procurement Office, the University has no policy of undertaking a life-cycle analysis of equipment prior to its purchase. Additionally, Procurements functions as a 'middle man' for individual departmental purchasing requests (R. Cook, personal communication, March 9, 2005) and therefore it is the individual department requests that influence purchasing on campus. Facilities Management is currently conducting a retrofit of all light fixtures in all facilities. This retrofit did examine the life cycle of the fixtures themselves, as well as the necessary bulbs for operation. Facilities Management also undertook a life-cycle cost analysis when considering the modernization of the ventilation, climate control, and water heating systems on campus. All renovations undertaken by Facilities Management will cost approximately CDN$ 699,732 (M-8), with an estimated energy savings of CDN$ 175,783 per year. Based off these figures, the

renovation payback period will be approximately four years (Energy Awareness Committee, 2004, p. 1-4).

The two new facilities (the new residence and Neurobiology Centre) had life-cycle analyses performed on the equipment being installed. Specifically, they examined the life cycles of the geothermal heat pumps, light fixtures, and appliances being installed into these facilities. Currently there are no specific figures available for this information. Once construction is complete, this information may become available.

Of the thirty e-mail surveys sent to department heads, seventeen departments responded. The Science departments (Biology, Mathematics, etc.) and the School of Business were more fluent with the premise of a life-cycle analysis. The Arts departments (English, Music, etc.), and the School of Nursing were unfamiliar with life-cycle analysis, with the exception of the Environmental Studies program. All departments and faculties had similar intent with their equipment purchases, they all were looking at durability, versatility, and the equipment costs. The one major similarity between the majority of the departments was their desire for new equipment, rather than reused, recycled, or refurbished equipment, with the exceptions of the Environmental Studies program (Arts), the School of Business, and the School of Nursing, which stated that they would purchase used equipment if it served the same purpose and function as new equipment. These departments attempt to minimize their environmental impacts and maximize their budget by using second-hand equipment instead of purchasing new equipment (see Appendix 8.1).

Discussion

The results regarding life-cycle cost assessment showed a variety of results. When the University facilities were being modernized and upgraded, the life cycle of the equipment being installed was taken under consideration. Facilities Management's life-cycle analysis examined the additional purchase cost in comparison to the existing system, the cost to replace the existing system, the

operating costs, then the final disposal costs. Using this gathered information (see Appendix 8.2: UPEI retrofit projects 2004-05), the University calculated the difference between the two systems and then took actions accordingly (Energy Awareness Committee, 2004, p. 4). The resulting life-cycle analysis demonstrated that there was significant cost in retrofitting the various systems. The analysis also projected that the energy savings from the retrofit would cover the cost of modernization within several years. The success of this retrofit demonstrates both the economic and environmental value of performing a life-cycle analysis. That the retrofit costs may be significant for the short-term, but the added efficiency and productivity will balance out the economic costs. In many situations performing a life-cycle analysis will save the consumer money in the end due to the higher efficiency (lower energy use), prolonged lifespan (remains functional longer than alternatives), and durability (higher quality of construction).

The results from the individual departments differed from that of Facilities Management. Two of the departments (Fine Arts and Classics) claimed that they purchased no equipment. Five of the departments (Physics, Chemistry, Biology, Business, and Environmental Studies) claimed that they had an understanding of life-cycle analysis. None of these departments had established policies on requiring life-cycle analysis prior to equipment purchase. Of these departments only two (Business and Environmental Studies) actively purchased/acquired used equipment instead of purchasing new. The remaining ten departments that responded (Asian Studies, Economics, English, History, Music, Sociology & Anthropology, Women's Studies, the School of Nursing, Computer Science & Information Technology, Mathematics & Statistics) claimed that they had no understanding of life-cycle analysis. Of these departments only one (Nursing) actively purchased/acquired used equipment instead of purchasing new.

The one commonality between all departments that responded was their desire for effective, durable, cost-efficient equipment. If these departments would perform a life-cycle analysis, they may be able to maximize their equipment purchases. Specifically, each year they may acquire fewer pieces of equipment,

but they would be of higher quality. These high quality pieces would statically [Editor's note: 'statistically'?] perform better, and have a longer life expectancy due the increased workmanship put into them. This would reduce the amount of equipment that needs to be replaced each year, allowing each department to re-invest those funds into other pieces of equipment.

Performing a life-cycle cost analysis reduces the ecological footprint of the University. This occurs through the reduction in equipment breakdown, replacement, and the final disposal, specifically taking these factors into consideration prior to equipment purchases. Performing a life-cycle analysis may have secondary environmental benefits, these may include: decreased emissions (in manufacture, in use, in disposal), increased recycled content, environmentally friendly construction and disposal methods. Demonstrating that performing a life-cycle analysis has economic and environmental benefits for all parties concerned.

It is recommend that the University initiate a program of informing faculty and staff of the premise of life-cycle analysis. This program should focus on demonstrating the economic and environmental benefits of performing a life-cycle analysis. To further reduce the University's environmental footprint, it is recommended that the University establish a policy of mandating life-cycle analysis on equipment purchases. It is understandable that this may be of inconvenience to some, but the environmental and economic benefits will outweigh the additional costs and inconveniences. By requiring life-cycle analysis of equipment purchases on campus, there will be the long-term benefits to the University through reduced energy consumption and equipment waste production. Furthermore, requiring life-cycle analysis may make the CCMs more aware of the impacts that their purchases are having on the environment, allowing for a greater understanding of how simple changes in campus consumption can have drastic positive effects on the planet.

Conclusion

This section of the CSAF provides insight into the level and depth of consideration, research, and understanding when equipment purchases are made on campus. As the results show, there is a lack in understanding about the basic principal of life-cycle analysis. Even the departments that have an understanding of life-cycle analysis still neglect to establish policies regarding equipment purchases and mandating the use of life-cycle analysis. The only area of campus where life-cycle analysis is performed is by Facilities Management, demonstrating the need for greater campus awareness on the procedure and benefits of performing an equipment life-cycle analysis.

8.5 Waste

Introduction

All community members produce both solid and hazardous wastes within the community. In North America, where there is a high consumption rate and a highly disposable culture, it is important to look at the amount of wastes that the community produces annually (Guerin and Cole, 2003, p. 155-156). On university campuses, such as UPEI, commercial wastes come from offices, cafeterias, and the residences, while the hazardous waste is mainly produced by science labs and in the concentrated cleaning products.

In order to examine whether the campus is sustainable, it is necessary to examine the waste treatment on the campus. How the waste is disposed of has significant impacts on the ecosystem. This examination could also be used as a framework or guideline for future recycling, reuse, and reduction programs. This subsection explores the waste stream and the issues around waste disposal at UPEI.

8.5.1 Solid

Introduction

        This section measures the community members' behaviors on solid waste treatment. It is necessary to examine the solid waste treatment, as well as the behavioral issues related to the waste sorting. This section can be presented as a tool for raising the awareness of ecological responsibility (Guerin and Cole, 2003, p. 155). It can also be used as a tool for promoting recycling, reuse, and reduction measures on campus.

Methods

        To determine the amount of commercial wastes produced on the campus in year 2003-2004 and year 2004-2005 (M-9 Solid Waste and Recyclables Produced) and other waste issues (M-10 Solid Waste Reduction), two interviews were conducted with Kathy MacKenzie, Assistant Manager of Facility Services, on March 7, 2005 and March 15, 2005. Ms. Mackenzie provided sufficient information about the waste issues on the campus; however, the information for M-9 and M-10 was insufficient. Directed by Ms. MacKenzie via e-mail on March 10, 2005, the information required for M-9 and M-10 was provided by Belinda Rogers, Manager of Accounting Office, on March 20, 2005. In addition, to find out the disposal of used computers on the campus, an interview was conducted with Larry Yeo, Computer Technician at Computer Services, on March 23, 2005.

        UPEI's 2003-2004 and 2004-2005 waste disposal bills were provided by Ms. Rogers with the dollar amount censored; these figures were converted into a table (see Table 8.5: UPEI waste generation). By using the CSAF Toolkit calculator, the solid waste reduction (M-10) was calculated. Recyclables being landfilled (M-11) and compost (M-12) could not be assessed due to time constraints in performing a waste audit at UPEI. Additional information on how local waste was handled and sorted was acquired from Heather Chowen, Disposal Manager of Island Waste Management, via e-mail on March 30, 2005.

Table 8.5: UPEI waste generation

Year	Month	Amount of disposal (in tons)
2003	May	26.3
2003	June	18.93
2003	July	18.96
2003	August	18.87
2003	September	20.92
2003	October	22.62
2003	November	20.49
2003	December	16.49
2004	January	16.49
2004	February	17.06
	Total produced	197.13
2004	May	18.83
2004	June	19.93
2004	July	20.45
2004	August	20.54
2004	September	22.77
2004	October	20.08
2004	November	22.92
2004	December	15.56
2005	January	15.31
2005	February	19.57
	Total produced	197.17

Results

According to the data that was provided by Ms. Rogers (Island Waste Management Corporation Disposal Fee Program Invoices), the campus produced approximately 197.13 tons of commercial waste, which amounts to 42.92kg per

capita between May 2003 and February 2004 (M-9). To achieve this figure, the total tonnage of commercial waste was divided by the total number of CCMs. The total CCMs had previously been determined for indicator M-3. Between May 2004 and February 2005, approximately 197.19 tons of commercial waste was produced, which amounts to 41.52kg per capita (See Graph 8.1: Solid waste production at UPEI). In addition, by using the CSAF Solid Waste Reduction calculator, the data also shows that the campus solid waste reduction was improved more than 3% per capita (M-10) (see Appendix 8.3: CSAF Toolkit calculator solid waste reduction).

Graph 8.1: Solid waste production at UPEI
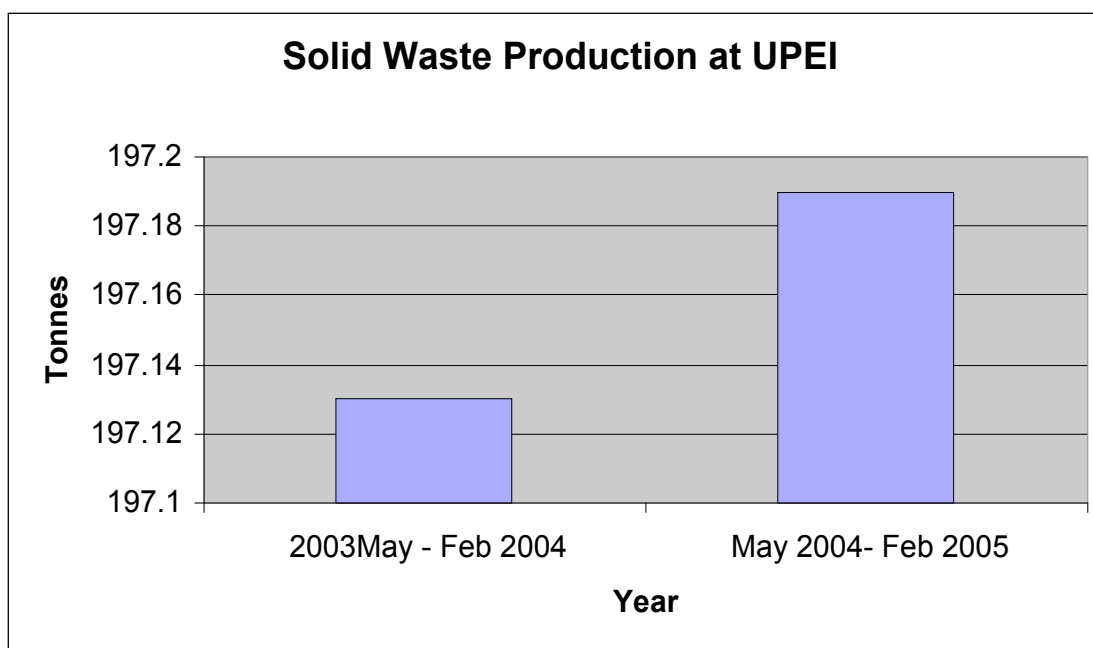
Working closely with the Island Waste Management Corporation (IWMC), Kathy MacKenzie stated that UPEI followed the IWMC rules for sorting commercial wastes. Solid wastes on the UPEI campus are required to be sorted separately in different containers: waste, recyclables, and compost. UPEI is allowed to transport its waste to the IWMC sorting center. However, because the bill is charged by total

weight of each trip, the amount of waste, recyclables, and compost that are produced by the campus cannot be determined. Additionally, there are no previous waste audits on record to provide estimation on UPEI waste stream components (i.e., percentage compost, percentage glass, etc.). Ms. MacKenzie also commented that due to a lack of enforced regulations and the CCMs' incompliance at UPEI, the sorting behaviors on the campus are woefully lacking (K. MacKenzie, personal communication, March 9, 2005).

In terms of used computers on the campus, Larry Yeo stated that all the used computers would not be thrown away. Some of the computers would be put in the various computer labs or given to the Salvation Army. Some computers would be sold to students at low prices. If the computers were no longer functional, they will be given to various labs (Computer Science, Engineering, and Physics) for experiments. Finally, Mr. Yeo commented that Computer Services would try to reuse computers if they could (L. Yeo, personal communication, March 23, 2005).

Discussion

The findings regarding the total amount of waste each CCM produced is very encouraging. After doing the comparison between the present fiscal year and last fiscal year, the improvement in waste disposal efficiency per capita has improved by more than 3%. This data demonstrates that the campus is currently producing less waste than in the previous fiscal year. However, in order to maintain recorded on future improvements, indicator M-9 should be examined and records kept every year. It is also encouraging that Computer Services has made attempts to reuse dated (old) computers throughout campus.

According to Ms. MacKenzie, the biggest barrier for UPEI waste management is the CCMs' involvement, or lack of. Ms. MacKenzie recommended that UPEI needs to start a campaign that can be used throughout the campus to raise the awareness of waste sorting and reduction (K. MacKenzie, personal communication, March 7, 2005). In addition, it is recommended that public

education sessions should be offered to all CCMs, including short waste-sorting sessions at New Student Orientation. Additionally, for the newcomers to PEI (such as foreign students, staff, and faculty) the administration should provide special sessions to introduce the IWMC to the new CCMs. By providing more publicity and public education to the CCMs, the campus can decrease its total annual waste production, therefore encouraging the continued education of all CCMs on how to reduce their ecological footprint.

Further recommendations include having the University negotiate with Chartwells to substitute the use of styrofoam meal containers with paper-based ones. Furthermore, the administration should encourage all CCMs to bring their own meal utensils instead of using the disposable utensils provided. By making these changes, the University can drastically reduce its annual waste production.

Conclusion

This section provides information on how the campus impacts the ecosystem specifically through the production of commercial wastes. The current trend in waste reduction shows positive ecological improvement for the University. To maintain and further improve this trend, additional information of campus waste services and systems need to be disseminated to all CCMs. If the proper actions are taken and programs initiated, this trend of waste reduction should continue into the future. In addition, the treatment of used computers should be promoted and continued. The University's administration needs to take the waste behaviors of CCMs as a serious issue and provide more public awareness about waste management. Because if UPEI cannot convince its CCMs to properly sort and reduce their waste, it will be exceedingly difficult for this campus to encourage long-term waste reduction.

8.5.2 Hazardous

Introduction

Hazardous waste is waste because of its quantity, physical concentrations, chemical properties, or infectious characteristics which may pose a substantial hazard to human or environmental health when improperly treated, stored or disposed of (Canadian Energy Pipeline Association, 2001). Mismanaging potentially hazardous materials can have numerous effects, especially to the health and safety of all CCMs. Materials deemed hazardous exist in all departments and facilities at the UPEI campus in the form of laboratory chemicals, cleaning products, industrial, and medical wastes. As such, their use and disposal must be closely monitored and regulated to ensure excess hazardous materials do not find their way into and disrupt our natural ecosystems.

Methods

To determine the total production (M-13), reuse (M-14), and recycling of hazardous materials (M-15) within the UPEI campus community, a series of interviews were held with persons responsible for the purchasing, use, and disposal of hazardous materials on campus. Pat Doyle, senior laboratory instructor in the Biology Department and Dawna Lund, senior laboratory instructor in the Chemistry Department, were contacted and interviewed March 14, 2005. Kathy MacKenzie, Assistant Manger of Facility Services and Linda Constable, office secretary for the Atlantic Veterinary College (AVC), were contacted and interviewed March 16, 2005. These preliminary interviews were used to gain access to hazardous waste disposal records and assess what, if any, programs were in place for the reuse and recycling of hazardous materials in the campus community.

Supplementary interviews for additional information regarding departmental inventories were carried out the following week with Pat Doyle, Dawna Lund, and Roger Cook March 22, 2005 and with Linda Constable from the AVC on March 25,

2005. These interviews were necessary to gain access to the two previous annual inventory and purchasing reports.

Results

        The total production of hazardous waste on campus (M-13) consists of total volume [Editor's note: weight, not volume] of both solid and liquid wastes produced on campus divided by the total CCMs. The total CCMs had previously been determined for indicator M-3. No comprehensive records of hazardous waste production existed in any interviewed departments. This is primarily due to the method of disposal for the majority of hazardous waste produced on campus: it can be safely diluted and disposed of down drains, consumed during use, or is neutralized/rendered inert during laboratory processes. There are no specific records kept to monitor the consumption of the various hazardous waste agents on campus. The only records that currently exist on campus relating to the total production of hazardous waste at UPEI are the annual disposal records of third-party companies, sub-contracted specifically for hazardous waste disposal on campus. All biohazardous material produced in the Nursing Department, Biology Department, University Health Centre, or the AVC are disposed of at the AVC incinerator; therefore, there are no records tracking the amount of waste incinerated, nor where the waste came from (K. MacKenzie, personal communication, March 7, 2005).

        As per the CSAF Toolkit, when official production records of hazardous waste are not available, chemical inventories and purchasing orders from all relevant departments are to be consulted and compared to find an estimate of annual usage. The annual inventories and purchasing orders from the Biology Department, Chemistry Department, Maintenance Department/Physical Plant/Facilities Management, Procurements, and the AVC were collected for 2002-2003 and 2003-2004. Due to time restraints and the manner in which the inventories were organized it was not possible to sort through the over 15,000

individually referenced items to determine the annual amounts of hazardous materials used on campus.

Interview questions regarding the reuse (M-14) and recycling of hazardous materials on campus (M-15) showed that there were no official policies in place for either indicator. The Maintenance Department does, however return used oil to the site of purchase, but no records exist stating quantity of used oil transferred; this is performed on an as needed basis (K. MacKenzie, personal communication, March 14, 2005). The Biology Department also participates in the unofficial reuse of formaldehyde occasionally in its biology labs (P. Doyle, personal communication, March 14, 2005).

The reduction of hazardous waste (M-16) produced by CCM over the previous year was not possible to complete, as the total production of hazardous waste could not be properly assessed. Instead, a comparison of 2002-2003 chemical waste disposal records and the 2003-2004 chemical waste disposal records were used. In the AVC, the number of disposed chemicals dropped from 206 in the 2002-2003 year to 138 items in 2003-2004 (see Appendix 8.4: Recent UPEI hazardous waste generation). In the Chemistry Department, the total number of disposed chemicals increased from 15 in 2002-2003 to 35 in 2003-2004 (see Appendix 8.4: Recent UPEI hazardous waste generation). In the Biology Department, due to renovations being held on campus, the official chemical waste disposal record could not be found; the only relevant information offered was the 2003-2004 manifests and work order from the third party disposal company, Matrix Environmental (see Appendix 8.4: Recent UPEI hazardous waste generation). The Maintenance Department does not maintain any official chemical waste disposal records; instead, when it is necessary to dispose of chemicals, they 'piggyback' what they need disposed of with another department. Therefore, due to this 'piggybacking,' no disposal records specifically exist for the Maintenance Department (K. MacKenzie, personal communication, March 14, 2005).

<u>Discussion</u>

The findings regarding hazardous materials on campus show that greater care must be taken when dealing with potentially dangerous materials. The UPEI campus community adheres to all guidelines laid out by the Island Waste Management Corporation (IWMC) and Environment Canada concerning the disposal and containment of hazardous materials; more of an emphasis needs to be placed on exceeding these expectations, rather then simply meeting them. Due to the manner in which contributing departments organize data concerning hazardous materials, it is extremely difficult to paint an accurate picture as to the total production of hazardous waste on campus (M-13). Knowing the total amount of hazardous waste produced is of paramount importance in understanding the extent of UPEI's ecological footprint.

Laboratory experiments, largely in the chemistry labs, make up the majority of all hazardous materials produced on campus. Most of the by-products from the chemistry labs are disposed of on-site within the actual laboratory. Most experiments carried out by students in the laboratory setting are designed to finish with an end product that can be easily disposed of (D. Lund, personal communication, March 14, 2005). The issue with this is that not all students do each experiment perfectly, which can leave un-neutralized compounds being disposed of along with those that were properly neutralized.

UPEI has the natural advantage of having lime beds in its natural drainage system. These lime beds allow for the neutralization of acidic compounds that may work their way into the standard wastewater waste stream. These acidic compounds often get into the wastewater due to either improper disposal or incomplete reaction of chemical agents. This natural safeguard is invaluable to the University as many chemicals used on campus have some acidic qualities (D. Lund, personal communication, March 14, 2005).

More than 70,000 chemicals are used commercially; very few of them have been fully tested against all potential human hazards (Daborn, 2001). In many cases, the side-effects are not known until after widespread use has occurred.

This method of trial and error is playing with human and environmental health and must be avoided whenever possible. The various departments at UPEI should be extremely careful when selecting chemicals for cleaning, fertilizing, and pest control so we can avoid future health complications for all CCMs and to further minimize UPEI's ecological footprint.

The lack of reuse and recycling programs of hazardous materials at UPEI (M-14, M-15) demonstrates that we may be falling behind other universities in this regard. The University of New Brunswick (UNB) actively recycles all batteries, chlorinated solvents, cyanide, and oil wastes (Gray, 2004). Until recently, all batteries on campus were considered to be waste products. The recent changes to IWMC guidelines now require that all batteries be stored until official policies can be put into place as to how batteries will be handled (K. MacKenzie, personal communication, March 14, 2005). Although no official oil recycling policy or records exist at UPEI to deal with waste oil, oil is saved in drums and returned to the site of purchase for recycling (K. MacKenzie, personal communication, March 14, 2005). The reasoning for not reusing chemicals on campus include cleansers being used until depletion, prohibiting the reuse of chemicals on campus (for safety reasons) (K. MacKenzie, personal communication, March 14, 2005) and laboratory chemicals once used may not be recycled or reused due to the potential contamination that could jeopardize the accuracy of future laboratory experiment results (D. Lund, personal communication, March 22, 2005).

Several recommendations in regards to hazardous waste production, reuse, and recycling (M-13, M-14, M-15) on the UPEI campus are as follows: Recommendation 1: The campus should adopt a more comprehensive multi-level approach to tracking hazardous materials on campus. If students, technicians, and cleaning staff were required to sign off on the amount of chemical materials they used during the course of their laboratory sessions and shifts, these numbers could then be handed in to the appropriate supervisors at the end of the day. These results could then be combined monthly to give a more complete picture as to when, how, and where chemical use was taking place. The finished monthly

reports could also be used, when combined annually, as a tool to help scrutinize the annual inventory. This would in turn help determine how many chemical products go missing over the course of the year; this recommendation could be implemented with relatively little cost to the participating departments. Admittedly, it would be slightly more work for the students, cleaning staff, and supervisors, but benefits of having such records on campus would make the entire process worthwhile. Recommendation 2: UPEI should conduct a survey as to what initiatives other Maritime and Canadian universities are doing in regards to reuse and recycling of hazardous materials on their campuses. The findings from such a survey might aid UPEI in finding projects to work on, as there are none in place at the moment. In doing this, UPEI may be able to implement ways to further reduce the production of hazardous waste on campus.

Conclusion

This section of the CSAF assesses key aspects of UPEI's use, storage, and policies concerning hazardous wastes. The interviews carried out in regards to hazardous materials at UPEI have shown that UPEI's CCMs are not making a significant effort to understand all aspects of where and how hazardous materials are being used on campus. While it is true that UPEI meets and follows all provincial guidelines regarding hazardous materials, in order for UPEI to move in a truly sustainable direction, it must take on the role as a leader within our community and surpass guidelines, not simply meet them.

Conclusion

After conducting the CSAF, it has been determined that UPEI has numerous problems if this campus wishes to become sustainable. The examination of the UPEI campus also has demonstrated great progress within the last several years to make this campus more sustainable than it was previously. These results therefore imply that UPEI is currently undergoing a sustainability paradigm shift, taking actions that are currently decreasing UPEI's ecological footprint. If this trend

continues, within several years UPEI may become a more sustainable campus. Further sustainability analysis needs to be undertaken at this campus to determine the fate of UPEI. Even if there are setbacks in making this campus sustainable, if the vigor and enthusiasm continues it is just a matter of time this campus is sustainable.

Appendix 8.1: Life-cycle survey and life-cycle survey summary

Dear *insert title and name*

My class (Environmental Studies 202) is performing a sustainability survey of this campus. One of the factors it examines is the life-cycle of the equipment (i.e., any order placed through Procurement Services) purchased for your department. It is for this reason I am e-mailing you. If it were not a burden, it would be very helpful if you could answer the following questions. It should be noted that the release of information is completely voluntary and if you would prefer not to release information pertaining to a question is perfectly acceptable.

1) Do you know what a life-cycle analysis of equipment purchase is?

2) If yes, what factors contribute to your decision-making process in deciding the equipment you purchase?

3) Does your department have any general policy on purchasing environmentally friendly equipment?

4) Does your department purchase used/refurbished equipment instead of purchasing new?

5) What is your intent when you make a equipment purchase?

Thank you for your time and cooperation,

insert your name

Table 8.4: Life-cycle survey summary

Department	Faculty	Question 1	Question 3	Question 4
Asian Studies	Arts	No	No	No
Canadian Studies	Arts	No response	XXXXX	XXXXX
Classics	Arts	N/A	N/A	N/A
Economics	Arts	No	No	occasionally
English	Arts	No	No	No
Environmental Studies	Arts	Yes	Not yet	Yes
Fine Arts	Arts	N/A	N/A	N/A
History	Arts	No	No	occasionally
Journalism	Arts	No response	XXXXX	XXXXX
Island Studies	Arts	No response	XXXXX	XXXXX
Modern Languages	Arts	No response	XXXXX	XXXXX
Music	Arts	No	No	No
Philosophy	Arts	No response	XXXXX	XXXXX
Political Studies	Arts	No response	XXXXX	XXXXX
Psychology	Arts	No response	XXXXX	XXXXX
Religious Studies	Arts	No response	XXXXX	XXXXX
Sociology & Anthropology	Arts	No	No	No
Women's Studies	Arts	No	No	No
Theatre Studies	Arts	No response	XXXXX	XXXXX
Atlantic Veterinary Collage	AVC	No response	XXXXX	XXXXX
School of Business	Business	Yes	No	Yes
Faculty of Education	Education	No response	XXXXX	XXXXX
School of Nursing	Nursing	No	No	Yes
Biology	Science	Yes	No	rarely
Chemistry	Science	Yes	No	No
Computer Sciences	Science	No	No	No
Engineering	Science	No response	XXXXX	XXXXX

Department	Faculty			
Family and Nutritional Sciences	Science	No response	XXXXX	XXXXX
Mathematics and Statistics	Science	No	No	No
Physics	Science	Yes	No	No

Department	Faculty	Question 2
Asian Studies	Arts	N/A
Canadian Studies	Arts	XXXXX
Classics	Arts	N/A
Economics	Arts	N/A
English	Arts	N/A
Environmental Studies	Arts	energy & resource efficiency, production & manufacturing process, transport/fuel/GHG/climate change
Fine Arts	Arts	N/A
History	Arts	N/A
Journalism	Arts	XXXXX
Island Studies	Arts	XXXXX
Modern Languages	Arts	XXXXX
Music	Arts	N/A
Philosophy	Arts	XXXXX
Political Studies	Arts	XXXXX
Psychology	Arts	
Religious Studies	Arts	XXXXX
Sociology & Anthropology	Arts	N/A
Women's Studies	Arts	
Theatre Studies	Arts	XXXXX
Atlantic Veterinary Collage	AVC	XXXXX
School of Business	Business	efficiency of equipment, a capital budget analysis, funding available

Faculty of Education	Education	XXXXX
School of Nursing	Nursing	N/A
Biology	Science	durability, available budget, quantity needed
Chemistry	Science	initial cost, cost of disposal, durability
Computer Sciences	Science	N/A
Engineering	Science	XXXXX
Family and Nutritional Sciences	Science	XXXXX
Mathematics and Statistics	Science	N/A
Physics	Science	initial cost, life expectancy, cost of operation

UPEI retrofit projects 2004-05

see also http://www.upei.ca/energyawareness/retrofit_project_for_web.pdf

University of Prince Edward Island Retrofit Projects: 2004 – 2005

As part of the University's Energy Awareness Program and in an effort to reduce energy costs, UPEI recently undertook a number of building system retrofit projects. Retrofitting included replacing existing bulbs and ballast in light fixtures with more efficient ones and various ventilation systems were modified to operate more efficiently during unoccupied hours. This work began in early August and continued throughout the fall and winter. For the University, the results of these changes will bring about more efficient buildings and a greener, more environmentally friendly campus.

The following tables summarize the energy retrofit projects that were completed from August 2004 to February 2005 and include work done on the following: Lighting and Electrical Improvements, Energy Management Systems and Climate Controls, Ventilation Motors, Water Heating, and Heating, Ventilation and Air Conditioning Systems. In addition, information is provided on the Estimated Utility Data (Baseline Year - 2003) and the Estimated Project Cost Summary. Of note is the Estimated Tonnes of Greenhouse Gases Saved by these retrofit projects. If you have any questions about the UPEI Retrofit Projects, e-mail us at energy@upei.ca.

Lighting and Electrical Improvements		
Description 1. Replace linear tube lamps with 28-watt T-8 lamp and electronic ballasts. 2. Replace incandescent fixtures with compact fluorescent, ranging from 13 watts to 39 watts. 3. Replace incandescent exit signs with LED type exit signs. **Buildings affected:** Atlantic Veterinary College, Chaplaincy Centre, Memorial Hall, Bernadine Hall, Central Utility Building, Young Sports Centre, Main Building, Robertson Library, W.A. Murphy Student Centre and the Wanda Wyatt Dining Hall	Estimated area affected by the measures (m^2)	57,195
	Estimated cost of all lighting measures	$401,363
	Estimated dollar savings	$84,798
	Estimated energy savings (GJ *)	3,825
	Estimated tonnes of Greenhouse Gases saved **	698
	kg of CO^2/$ invested	1.74

*   Giga joules
**   Savings per year

Energy Management Systems and Climate Controls

Description		
Description 1. Install several new Direct Digital Control (DDC) points and/or software to shutdown Air Handling Units (AHUs) based on a combination of outside air temperature and space scheduling + associated programming. 2. Place Hot Water System (HWS) loop temperature controller on Building Maintenance System (BMS). 3. Place existing Domestic Hot Water (DHW) re-circulation pumps on BMS for scheduled shutdown. **Buildings affected:** Atlantic Veterinary College, Cass Science Hall, Memorial Hall, Bernadine Hall, Blanchard Hall, K.C. Irving Chemistry, Marian Hall, Robertson Library and Steel Building	Estimated area affected by the measures (m²)	51,657
	Estimated cost of all control measures	$50,600
	Estimated dollar savings	$12,366
	Estimated energy savings (GJ)	853
	Estimated tonnes of Greenhouse Gases saved	**156**
	kg of CO_2/$ invested	3.07

Ventilation Motors

Description		
Description 1. Install variable frequency drives on both the supply fans and exhaust fans for multiple AHUs. 2. Install new high efficiency motors. **Buildings affected:** Atlantic Veterinary College, Steel Building, K.C. Irving Chemistry Centre and Main Building	Estimated area affected by the measures (m²)	31,483
	Estimated cost of all motor measures	$172,369
	Estimated dollar savings	$56,664
	Estimated energy savings (GJ)	5,510
	Estimated tonnes of Greenhouse Gases saved	**1,005**
	kg of CO_2/$ invested	5.83

Water Heating		
Description 1. Replace existing electric hot water heater with new commercial high efficiency electric domestic hot water storage tank. **Buildings affected:** Kelley and Robertson Library	Estimated area affected by the measures (m^2)	12,931
	Estimated cost of all water heating measures	$15,500
	Estimated dollar savings	$2,550
	Estimated energy savings (GJ)	64
	Estimated tonnes of Greenhouse Gases saved	12
	kg of CO^2/$ invested	0.75

Heating, Ventilation and Air Conditioning Systems		
Description 1. Convert system units and corresponding selected areas from constant volume to variable air volume. **Buildings affected:** Robertson Library	Estimated area affected by the measures (m^2)	10,429
	Estimated cost of all motor measures	$70,700
	Estimated dollar savings	$19,405
	Estimated energy savings (GJ)	1,105
	Estimated tonnes of Greenhouse Gases saved	202
	kg of CO^2/$ invested	2.85

Estimated Utility Data (Baseline year - 2003)

Item	Total in the Retrofit Project
Basic Information	
Number of buildings	17
Total area of buildings (m²)	71,100
Pre-Retrofit (Baseline) Utility Data	
Electricity (GJ)	46,111
Other (GJ) - high temperature hot water	63,319
Total energy consumption	109,430
Total energy cost ($)	$2,365,000
Post-Retrofit Utility Data	
Electricity (GJ)	39,777
Other (GJ) - high temperature hot water	58,305
Total energy consumption	98,082
Total energy cost ($)	$2,162,217
Expected Energy Savings (annually starting in 2005-2006)	
Electricity (GJ)	6,334
Other (GJ) - high temperature hot water	5,014
Total expected energy savings	11,348
Total expected energy cost savings($)	$175,783
Estimated tonnes of Greenhouse Gases saved	**2071**
kg of CO_2/$ invested	**2.92**

Estimated Project Cost Summary

Project Item	Estimated Cost
Project Implementation Costs	
• Lighting system	$401,353
• Energy management systems and climate controls	$50,600
• Ventilation motors	$172,379
• Water Heating	$4,700
• Heating, ventilation and air conditioning systems	$70,700
TOTAL	$699,732
Average Payback Period for all Measures (yrs)	4

Appendix 8.3: CSAF Toolkit calculator solid waste reduction

INDICATOR M-10: Solid Waste Reduction	
Tonnes waste disposed previous year:	**197.13**
FTE previous year:	**4593**
Tonnes waste/FTE previous year:	0.04291966
Tonnes waste disposed current year:	**197.19**
FTE current year:	**4749**
Tonnes waste/FTE current year:	0.041522426
Percent improvement in waste disposal efficiency/FTE:	**3%**

* 0.04291 tonnes ≈ 42.91 kilograms, 0.04152 tonnes ≈ 41.52kilograms

Appendix 8.4: Recent UPEI hazardous waste generation

The Chemistry Department's total chemical waste disposal for 2003:
    15 total number of chemicals disposed of
    ~66.51 l total combined liquid volume
    ~0.941 kg total combined solid weight

The Chemistry Department's total chemical waste disposal for 2004:
    35 total number of chemicals disposed of
    ~76.103 l total combined liquid volume
    ~11.932 kg total combined solid weight

The Atlantic Veterinary College total chemical waste disposal for 2003:
    206 total number of chemicals disposed of
    ~894.3369 l total combined liquid volume
    ~1.61845 kg total combined solid weight

The Atlantic Veterinary College total chemical waste disposal for 2004:
    138 total number of chemicals disposed of
    138.1029 l total combined liquid volume
    3.922125 kg total combined solid weight

The Biology Department's total chemical waste disposal for 2003:
    Records could not be found in either the Biology office or Pat Doyle's
    personal records due to renovations / relocation.

The Biology Department's total chemical waste disposal for 2004:
    Total number of chemicals disposed of was not made available on the
    manifest.
    2000 l total combined liquid volume
    No solid waste information mentioned on manifest.

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9.   Air

Andrew Breeze, Niki Heddle, Karen MacAdam, Sarah Skipper

Abstract

Air - without it, human life would cease to exist. Air is essential to most life on earth, and protecting its quality is a key component of global and local sustainability. What is in the air affects human health and the environment. Protecting and monitoring indoor and outdoor air quality is challenging, but a necessary part of creating a sustainable, healthy campus. To assess the air quality of our campus, interviews were conducted with various members of the campus community and surveys were carried out. The people interviewed were eager to help, but did not always readily have the information needed. In finding records of floor plans, asbestos and mould amounts, and indoor pesticide use, there was limited success. Other problems included the use of LEED standards of measurement in the CSAF indicators. As of yet, most of the buildings on campus do not use these standards and indicators A-4 and A-10 could not be assessed properly.

It was found that the University falls short in many areas, particularly in outdoor air protection and monitoring. While most of the indicators for indoor air quality and monitoring were below benchmark targets, there was evidence of on-going efforts to make improvements in this area. One area in which the University can take pride in is having campus-wide smoke-free indoor space. The University has plenty of room for improvement, but has the potential to achieve most of the final goals for sustainable air quality.

9.1 Indoor

9.1.1 Protection

<u>Introduction</u>

As students of a university, most of our time is spent in classrooms and labs. With so much time spent indoors, it is important that healthy air quality is maintained on campus. Air is essential for life, and ensuring its quality is important for protecting human health. Campus community member health is important to campus sustainability as it affects productivity, the ability to learn, and the quality of life. Poor air quality detracts from people's ability to contribute to society.

The University of Prince Edward Island has buildings that range in age from one hundred and fifty years old to under a year old. Renovations periodically take place on campus and steps to better air quality should always be considered in these improvements. Poor ventilation systems, contaminants, and chemicals which are used in the up-keep of the campus negatively affect air quality. Opening windows, living indoor plants, and proper ventilation systems can help to regulate healthy air.

<u>Methods</u>

Several of the indicators require knowing the total indoor space. The total area of every building was given on the University of Prince Edward Island website. On the UPEI website there is a link on the left side to the UPEI Campus Tour. This brings up a map of the campus with every building. Clicking on a specific building brings up details of the building, including its total area. The total areas of all the buildings were added together to calculate the total indoor space. The total area was then converted from feet squared to metres squared. Appendix 9.1 shows the calculations that were done to find the total indoor space.

Many of the indicators (A-1, A-2, A-4, A-7, A-8, A-9) required interviewing the Facilities Management staff by e-mail, phone, and in person. Calder Campbell, Building Systems Foreman, Kathy MacKenzie, Assistant Facilities Manager, and Blane MacDonald from Facilities Management were consulted. We also

interviewed the Human Resources Department for information on scent-free policies (A-2). Calculations for scent-free space can be seen in Appendix 9.4.

Indicator A-3 Opening Windows required floor plans and a survey of the buildings. Laurie Eveleigh of Facilities Management was contacted by e-mail and a meeting was arranged for March 18, 2005. She was only able to provide the floor plans for three buildings (Main, K.C. Irving, and Murphy Student Centre). An e-mail was also sent to the archivist at Robertson Library, Simon Llyod, who was able to find floor plans for the Chi-Wan Young Sports Centre and Wanda Wyatt Cafeteria. The floor plans were measured and the area of rooms containing windows was calculated. Some of the plans required a conversion from feet to metres. The information and calculations can be found in Appendix 9.2. The buildings that floor plans were available for were surveyed to see which windows opened.

Indicator A-5 Smoke-free Indoor Spaces was general knowledge, since Prince Edward Island legislation prohibits smoking indoors in public places.

Indicator A-6 Living Indoor Plants was found by a survey of nine buildings, as there was not enough time to survey all the buildings. The buildings surveyed were Main, K.C. Irving, W.A. Murphy Student Centre, Robertson Library, Kelley, Dalton, Memorial, and the Chaplaincy Centre (see Appendix 9.1 for square metres of each building). A survey of living indoor plants was conducted for each of these buildings (see Appendix 9.3 for number of plants found in each building).

Results

Indicator A-1 Asbestos and Mould results indicate that Maritime Testing Limited contracted a survey and management plan in 2000. They conducted a workplace assessment of asbestos-containing materials, outlined the proper course of action, and provided a management strategy. Results of the management plan have been requested but no response has been made.

Through researching scent-free indoor spaces, indicator A-2, it was determined that UPEI does not have a scent-free policy at the present time, and

there are no immediate plans to have one implemented. During the process of other data collection it was noted that three buildings on campus had scent-free signs posted on their doors: Dalton Hall, W.A. Murphy Student Centre, and the Student Health Centre in the W.A. Murphy Student Centre, making 6.62% of indoor space scent-free. [Editor's note: the AVC also has such a sign posted in the entrance hall.]

The percentage of indoor space with opening windows, indicator A-3, was a representative calculation, using only five buildings, as complete floor plans for all buildings on campus could not be found. The representative percentage of indoor space serviced by opening windows on campus is 35%.

Table 9.1: Percent of total area serviced by opening windows, by building

Building	Percent of total area (m^2)
Chi-Wan Young Sports Centre	8.68%
K.C. Irving Chemistry Centre	57.74%
Main Building	68.97%
W.A. Murphy Student Centre	24.96%
Wanda Wyatt Dining Hall	61.59%

Air change effectiveness, indicator A-4, requires the percentage of interior zones that meet the LEED standard. Since many of the buildings are older, they are not sectioned off into interior zones. The LEED standard for air change effectiveness is not used at our University and, therefore, cannot be calculated.

Smoke-free indoor spaces, indicator A-5, measured the percentage of indoor space that is smoke-free. Results found that Prince Edward Island has an Island-wide legislation which bans smoking in indoor public places. The buildings on the campus of the University of Prince Edward Island are 100% smoke-free. The short-term benchmark is at least 80% smoke-free; UPEI has achieved the long term goal of 100%.

The total number of living plants indoors, indicator A-6, was found for nine buildings, as there was not enough time to survey all the buildings. The total number of plants found in these nine buildings was 298. The number of plants was 0.01 per square metre. The short-term benchmark for this indicator is 0.1 per square metre, and the final goal is one per square metre.

Table 9.2: Number of indoor plants by building

Building	Number of plants in building
Main	43
K.C.I. Chemistry	7
W.A. Murphy Student Centre	9
Robertson Library	58
Kelley	44
Cass	6
Dalton	89
Memorial	39
Chaplaincy Centre	3

Indicator A-7 measured the total square meters of area of indoor space on campus that is always cleaned using a chemical-free system. Results found that there are no areas that are chemical-free in regards to cleaning on the campus. They have, however, greatly reduced the amount of harsh products used for cleaning. Five out of seven cleaning products used are 'green approved.' Also, some of the products used are fragrance-free. There is no record kept that describes which chemicals are used where, and in what quantity.

Indicator A-8 measured the amount of pesticides used indoors in grams within a year. Results found that UPEI contracts an outside firm for pest control. They are mandated to use as few chemicals as possible and to utilize chemical-free traps as opposed to baits when possible. If chemicals are required, building occupants are notified and, if possible, work is done outside of business hours.

More details were requested, such as specific amounts of pesticides within the period of a year; however, this information has not been obtained.

Cleaning of air handling units, indicator A-9, results showed that UPEI has 44 HVAC (heating ventilation and air conditioning) units in the buildings across campus; there are a large number of exhaust fans associated with these buildings as well. During the past year one has been cleaned and two have been partially cleaned. The benchmark goal for this indicator is at least 50%. Currently, UPEI is achieving 6.82% (see Appendix 9.4 for calculations).

Discussion

The University of Prince Edward Island shows concern with the quality of air in its buildings on campus, but easily accessible, up-to-date records were often hard to find. Without records it is hard to assess current sustainability and set goals for the future. Part of the difficulty in acquiring data is that some of the information is obtained by outside organizations, such as indoor pest control (A-8) and asbestos and mould (A-1) records. The University should keep copies of this information to be readily accessible to the public, if the records are not under a confidentiality agreement. On-campus records were also not always easily procured. Floor plans for all of the buildings were not available (A-3) and no record is kept of the quantities of cleaning supplies used, or where they are used (A-7). Accessible records would make evaluating the sustainability of the campus easier.

The fact that an asbestos and mould survey was done, that five of the seven cleaning agents used on campus are 'green,' that contracts for pesticide management mandate minimization of chemical use, and that several departments have an unofficial scent-free policy is indication of a growing awareness of the need for healthy air practices. This consciousness is reflected in the greater community of Prince Edward Island. The Government of Prince Edward Island's Smoke-free Places Act 2004 bans smoking from all indoor public places, including the University of Prince Edward Island.

The lack of an official scent-free policy is an indicator of a lack of recognition or concern for campus community members with scent sensitivities. It is argued that Multiple Chemical Sensitivity (MCS) is a psychosomatic condition (Radcliffe, 2000). Although this may be true, we recommend that UPEI have a scent-free policy for the campus and have a campaign to raise awareness on the importance of this issue.

The representative survey for opening windows indicates that the University does not meet the recommended short-term benchmark of 50%. The cost of installing windows may have been one of the reasons the indicator was low. In the future, construction of new buildings should be done with the intention of having the maximum possible area of indoor space serviced by opening windows. As well, future renovations and construction should be carried out in accordance with LEED standards, if at all possible. Renovations of older buildings to meet these standards may be too difficult and expensive to be feasible.

The number of living plants varies from building to building, but falls far short of the short-term goal of 0.1 plants per square metre. A new greenhouse was built during the previous year, but it has not yet been filled with plants. Once it has been, it will raise the level of this indicator. As well, it could provide a source of plants for people who wish to keep them in offices or classrooms. Plants in classrooms would require permanent care-takers, such as professors or janitorial staff who do not mind the extra workload.

Another area that the University fell short in is the percentage of HVAC systems cleaned yearly. Only 6.82% of the HVAC units were cleaned last year. This is far below the short-term benchmark of 50% per year. The simplest solution to this problem is to have the janitorial staff clean all the vents every year. This may be difficult for the staff if they are extremely busy already.

Conclusion

The research that was conducted on air quality has shown that UPEI must take steps to remove contaminants that are found in the air. Some examples of

these contaminants are asbestos and mould, pesticides, and chemicals used in cleaning. It is very important to reduce or eliminate these harmful substances from the air as they can cause many human health concerns. There is a strong need for opening windows in some of the buildings, and many lack plants which can help to purify the air. Easily accessible records on asbestos and mould and indoor pesticide management is our first recommendation for reaching sustainable air quality practices. Along with that, we recommend an organized, easily accessible set of floor plans for every building, as that information is important for many sustainability sectors. These recommendations should be addressed as soon as possible. To increase awareness for the need of plants, one of the societies on campus, like the Biology Society, could raise funds and awareness by selling indoor plants on campus.

9.1.2 Quality and Monitoring

Introduction

Protection of indoor air quality is essential. Good ventilation systems, plants that act as air filters, and reduced pollutants are important to maintaining healthy air quality. Though there are many ways to improve air quality, one must have monitoring systems to ensure that the steps taken are effective in maintaining clean air, for the good of human health. Monitoring also supplies records for future reference and comparison to other universities and standards of air quality, such as LEED green building criteria.

Methods

For indicators A-10 Carbon Dioxide Monitoring Indoors and A-11 Indoor Air Quality Complaints, Calder Campbell, Building Systems Foreman - Facilities Management, was e-mailed and an interview was arranged for March 28, 2005. The information needed on carbon dioxide monitoring systems and air quality complaints was obtained during the interview.

Results

Indicator A-10, the percentage of interior zones with CO_2 monitoring systems, could not be calculated correctly since the University does not use the interior zone system. The University would likely fall short of the benchmark of 50%. The W.A. Murphy Student Centre has two carbon dioxide monitoring systems and is the only building on campus with them.

The total number of air complaints received last year per 5000 CCMs was 8.4, much higher than the benchmark of 1 per 5000 CCMs, and the long-term goal of zero per 5000 CCMs.

Discussion

The idea of monitoring for carbon dioxide levels is fairly new, and is of particular concern for rooms that hold a high population of people because people exhale carbon dioxide. Only the newest building, the W.A. Murphy Student Centre, has carbon dioxide monitors. One for the student bar and one for the courtyard, both of which frequently contain a high density of people. The carbon dioxide monitors measure the level of CO_2 and automatically increase ventilation when levels are high. There are plans to buy another monitor. Eventually monitors for every building should be put in place.

Last year eight complaints were received by Facilities Management. The complaints were filled out on a form, which was passed on to Calder Campbell who assessed the problems and made recommendations to fix them. The number of complaints was above the recommend benchmark of 1 per 5000 CCMs. Calder Campbell told me two air quality complaints have already been received to date this year. He explained that they were caused by a warm air inversion that occurred in February. A warm air inversion occurs when warm air moves in and then cold air moves in over the warm air , trapping the warm air and any odours associated with the warm air (C. Campbell, personal communication, April 1, 2005). Closer monitoring of air quality and upkeep of ventilation systems could help lower the occurrences of poor air quality complaints.

Conclusion

It is important to properly monitor air quality, especially considering many of our buildings are old and have poor ventilation systems. Our research has shown that UPEI has very few carbon dioxide monitoring systems. It has been documented that people have experienced health concerns due to poor air quality on campus. The University should budget funding to improve monitoring systems and overall air quality to ensure people remain healthy and content. A healthy environment attracts new students, faculty, and staff.

9.2 Outdoor

9.2.1 Protection

Introduction

Our atmosphere is filled with pollutants everyday, from the exhaust of cars, smokestacks of industry, and methane of livestock. As a university, it is important that we minimize our contribution to air pollution. Toxic air emissions negatively affect human health, health of other living organisms, and our global climate. An increase in respiratory illnesses, including asthma, emphysema, and lung cancer decreases the amount people can participate in society and increases the cost of health care. This makes it economically and socially unsustainable. As well, it is not only the human species that is affected by poor air quality but all living organisms. Air quality is important in being environmentally sustainable. It is important to reduce harmful outputs into the air, as well to encourage the removal of existing pollutants.

Methods

Indicator A-12 Smoke-free Outdoor Spaces was done using the knowledge of the University's policy of having a 4.5 metre smoke-free buffer zone around any entrance. The number of entrances was counted in a campus-wide survey. The smoke free area was then calculated (see Appendix 9.4).

An inventory of the amount of trees on campus, inside the Perimeter Road, was completed for indicator A-13 Living Trees Outdoors. Total outdoor space inside the Perimeter Road was obtained from the CSAF Land group.

Results

Dividing the smoke-free area by the total outdoor space (in square metres), and multiplying that by a hundred, we obtained 12.02%. The goal for this indicator will eventually be to have all outdoor land area on campus smoke-free. The short-term benchmark is to have at least 75% of the outdoor campus space smoke free.

Results for the amount of living trees on campus (A-13) reveal that there are a total of 841 trees within the perimeter of the campus. The benchmark for this indicator is "at least 0.05 trees per square metre." UPEI currently has 0.0023 trees per square metre.

Discussion

UPEI falls far short of the recommended total outdoor space that is smoke free. It is important to increase the amount of smoke-free outdoor space. Tobacco smoke contains four thousand chemicals, at least fifty of the those chemicals have been linked to cancer. Over 450,000 Canadians will die from smoking this year (Health Canada, 2004). There are challenges to expanding smoke-free outdoor space, which must be carefully considered. Implementing any policy to further restrict the area in which smokers can smoke would meet with resistance. Smokers would feel further alienated and limited in their freedom. It would also be difficult to enforce a smoke-free outdoor space policy.

The low relative population of trees on campus is not entirely representative of the density of trees because the wooded field beyond the University Perimeter Road was not included. The field is fairly densely wooded and was not included due to time constraints. In further campus sustainability assessments, including that area will favourably increase the recorded density of trees on campus. It is

difficult to get support for planting more trees on campus, as Security worries that more trees will provide more cover for assailants.

Conclusion

The low results of the outdoor air protection section indicate that awareness and concern for outdoor quality needs be raised. While it would be better for the environment and for the health of campus community members if the entire campus was smoke free, it would be unlikely to occur. It is likely many of the smoking members of the campus community would be unsupportive and offended by a policy that banned smoking outdoors. It is very hard to pass and enforce a policy that is not supported by the people it affects. We recommend efforts instead be focused on campus programs to help people quit smoking and campaigns that raise awareness of the dangers of smoking.

The University would benefit from more trees as they can provide shelter from the wind and absorb carbon dioxide from the air. Security concerns are valid, and could be addressed by campaigns emphasizing the importance of not walking alone at night and calling security for a drive if necessary. A survey of the number of trees in the field beyond the Perimeter Road should also be done for future reference.

9.2.2 Quality and Monitoring
Introduction

The emissions of pollutants into the air cannot be completely reduced immediately. In protecting outdoor air quality it is imperative to have a monitoring system. Measurable results make it possible to have specific quantitative goals, as well as providing a way to compare with other universities, past records, and future results.

Methods

An interview with Calder Campbell was conducted April 1, 2005 to determine the monitoring of exterior vents (A-14).

Results

It was discovered, through Facilities Management, that no monitoring of exterior vents for greenhouse gases (GHG), including CO_2, or of particulates occurs on campus. The percentage of vents monitored is therefore 0%. The short-term benchmark for this indicator is at least 50%. The long term benchmark is full monitoring of all vents (100%).

Discussion

There is no monitoring of outdoor air emissions. The University falls far short of the short-term benchmark of 50% of HVAC&R units having particulate, carbon dioxide, and other greenhouse gas monitors. This may be due to a lack of awareness of the serious effects these emissions have on human and other organisms health directly, as well as indirectly from climate change. Monitors should be installed on as many possible HVAC system as possible.

Conclusion

Greenhouse gas emissions from the University are contributing to climate change, and along with the rest of Canada, we need to monitor our outputs and lower them as much as possible. Climate change is a global issue that the people of Prince Edward Island should be concerned about. Prince Edward Island is very vulnerable to a rise in sea level caused by climate change. Our delicate sand dune ecosystems will be easily eroded away and property close to the shore will be damaged (Government of Canada, n.d.). Monitoring systems should be installed to record the emissions of our University, so that we can set goals to reduce our emissions.

Appendix 9.1: Total indoor space of buildings on campus

Name of building	Total indoor area (ft^2)	Total indoor area (m^2)
Atlantic Veterinary College	246346	22886.29
Bernardine Hall	40415	3754.68
Blanchard Hall	55506	5156.68
Cass Science Hall	14953	1389.18
Central Utility Building	56292	5229.7
Chaplaincy Centre	4040	375.33
Classroom Centre	15067	1399.77
Dalton Hall	19800	1839.48
Duffy Science Centre	44133	4100.09
Equipment Depot	2766	256.97
K.C. Irving Chemistry Centre	24750	2299.35
Kelley Memorial Building	28119	2612.34
Main Building	44710	4153.69
Marian Hall	18130	1684.33
Robertson Library	112263	10429.57
Memorial Hall	19709	1831.03
Chi-Wan Young Sports Centre	60459	5616.83
Steel Building	25134	2242.12
W.A. Murphy Student Centre	38680	3593.49
Wanda Wyatt Dining Hall	12652	1175.41

Total area = 82026.33 m^2

Appendix 9.2: Total area of rooms with opening windows

K.C. Irving Chemistry Centre – Level 1

Room number	Area in square feet	Area in square metres
101	289	26.8
102	340	31.3
104	1475	137.0
111	1178	109.4
112	1141	106.0
128	952	88.4
129	308	28.6
129A	308	28.6
131	242	22.3

K.C. Irving – Level 2

Room number	Area in square feet	Area in square metres
200	540	50.2
202	266	24.7
209	372	34.6
210	162	15.0
211	162	15.0
212	162	15.0
213	162	15.0
214	162	15.0
217	1891	175.7
218+221	432	40.1
225	1500	139.4
227	168	15.6
229	920	85.5
231	1029	95.6
232	135	12.5

Total area = 1327.6m^2

W.A. Murphy Student Centre

Room number	Dimensions (ft)	Area (m²)
Courtyard	74x64	22.56 x 19.51 = 440.15m²
209	16x11	4.88 x 3.35 = 16.35m²
210	11x19	3.35 x 5.79 = 19.40m²
245	(13x10) – 1/2(4x4)	(4.27 x 3.05) – 1/2 (1.22 x 1.22) = 12.28m²
246	10x11	3.05 x 3.35 = 10.22m²
247	11x11	3.35 x 3.35 = 11.22m²
248	13x11	3.96 x 3.35 = 13.27m²
249	11x11	3.35 x 3.35 = 11.22m²
250	14x13	4.27 x 3.96 = 16.90m²
251	14x10	4.27 x 3.05 = 13.02m²
252	14x10	4.27 x 3.05 = 13.02m²
254	13x12	3.96 x 3.66 = 14.49m²
255	11x12	3.35 x 3.66 = 12.26m²
256	10x12	3.05 x 3.66 = 11.16m²
257	10x13	3.05 x 3.96 = 12.08m²
276	9x12	2.74 x 3.66 = 10.03m²
277	10x12	3.05 x 3.66 = 11.16m²
278	11x12	3.35 x 3.66 = 12.26m²
290	(37x64) + (4x44)	(11.28 x 19.51) + (1.22 x 13.41) = 236.43m²

Conversion factor (feet to metres) = .3048

Total area = 896.92m²

Chi-Wan Young Sports Centre – Lower Level

Room	Area (m²)
101	2.6m x 3.5m = 9.1m²
107	6.0m x 5.2m = 31.2m²
108	3.2m x 6.0m = 19.2m²

109	5.5m x 6.0m = 33m^2
110	(12.3m x 8.8m) + (10.1m x 6.5m) - (0.9m x 5.5m) + 1/2 (2.4m)2 = 171.8m^2

Chi-Wan Sports Centre - Upper Level

200	(6.5m x 6.0m) + (1.5m x 4.8m) - (2m x 2.5m) = 41.2m^2
205	3.2m x 4m = 12.8m^2
207	(10.2m x 3.4m) + (6.0m x 6.6m) = 74.28m^2
209	(10.2m x 3.4m) + (6.0m x 6.6m) = 74.28m^2
212	9.5 x 8.0m = 76m^2
216	

Total area = 487.78m^2

Main Building - First Level

Room	Dimensions (ft)	Area (m^2)
6	(26 x 12) + (20 x 7)	(7.92m x 3.66m) + (6.10m x 2.13m) = 41.98m^2
20	36 x 24	10.9m x 7.32m = 80.30m^2
26	(25 x 28) – 1/2 (13 x 18)	(7.62m x 8.53m) – 1/2 (3.96m x 5.49m) = 54.13m^2
30	28 x 33	8.53m x 10.06m = 85.81m^2
40	54 x 38	16.46m x 11.58m = 190.61m^2

Total area= 452.83m2

Main Building - Second Level

Lobby	26 x 40	7.92m x 12.19m = 96.54m^2
101	40 x 40	12.19m x 12.19m = 148.60m^2
110	9 x 8	2.74m x 2.44m = 6.69m^2

111	20 x 16	6.10m x 4.88m = 29.77m^2
112	10 x 16	3.05m x 4.88m = 14.88m^2
114	11 x 16	3.35m x 4.88m = 16.35m^2
115	12 x 16	3.66m x 4.88m = 17.86m^2
116	11 x 16	3.35m x 4.88m = 16.35m^2
117	18 x 16	5.49m x 4.88m = 26.79m^2
120	38 x 25	11.58m x 7.62m = 88.24m^2
130	30 x 44	9.14m x 13.41m = 122.57m^2
132	17 x 16	5.18m x 4.88m = 25.28m^2
133	10 x 16	3.05m x 4.88m = 14.88m^2
135	8 x 16	2.44m x 4.88m = 11.91m^2
136	10 x 16	3.05m x 4.88m = 14.88m^2
137	8 x 16	2.44m x 4.88m = 11.91m^2
138	10 x 16	3.05m x 4.88m = 14.88m^2
139	10 x 16	3.05m x 4.88m = 14.88m^2
140	10 x 16	3.05m x 4.88m = 14.88m^2

Total area = 708.14m^2

Main Building - Third Level

Room	Dimensions (ft)	Area (m^2)
201	(14'x16') – 1/2(8'x8')	(4.27m x 4.88m) – 1/2(2.44m)^2 = 17.86m^2
202	10'x16'	3.05m x 4.88m = 14.88m^2
203	10'x16'	3.05m x 4.88m = 14.88m^2
204	10'x16'	3.05m x 4.88m = 14.88m^2
205	10'x16'	3.05m x 4.88m = 14.88m^2
206	10'x16'	3.05m x 4.88m = 14.88m^2
207	10'x16'	3.05m x 4.88m = 14.88m^2
208	10'x16'	3.05m x 4.88m = 14.88m^2

209	10'x16'	3.05m x 4.88m = 14.88m^2
210	9'x8'	2.74m x 2.44m = 6.69m^2
211	26'x16'	7.92m x 4.88m = 38.65m^2
212	10'x16'	14.88m^2
213	8'x16'	2.44m x 4.88m = 11.91m^2
214	10'x16'	14.88m^2
215	10'x16'	14.88m^2
216	11'x16'	3.35m x 4.88m = 16.35m^2
217	21'x16'	6.40m x 4.88m = 31.23m^2
220	39'x27'	11.89m x 8.23m = 97.85m^2
221	(16'x14') – 1/2(3'x3')	(4.88m x 4.27m) - 1/2(0.96m)^2 = 20.43m^2
223	16'x10'	14.88m^2
224	16'x11'	4.88m x 3.35m = 16.35m^2
225	16'x10'	14.88m^2
226	16'x11'	16.35m^2
227	(16'x12") + 1/2(16'x9')	(4.88m x 3.66m) + 1/2(4.88m x 2.74m) = 24.55m^2

Total area= 629.70m2

Main Building - Fourth Level

Room	Dimensions (ft)	Area (m^2)
301	317	29.4m^2
302	160	14.9m^2
304	160	14.9m^2
305	144	13.4m^2
306	160	14.9m^2
307	144	13.4m^2
308	160	14.9m^2

309	144	13.4m^2
310	63	5.9m^2
311	400	37.2m^2
312	160	14.9m^2
313	160	14.9m^2
314	160	14.9m^2
315	160	14.9m^2
316	160	14.9m^2
317	160	14.9m^2
319	150	13.9m^2
320	988	91.8m^2
321	131	12.2m^2
323	135	12.2m^2
324	135	12.2m^2
325	135	12.2m^2
326	135	12.5m^2
327	285	26.5m^2
328	135	12.5m^2
330	210	19.5m^2
332	240	22.3m^2
333	285	26.5m^2
340	918.5	85.3m^2

Total area = 622.2 m2

Main Building - Fifth Level

Room	Dimensions (ft)	Area (m^2)
401	338	31.4
402	130	12.1
404	130	12.1
406	130	12.1
407	130	12.1
408	130	12.1

409	130	12.1
410	56	5.2
411	338	31.4
412	143	13.3
413	143	13.3
414	143	13.3
415	143	13.3
416	143	13.3
417	143	13.3
418	117	10.9
419	143	13.3
420	900	83.6
421	180	16.7
423	157.5	14.6
424	157.5	14.6
425	157.5	14.6
426	157.5	14.6
427	210	19.5
428	157.5	14.6
430	157.5	14.6

Total area = 452.0 m2

Total area of opening windows for Main Building: 2864.87 m^2

$452.83m^2 + 708.14m^2 + 629.70m^2 + 622.2m^2 + 452.0 m^2 = 2864.87m^2$

Wanda Wyatt Dining Hall

Room	Area (m^2)
Entry 101	16.00m^2
Lobby 102	94.95m^2
Women's room 105	26.25m^2
Office 109	9.86m^2
Mechanical room 110	8.75m^2

Electric room 111	9.10m^2
Garbage room 112	10.00m^2
Receiving 114	12.00m^2
Dry storage 118	22.80m^2
Meat cooler 119	9.50m^2
Freezer 120	9.50m^2
Vegetable cooler 121	9.50m^2
Baking 122	17.48m^2
Dish pot washing 123	38.00m^2
Dining Hall 127	430.25m^2

Total area = 723.94 m2

Total area of indoor space serviced by opening windows:

Chi-Wan Young Sports Centre:	487.78 m^2
K.C. Irving Chemistry Centre:	1327.60 m^2
Main Building:	2864.87 m^2
W.A Murphy Student Centre:	896.92 m^2
Wanda Wyatt Dining Hall:	723.94 m^2
Total:	6301.11 m^2

Total area of buildings:

Chi-Wan Young Sports Centre:	5616.83 m^2
K.C. Irving Chemistry Centre:	2299.35 m^2
Main Building:	4153.69 m^2
W.A Murphy Student Centre:	3593.49 m^2
Wanda Wyatt Dining Hall:	1175.41 m^2
Total:	16838.77 m^2

Percentage of indoor space serviced by opening windows:

6301.11m^2/16838.77m^2 x 100 = 37.42%

Appendix 9.3: Total number of living plants indoors

Building	Number of plants in building	Total area of building
Main	43	4153.69m^2
K.C. Irving Chemistry Centre	7	2299.35m^2
W. A. Murphy Student Centre	9	3593.49m^2
Robertson Library	58	10,429.57m^2
Kelley	44	2612.34m^2
Cass	6	1389.18m^2
Dalton	89	1839.48m^2
Memorial	39	1831.03m^2
Chaplaincy Centre	3	375.33m^2
Total	298	28523.46m^2

Plants per square metre = 298/28523.46m^2 = 0.01

Appendix 9.4: Calculations

A-2: Percentage of scent-free indoor spaces

Dalton Hall: $1839.48m^2$

W. A. Murphy Centre: $+ 3593.49m^2$

Total scent-free spaces: $= 5432.97m^2$

Total indoor area: $82026.33m^2$

$5432.97m^2 / 82026.33m^2$ x 100 = 6.62%

A-9: Percentage of HVAC units cleaned in the last year

Number of HVAC units cleaned in past year = 1

Number of HVAC units partially cleaned in past year = 2

Total number of HVAC units = 44

% of HVAC units partially or fully cleaned in last year = 3 / 44 x 100 = 6.82%

A-12: Percent of smoke-free outdoor space

Total number of entrances: 123

Smoke-free area around one door way: $1/2$ x $\prod r^2$ = [$1/2$ x $\prod$ $(15m)^2$] = 353.43

Total outdoor smoke-free space = [$1/2$ x $\prod$ $(15m)^2$] x 123 = $43471.79m^2$

Total outdoor space within the Perimeter Road = $361,385.76m^2$ (CSAF Land
    group, personal communication, March 30, 2005)

Percent of smoke-free outdoor space: 12.03%

A-13 Number of trees per square metre

Total Trees: 841

Total outdoor space within the Perimeter Road = $361,385.76m^2$ (CSAF Land
    group, personal communication, March 30, 2005)

Trees per outdoor square metre = $841/361385.76m^2$ = 0.0023 trees/m^2

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10.   Energy

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Abstract

We live in a world that is run on oil and this causes much conflict around the world both politically and environmentally. We are reminded of that aspect of our lives every day because almost every aspect of human existence has some type of dependance on oil to it. From the time your alarm clock wakes you up in the morning, to when you start your car in the morning, till the time you turn your light off at night to go to sleep, you are contributing to the problem of global warming and climate change through CO_2 and other greenhouse gas emissions.

The way we produce energy for our daily lives is at the forefront of this problem. With 41% of the global demand for energy coming from oil alone, and another 46% coming from a mix of natural gas and coal power plants (Davis et al., 2003, p. 4), it's no wonder that we are starting to see changes in our weather patterns and changes in the migratory paths of birds and sea life. We are not sustainable with our energy production techniques and sources and that needs to change before our environmental fails and we are left with a dead planet with no oil left to burn.

This may sound pretty bleak but with new technologies with renewable energy sources for our transportation and our energy production, we can make a difference and we can stop the negative effects that we are having on our environment, as well as benefitting the economy by adding jobs to our country through the now developing green sector of our country's industry.

10.1 Sources

Introduction

This chapter is split into three parts. Energy Sources (10.1), Intensity of Energy Use (10.2), and Energy Management (10.3). Energy Sources is further

split down into three separate indicators, Renewable Energy: Buildings (E-1), Renewable Energy: Fleet and Grounds Vehicles (E-2), and, finally, Local Energy Sources (E-3).

It is important to look at the energy sources for an institution because you can save a lot of money on your power bill. But if you're still purchasing energy from non-renewable energy sources, you're still affecting the environment in a very adverse way. You can save money, and at the same time help the environment by not purchasing non-renewable energy.

Unfortunately, not all indicators were able to be answered at this time because of lack of records and time. But we now have a very important understanding that UPEI is not sustainable in its energy consumption and purchasing practices. UPEI is a very small university and stands to benefit greatly from an increased savings from a mix of sustainable practices, energy consumption awareness, and with the purchase of renewable energy.

Methods

To find out how much energy is consumed on campus each year and how much renewable energy is consumed each year (E-1), we contacted the Energy Manager Greg Clayton [Editor's note: Director of Facilities Management], who put us in contact with Calder Campbell (Building Systems Foreman), who was able to give us information on energy use for electricity and heat.

Calder Campbell was able to put us into contact with Kathy MacKenzie, who works with Facilities Management. Kathy was able to give us information about the gas consumption of the fleet and grounds vehicles, and info on the fleet and grounds vehicles themselves (E-2). Not much information was available on the fleet and grounds vehicles. No gas consumption records were kept, and the amount of vehicles on campus was unknown because each faculty takes care of its own fleet, and there is no Fleet Manager.

Calder Campbell was also able to give us contact info for Dave Wonnacott at PEI Energy Systems. Unfortunately, he did not return our calls and so we were

unable to hold a meeting with him for the answers to sources of UPEI's energy sources (E-3). The answers were made available from information taken from the energy consumption assessment done on campus during the 2004-2005 school year.

Results

E-1 Renewable Energy: Buildings

According to Calder Campbell, UPEI consumed 13,640,511 kWh worth of energy for electricity (49,100 GJ) and 23,170,000 kWh of energy for heating (83,400 GJ) in 2003.

In 2004, UPEI's energy consumption increased very slightly, consuming 13,770,390 kWh worth of energy for electricity (49,600 GJ), and consuming 24,397,000 kWh worth of energy for heating (87,800 GJ).

Unfortunately, there were no records as to how much renewable energy is consumed by the University. Only one building on campus has solar panels, and it has been questioned whether those solar panels are even still in working order. The solar panels were initially used to help heat water in the Maintenance Building.

The short-term benchmark for this indicator is to have 20% of our energy consumption to be from renewable energy systems, and we are at close to zero. This indicator should take priority to be assessed by a faculty member because if we want to become a sustainable campus, we must start with our energy sources and our energy production on campus from solar and wind power generation.

E-2 Renewable Energy: Fleet and Grounds Vehicles

For the information on this indicator, we approached Kathy MacKenzie from Facilities Management, and conducted an interview on April 7 and 8, 2005. The only information she was able to give us was that Facilities Management has 15 vehicles that are used on and off campus, and that they range from gators (maintenance vehicles) [Editor's note: utility vehicles], to tractors, to heavy duty trucks. Unfortunately, she was unable to give us any information on the rest of the

faculties' vehicles on campus, due to the fact that each faculty deals with its own vehicles and own gas consumption records, which no faculty keeps track of. Due to time restraints, we were unable to contact anyone from other departments for any additional information on this indicator.

We were, however, told that a lot of vehicles are owned by the Atlantic Veterinary College and that most of them would be a heavier model of automobile, for transportation of the large animals that they treat at the facility. Also, we found out that a lot of professors who receive grants from the University are sometimes allotted a vehicle for their use on their research project. All of which adds to the overall amount of CO_2 released into the atmosphere by our institution. Once again, no concrete information was available on this matter.

UPEI at this time has no vehicles that are powered by alternative energy sources, and has no intentions of purchasing a green fleet for the campus. The short-term goal for this indicator was to have 20% of our fleet vehicles powered by renewable energies, and we are at 0% because we don't have a single one. It is uncertain at this time whether or not UPEI plans on purchasing any green fleet vehicles.

E-3: Local Energy Sources

Initially, we tried to get the information for this indicator from Dave Wonnacott from PEI Energy Systems; however, we were unable to get into contact with him and had to look for the information regarding the energy production for our campus from a different location.

For this info we looked to the energy assessment that was done for our campus during the 2004-2005 school year, which yielded some very unsettling information.

UPEI receives the bulk of its energy from off-Island non-renewable energy producing power plants (coal and natural gas); power produced from an incinerator, which also provides heat for the Queen Elizabeth II Hospital located in Charlottetown; and we also get some power here on campus by burning wood

chips. All three of these methods of producing energy are very hard on the environment and release very large amounts of CO_2 and other noxious chemicals into the atmosphere, especially the incinerator.

Once again, the short-term goal is to have 20% of our energy produced by local renewable energy sources, and we are at approximately 0%. [Editor's note: indicator does not specify local energy sources, within 500km of the campus, are to be renewable.] This can be done, however, by switching part of our power consumption to electricity produced from the AWTS (Atlantic Wind Test Site) located in North Cape, PEI, which has seen recent development in the last decade and is very well accepted as innovation here on PEI.

Discussion

After looking over the information we were able to gather on the energy sources used at UPEI, much can be done to reach towards a sustainable future, and much must be done to achieve it. As it stands, UPEI is not sustainable in its energy practices, and in our opinion makes UPEI not able to be sustainable at all. An institution's energy consumption and type of energy used, whether renewable or non-renewable, plays a huge part in the struggle for sustainability and without the use of clean energy to power such an institution, you cannot reach a sustainable level of existence.

As previously stated, a very easy way to start consuming renewable energy is to start purchasing power from the AWTS. This is definitely feasible. The only downside is that it is being sold to the consumer at a higher rate, which yes, is strange because wind has no cost to it. But that higher cost could more than be offset by the saving in overall energy consumption with the use of less consuming appliances and more stress put on energy conservation. An example of this is students beginning to turn off their computers and monitors when they are done using them; this is becoming increasingly popular on campus, which also shows that students are interested in helping the environment, and that more students are becoming interested in what problems the environment has right now.

The energy awareness program should definitely be established again next year, because with the completion of two new buildings here on campus (the new residence and the new research building) energy consumption overall on campus will go up.

One interesting aspect of the UPEI faculty that caught us by surprise is the fact that there is no position for Fleet Manager for the entire campus. If we want to take a firm stance in the fight against global warming, a Fleet Manager would be a step in the right direction.

If the position was to be made available, it should be filled by an individual who is environmental conscious as well as having a good understanding of sustainability practices. This would ensure that future investments for the fleet would be made with the idea of sustainability at the forefront, and not cheapness of vehicles, thus helping UPEI reach its goal of becoming one of the few, truly sustainable campuses.

Conclusion

If UPEI wants to be sustainable and have as little impact on the surrounding environment as possible, it is going to have to make drastic changes to its dependence on electricity through non-renewable energy sources. There are alternatives that can and should be introduced to the campus (i.e., more widespread solar panel use on campus and purchase of wind energy from the ATWS). This would be a milestone for the campus on the journey towards sustainability, and would drastically reduce the amount of CO_2 and other environmentally-unfriendly emissions produced by the campus.

The campus fleet could also be upgraded very easily with the purchase of one or more hybrid vehicles, battery-powered maintenance vehicles, and bio-diesel power lawncare equipment. Currently, UPEI utilizes none of the above-mentioned technology, but should look towards the purchase of some of these vehicles to help work towards sustainability.

10.2 Intensity of Use

Introduction

The indicators in this section measure how efficiently and intensely energy is consumed on our campus. The indicators focus on the energy that is consumed for all heating, cooling, ventilation, and electrical systems (E-4), as well as the energy consumed for all fleet/grounds (E-6) and commuting vehicles (E-5) used on campus. It also measures the energy consumed in relation to the campus floor space (E-4) and relative to the number of campus community members (E-5).

Despite that fact that our campus is much smaller than many other universities around Canada, it is still by no means sustainable. As a result of the issues regarding climate change and Canada's signing of the Kyoto Protocol, Canada is required to reduce greenhouse gas emissions by approximately 6% by the year 2010. [Editor's note: under the Kyoto Protocol, Canada is obliged to reduce its GHG emissions to 6% below 1990 levels by the period between 2008 and 2012. During a visit to the UPEI campus on 3 March 2005, Federal Environment Minister Stephane Dion stated that since GHG emissions have increased, in practice the Kyoto obligation amounts to a required reduction of 26% by 2010.] These reductions should begin on our campus by using more renewable energy sources and also through implementing a transit system to reduce the fuel that is expended on campus travel.

Therefore, while current progress towards a sustainable campus is bleak, there are several changes that could be enforced to make the University of Prince Edward Island more sustainable.

Methods

To assess indicators E-4 Greenhouse Gas Emissions: Buildings and E-8 Reduction in Energy Consumption, an interview was conducted on March 21st, 2005 with Calder Campbell who is the Building Systems Foreman on the University of Prince Edward Island campus. These indicators assessed the total energy consumed for the heating, cooling, ventilation, and electrical systems as well as the

total amount of interior space on campus and how many energy meters are located on campus. He provided us with estimates of the total energy consumed for the electrical and heating systems on campus. The electrical and heating systems estimates were presented to us in kiloWatt hours (kWh) and Megawatt hours (MWh), which had to be converted into Gigajoules (GJ). This number then had to be converted into GHG equivalent (tonnes) and divided by the total number of square meters of interior space on campus.

To specify the total energy consumed for the commuting transportation and the number of campus community members (CCMs) (E-5), we contacted the Registrar's Office on March 17th, 2005 and Al Veal, who is in charge of Security & Utility on campus. We conducted these interviews on March 21st, 2005. He provided us with the total number of parking passes sold and the total number of parking spaces for the current and previous year. The Registrar's Office gave us an estimate of the number of campus community members (CCMs) for the current and previous year.

To determine the total amount of energy consumed for all fleet and grounds vehicles/equipment (E-6), an interview was conducted with Kathy MacKenzie, who is the Assistant Manager of Facility Services, on April 7th, 2005. She provided us with the number of vehicles used on and off campus, including tractors, gators, etc. To calculate the total energy consumed for work-related travel and the total number of faculty and staff for the current year (E-7), we conducted an interview with Doreen Foster in the Accounting Office on April 7th, 2005. She was unable to provide us with the necessary information, because it was too time-consuming to review all of the files on travel for faculty and staff.

Indicator E-8 assesses the total change in energy consumption in Gigajoules for buildings, commuting, and fleet and grounds vehicles in the current year over the previous year. A portion of this information was already obtained from the interviews with Calder Campbell, Al Veal, and Kathy MacKenzie. They provided us with the information for the current and previous year. The energy

consumed for the buildings, electrical, and heat was given to us in kiloWatt hours and Megawatt hours, which had to be converted to Gigajoules.

Results

      Calder Campbell, who is the Building Systems Foreman on campus, provided us with the total energy that was consumed for the heating, cooling, ventilation, and electrical systems for 2003 and 2004 (see Appendix 10.2). In 2003, the energy consumed for the electrical systems was 13,640,511 kWh, the energy consumed for the heating systems was 23,170 MWh. These had to be converted to Gigajoules, which totalled 49,105.8396 GJ for the electrical system and 83.412 GJ for the heating system. In 2004, the energy consumed for the electrical system was 13,770,390 kWh and the energy consumed for the heating systems was 24,397 MWh. These had to be converted to Gigajoules which resulted in 573.404 GJ for the electrical systems and 87,829.2 GJ for the heating system. These numbers also had to be converted into GHG equivalent (tonnes). In 2003, the electrical system in tonnes totalled $1.17 \times 10^{(7)}$ and the heating system totalled $1.99 \times 10^{(3)}$ tonnes of oil. In 2004, the electrical system totalled $1.18 \times 10^{(6)}$ tonnes of oil and the heating system totalled $2.09 \times 10^{(3)}$. For 2003, the total energy consumed in tonnes of oil was $1.17 \times 10^{(3)}$ and for 2004, the total energy consumed in tonnes of oil was $3.28 \times 10^{(3)}$. [Editor's note: it is unclear to me what the students did here; the CSAF p. 182-183 does not specify conversions, and we did not use the e-mission calculators mentioned on p. 183 of the CSAF Toolkit.]

      Calder Campbell also provided us with the total square meters of interior space on campus, which added up to 83,981 m^2 (see Appendix 10.1). To determine the long-term goal of this indicator, the total energy in tonnes [Editor's note: GHG emissions in tonnes] was divided by the total interior space in square meters. This totalled $1.39 \times 10^{(5)}$.

      Indicator E-5 assessed the total greenhouse gas emissions for the commuting transport. Al Veal provided us with the number of parking passes that

were purchased in 2003/2004 and 2004/2005 (a portion of the year) (see Appendix 10.3). For 2003/2004, a total of 2,175 parking passes were sold, and 111 reserve parking passes were sold. In 2004/2005, a total of 1,993 general parking passes were sold and 106 reserve passes. The CARI Centre (Capital Area Recreation Inc. Aquatics Facility and MacLauchlan Arena), which is a new addition to the campus, sold 242 parking passes. This year, there was a 2.4% increase in parking passes sold. The total number of parking spaces on campus in 2004/2005 is 1,112 general parking spaces, 124 reserved spaces, and 20 barrier-free (accessible) spaces.

We could not obtain the total energy consumed by commuting transport (E-5) because there is not a way to keep track of all of the vehicles that commute to and from campus. However, the number of parking passes sold gives us a rough idea of the number of vehicles that commute to campus.

The Registrar's Office was able to provide us with an estimate of the number of CCMs on campus, which is approximately 500 faculty, 200 staff [Editor's note: appr. 200 faculty, appr. 500 staff] and 3,455 full-time students and 594 part-time students were registered in December of 2004 (see Appendix 10.3).

Indicator E-6 evaluated the greenhouse gas emissions for fleet and grounds vehicles on campus. Kathy MacKenzie, who is the Assistant Manager of Facility Services, informed us that there are 15 vehicles used on and off campus for various purposes (e.g., gators, tractors). This does not include the different vehicles used for the Atlantic Veterinary College, Biology Department, Chartwells, and research grant vehicles. There were no records of the amount of gas that was bought by the University because this purchasing was done within each faculty. Due to time constraints, we were unable to obtain the amount of fuel that was used for these fleet and grounds vehicles. The lack of files could also be due to the fact that there is no Fleet and Grounds Vehicles Manager. The number of campus community members in 2004/2005 is approximately 700 faculty and staff, and 3,455 full-time students and 594 part-time students enrolled at the University as of December 1st, 2004. This results in a total of 4749 campus community members.

Indicator E-7 assesses the greenhouse gas emissions for campus travel. We were able to find out the number of staff and faculty for the current year, but were unable to determine the total energy consumed for all work-related travel (air, land, water). Doreen Foster stated that it would be time-consuming to find the necessary information to assess this indicator, and some of the information is not allowed to be shown to the general public.

Indicator E-8 measures the total reduction in energy consumption in GJ for all buildings, commuting, and fleet and grounds vehicles in the current year over the previous year. This indicator can not be completed fully; however, the total energy consumption in Gigajoules for 2003 was 49,105.8396 for the electrical system and 83,412 Gigajoules for the heating system. The total energy consumption in Gigajoules for 2004 was 49,573.404 for the electrical system and 87,829.2 for the heating system. We were unable to reach our short-term benchmark, which was 0% to –5% change, or long-term goal, to determine whether there was a positive change made, which would indicate a reduction in energy consumption, because we could not obtain all the necessary information that was required for this indicator.

Discussion

UPEI does not use renewable energy sources for buildings or grounds vehicles, which falls short of the 20% short-term benchmark set by the Sierra Youth Coalition. As well, UPEI does not have a Fleet and Grounds Vehicles Manager, but instead records are kept within each individual faculty where vehicles are used (e.g., AVC, Biology Department, Chartwells, Campus Security). In order to gain a better perspective and control over UPEI-owned vehicles, we recommend hiring a Fleet and Grounds Vehicles Manager to keep track of vehicle use in an attempt to minimize their fossil fuel consumption.

Between 2003 and 2004, parking permit sales increased 2.4%. The majority of students, staff, and faculty posses parking passes. On top of that, there is no public transit system to persuade city-dwellers to choose a less energy-

consuming method of transport. UPEI is presently considering a public transit system and is conducting research regarding the transportation of students, staff, and faculty through the campus website. Our recommendation is that UPEI implements a program similar to that of UBCs Trek program as well as public transit. UBC's program is designed to help students get to school the most environmentally-friendly way possible. For example, you can register online to carpool with other UBC students. This program was implemented with the goal of "reducing the amount of single occupancy vehicle traffic coming to and from campus." Car owners receive a reward package that includes bus passes, premium parking spot access, and vouchers for car maintenance and repair (http://www.trek.ubc.ca/).

Some indicators were not available because UPEI simply does not keep records of certain energy expenditures. In terms of work-related travel, UPEI keeps receipts and measures travel in a monetary value rather than in terms of energy consumption. It is difficult to calculate, for example, the amount of energy spent transporting one person across the country by airplane. But focusing on dollars spent rather than energy consumed is telling only half the story in terms of having a sustainable campus.

Conclusion

At this point, the University of Prince Edward Island is not very sustainable in terms of the amount of energy consumed per square meters of interior space on campus. The University also does not keep proper records on fleet and grounds vehicles, and for faculty and staff travel. Therefore, it should be suggested that better records be kept so that these indicators can be assessed properly. The University of Prince Edward Island is implementing new ways to save energy by introducing plans such as the retrofit program and using new renewable energy sources. Consequently, the University is not very sustainable in terms of energy consumption and greenhouse gas emissions; nevertheless, new plans are being employed which will help our campus have a sustainable future.

10.3 Management

<u>Introduction</u>

Our University has many options regarding the reduction of energy use. Energy conservation has been an ongoing sustainability issue. The management staff at our University have the ability to monitor and keep accurate records of what kind and how much energy we consume annually. However, our campus has not kept very precise records of energy consumption information. We were able to obtain some information concerning our campus' energy use, but the data we were provided with were estimates which may not be entirely accurate. However, the data which will be presented will provide a useful illustration of the energy management on our campus. The relationship between energy consumption and sustainability is clearly very direct. The more 'unclean' energy we use, the more damage we do to the biosphere.

<u>Methods</u>

To determine the number of energy meters (E-9), the amount of square feet lit by automatic lighting sensors (E-12), and the amount of floor space upon which HVAC&R systems are operated with direct digital control (E-11), an interview was conducted on March 21st, 2005 with Calder Campbell, who is the Building Systems Foreman on campus. Calder Campbell indicated that it would be too labor-intensive and time-consuming to determine how much floor space is lit by lighting sensors, as well as how much of the HVAC&R system of the floor space is directly digitally controlled (E-11). He was, however, able to accurately indicate how many energy meters are on campus. Although he was unable to provide precise numbers for E-11 and E-12, he was able to supply approximations.

Calder Campbell provided a list of all the buildings on campus and the number of square feet in each building. He then provided estimates of how much of the campus floor space HVAC&R system operates with direct digital control. He also estimated how much floor space was lit by lighting sensors. He also supplied the number of energy meters on campus (E-9). Once we obtained the number of

energy meters, we divided that number by the number of square meters on campus. Calder Campbell provided all his estimates in square feet, all of which had to be converted into square meters. After the conversions were complete, we worked out how much of the campus floor space HVAC&R system operated with direct digital control by taking the number of square feet which are monitored and dividing that by the total number of square feet and multiplying that number by 100. We found out how many square meters of campus are lit by automatic lighting sensors through the same method.

In order to determine what percent of energy consuming equipment purchased over the past year was of the highest energy efficiency rating available (E-10), two campus staff members were contacted. First, Phil Hooper, who is the Head of the Comptroller's Office, was contacted via e-mail on March 17th, 2005. He provided a rough estimate of how much money was spent on energy consuming equipment over the past year. He was able to provide only a rough estimate because there are no records kept of purchases of energy consuming products. The only records kept were of all purchases made over the past year; these records did not consider whether or not the product consumed energy. To determine what how much of these purchases were of the highest energy efficiency rating available, we contacted the Procurement Office. We met with Roger Cook, who is the Head of the Procurement Office, on March 18th, 2005. He explained that information regarding the exact amount of money spent on energy efficient equipment was not tracked. However, he was able to provide us with an estimate of how much money was spent on energy efficient equipment over the previous year. We then took the two numbers provided by Phil Hooper and Roger Cook and divided them and multiplied them by 100 to determine the percent of energy efficient equipment purchased over the past year.

Results

According to Calder Campbell, the Building Systems Foreman, who was interviewed on March 21st, 2005 78% of our campus floor space HVAC&R system

is operated through direct digital control (E-11) (see Appendix 10.4). Calder Campbell also provided an estimate of how much floor space is lit by automatic lighting sensors (E-12) (see Appendix 10.5). He estimated that approximately 2% of the campus floor space is lit by automatic light sensors. The areas which are lit include the bathrooms almost exclusively. Based on the estimates provided by Phil Hooper and Roger Cook 85% of the energy consuming equipment purchased over the past year was energy efficient (E-10) (see Appendix 10.6). Calder Campbell also indicated the number of energy meters on campus (E-9); he indicated that there is one energy meter for every 2099 square meters.

Discussion

It appears that our University is doing considerably well in the subsection of energy management. A large portion of our campus floor space HVAC&R system is monitored directly and digitally (E-11); 78% of the floor space is monitored. The short-term benchmark is at least 50%. The long-term benchmark is 100%, so there still is some progress to be made. There are four buildings on campus which are not monitored digitally and four buildings which are partially monitored. The University should be making strides to digitally monitor each and every square meter of floor space on campus.

Our campus appears to be doing well with our purchases of energy efficient equipment (E-10). Our sources indicated that 85% of the equipment bought at our University over the previous year was energy efficient. This is largely due to the retrofit program which is taking place on campus. Our campus replaced 90% of its light bulbs with more energy-efficient bulbs. The short-term benchmark for the purchasing of energy-efficient equipment is 50%, so it appears that our campus is doing well. However, the long-term benchmark is 100%, so there are still improvements to be made. Although it appears we are doing quite well with our purchases of energy efficient equipment it is possible that our purchases are not of the highest energy efficiency ratings available. In the meeting conducted with Roger Cook on March 18th, 2005 he indicated our University's attitude concerning

the purchase of energy efficient equipment. Roger Cook explained that the energy efficiency of a product is the third consideration our University has when it purchases an energy consuming product. First, we consider the cost of the product: is it as cheap as possible? Second, we consider the usability: does the equipment perform the task it was intended for? Finally, if these first two criteria are satisfied, we consider how environmentally safe the product is. However, Roger Cook indicated that very few new models of energy consuming products are environmentally 'unfriendly,' unless it is absolutely necessary for them to be so. For example, a specialized refrigerator which can reach much lower temperatures than a standard refrigerator may be quite harsh on the environment. So most purchases are of 'green models,' simply because no other model types are available. But one must ask: how safe are these 'green' models? Are they as environmentally safe as possible? The creators of the University of New Brunswick (UNB) sustainability report indicated that all new equipment purchased on their campus had to meet Energy Star's high energy performance. Perhaps our campus could take a cue from UNB. Currently, our campus does not have a policy regarding the purchasing of energy efficient equipment. Our campus should consider implementing a set of mandatory guidelines for the purchasing of energy consuming equipment.

Our campus is nowhere near where it should be concerning automatic light sensors (E-12). Only 2% of our campus floor space is lit by automatic lighting sensors. The short-term benchmark is at least 25% and the long-term benchmark is 100%. The 2% of the campus which are controlled by automatic light sensors are the bathrooms. However, the library stacks' lighting system is controlled by manual timers, this floor space was not factored into the floor space monitored by automatic lighting sensors because these lights are not automatically activated. Also notable, our campus maintenance staff is instructed to turn off lights when rooms are not in use; this must have some impact on the length of time lights are left on. One suggestion which was made by the creators of the UNB report was to fit the campus' vending machines with automatic light sensors. The authors

explain that the vending machine lights up when someone is within close proximity. And then after a minute or two the light will shut off again but the refrigerator will continue to run. Small changes like this will help our campus become more sustainable. Our campus is far from the short-term benchmark of 25%. The campus should consider improving this by installing lighting sensors in areas which are not frequently used.

Our campus has an energy meter for every 2099 m^2 (E-9). These meters indicate how energy is monitored and billed for our campus.

Conclusion

The research on the management of energy on our campus has indicated that we are doing well when it comes to HVAC&R operating with direct digital control. And it appears that we are purchasing an ample amount of energy efficient equipment. However, more of our campus floor space should be lit by automatic lighting sensors. The data which has been obtained may not be entirely accurate since data concerning energy management are not well documented. We would recommend to the management staff better tracking of such information. The first step to change is being aware of the problem. Also, as was mentioned, our campus needs to adopt a policy for purchasing energy efficient equipment. We hope that our suggestions will make an impact on how our campus officials view energy use and management at our University.

Conclusion

UPEI has made a commitment to becoming a sustainable campus. We know that it's good for us financially, environmentally, socially and it's also good for our health. Awareness on campus is rising about environmental problems and solutions every day, and with more and more technology being available every day, we can become fully sustainable and minimize our impact on the surrounding environment.

However, many problems will block our path on the road to sustainability, and many of them will take long periods of time and large investments of money to complete. However, we know that this is the way of the future and that it is in our best interest to stay interested in this project. In this instance, the pros far outweigh the cons.

Being a sustainable campus is something to be very proud of, and not only does it sound good, but it brings in more students which equals more money for the campus. Globally, students are starting to understand that the ideas of sustainability are not only for large companies and industry to take a hold of in order to help the environment, they are starting to realize that it's up to every individual to do her/his part. Many students wants to help out and many of them are starting to choose sustainable campuses to hold them until their education is complete.

UPEI is growing very rapidly, and it's important to understand that with rapid growth of an institution there is also a very rapid impact on the surrounding environment. It is very important for the future stability and growth of a campus to look towards sustainability to help save money, to lower the impact on the environment, and to help keep the surrounding area as pristine and healthy as possible, ensuring that future generations are able to grow without the problems affiliated with their forefathers. Every day we are being burdened with the thoughts of climate change and global warming and what that means to the future of our families and of our planet. Embracing sustainability will ensure a future for our children, lower the burden this places on hospitals because of our increased health levels, allow our environment to stay healthy and able to support life, and allow the human race to grow without having to worry about the air we breathe and the water we drink.

[Editor's note: the students seem to have failed to consult the Energy Awareness Program Committee and/or the UPEI Energy Awareness Program website for their research, especially regarding E-8.]

Appendix 10.1: Total square metres of floor space

Building Name	Floor space
Sport Centre	5,607 square metres
Equipment Depot	276 square metres
Student Centre	3,593 square metres
Central Utility Building	3,304 square metres
Classroom Centre	1,400 square metres
Main Building	4,001 square metres
Dr. Steel Building	2,298 square metres
Dalton Hall	1,844 square metres
Memorial Hall	1,831 square metres
Cass Science Centre	1,389 square metres
Kelley Memorial Building	2,205 square metres
Chaplaincy Centre	375 square metres
AVC	22,886 square metres
Robertson Library	10,506 square metres
Duffy Building	4,120 square metres
Marian Hall	1,815 square metres
Bernadine Hall	3,755 square metres
Wanda Wyatt Dining Hall	1,175 square metres
Blanchard Hall	6,947 square metres

K.C. Irving	2,417 square metres
Tunnels	1,938 square metres
Total square metres	*83,981 square metres*

Appendix 10.2: Data and calculations for indicator E-4 Greenhouse Gas
  Emissions: Buildings

2003

Electrical system - 13,640,511 kWh

Heat system - 23,170 MWh

2004

Electrical system - 13,770 kWh

Heat system - 24,397 MWh

2003

Electrical system converted to Gigajoules - 49,105.8396 - converted to tonnes –
  1174.8650903

Heat system converted to Gigajoules – 83,412 - converted to tonnes - 1.9922614

2004

Electrical system converted to Gigajoules - 49,573.404 - converted to tonnes –
  1184.04041271

Heat system converted to Gigajoules - 83,981 - converted to tonnes –
  2097.7644024

Appendix 10.3: Data for indicators E-5 and E-6

2003/2004: 2,175 general parking   111 reserved parking

2004/2005: 1,122 general parking   124 reserved parking
                20 barrier-free (accessible) parking   CARI 1,334 parking spaces

Campus community members:
    students 2004: 3,455 full time students, 594 part time students
    faculty: 500
    staff: 200

Appendix 10.4: Data for indicator E-11

number of built square metres on campus: 83,9981
number of built square metres HVAC&R operating under direct digital control:
    65,820

Appendix 10.5: Data for indicator E-12

number of built square metres on campus: 83,9981
number of built square metres lit by automatic lighting sensors: 16799

Appendix 10.6: Data for indicator E-10

amount spent on energy consuming equipment: $351,750
amount spent of energy efficient equipment: $300,000

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11.   Land

Vanessa Lutz, Cameron McPhail, Amanda Tweedy

Abstract

The Land section under the 'ecosystem' section of the Campus Sustainability Assessment Framework (CSAF) covers thirteen indicators, which assess campus land use in the areas of 'managed greenspace,' 'natural areas' and 'intensity of use.' We researched twelve of these indicators and were able to find information for ten. Results show the overall use of campus land is insufficient regarding sustainability. Recommendations are made as to how the University can increase the amount of natural areas and greenspace it has, as well as improve plans for future development.

11.1 Managed Greenspace

Introduction

The Land section is an indicator of how much managed greenspace our campus has. Greenspaces are important to our campus. They are important contributors to campus sustainability for humans and ecosystems. The space can promote social activities and also have a good impact on an ecosystem's well-being. All permeable surfaces on campus that are managed in some way are considered managed greenspace.

Methods

To determine the total acres of managed greenspace (L-1) on our campus we obtained an aerial map that was very well detailed, showing all buildings, walkways, parking lots and was scaled. We received this map from Laurie Eveleigh, the Assistant Planner in Facilities Management on the 21st of March. We then determined the greenspaces and natural areas. Then we measured all of the greenspaces on our campus.

To find out the information for inorganic fertilizers (L-2) and pesticides (L-3) that were used annually we contacted the Facilities Management Department. Vanessa Lutz e-mailed Roger Cook at Facilities Management on the 21st of March, but he was out on vacation. Amanda Tweedy visited the Facilities Management Department on the 23rd of March in which she was given an e-mail address for Laurie Eveleigh, Assistant Planner to send all of our questions to. Amanda Tweedy e-mailed Laurie Eveleigh that day regarding pesticides and inorganic fertilizers. Also on the same day, Vanessa Lutz called the Facilities Management Department and left a message on Kathy MacKenzie's answering machine. Kathy left a message on Vanessa's answering machine on the 30th of March but did not have any answers for us.

We were unable to complete the indicator native plants (L-4) due to time constraints.

Results

According to the map that we had obtained from Laurie Eveleigh on the 21st of March we found that the University of Prince Edward Island has 13.5 hectares of managed greenspace inside the Perimeter Road and 32.6 hectares of managed greenspace in total. That means that there is 37.3% of managed greenspace inside the Perimeter Road and 59% of the total area of the property is managed greenspace. In total, all of UPEI's greenspace 100% of it is managed.

We were unable to obtain the information needed in order to calculate the inorganic fertilizers (L-2) indicator due to time constraints.

We were also unable to obtain the information needed in order to calculate the pesticides (L-3) indicator due to time constraints.

We were unable to obtain the information for the native plants (L-4) indicator due to the large amount of research required and our time constraints. This indicator, native plants (L-4), was too time consuming to obtain information about the native plants on the University's campus.

Table 11.1: Indicators and benchmarks (Cole and Guerin, 2003)

No	Indicator	Measurement units	Results	Short-term benchmark	Long-term goal
L-1	Managed Greenspace	Total hectares of managed greenspace, divided by the total on-campus greenspace (both managed and natural, including everything that is not built, or that is permeable); multiply everything by 100.	(32.6 hectares) 59% of the campus is greenspace and 100% of the greenspace is managed		
L-2	Inorganic Fertilizers	Total volume of solid and liquid inorganic fertilizers used annually (in kilograms) divided by the total hectares of managed greenspace.	N/A		Zero
L-3	Pesticides	Total volume of solid and liquid pesticides (including both plant and animal poisons of all types) used annually (in litres) divided by the total hectares of managed greenspace.	N/A		Zero
L-4	Native Plants	Total number of native plants installed (number of individual plants) annually in managed greenspace divided by	N/A	At least 50%	100%

		the total number of plants installed in that year; multiply by 100.			

Discussion

The finding of the managed greenspace (L-1) indicator shows us that all of the University of Prince Edward Island campus' greenspace is managed. This means that anything that is not building or pavement is managed in some way or another. We have found that there is too much paved area and too many buildings. There are too many paved paths for the students, faculty, and guests to use. We believe that the University should remove some of the paved paths from our campus and replace them with gravel paths or grass paths. This increases the area of permeable surfaces. We do not think that they should all paths that are currently present. In the Concordia's Report they have a quote, "an extensive report by the United Nations Environmental Program (UNEP) in 2002 found that over 70% of the planet's land surface could be affected by the impact of roads, mining, cities, and other infrastructure developments in the next 30 years unless urgent action is taken" (Davis, Lamarca, Guerin and Larsen, 2003). We also believe that we should be trying to add more greenspace to our campus even though it is harder due to being an urban campus. We think that with the CARI complex parking and our current UPEI campus parking that there are enough parking spaces. We even think that the University could remove one of the smaller parking lots near the soccer fields and replace it with native tree species. Concordia University has already completed their campus sustainability assessment and is also trying to green their campus due to their findings (Davis, Lamarca, Guerin and Larsen, 2003).

We were unable to obtain the information needed for the inorganic fertilizers (L-2) indicator because of time constraints. If our campus is using inorganic fertilizers, we would recommend that we not use any inorganic fertilizers on our campus. As a short-term goal, we would recommend that our campus cut back on

the use of inorganic fertilizers. We hope that the University is limiting their use of inorganic fertilizers on our campus. If we are currently not using any inorganic fertilizers, we would recommend that the University continue to not use them. Concordia University currently uses .03 kilograms per square meter and their long-term goal is zero kilograms per square meter (Davis, Lamarca, Guerin and Larsen, 2003).

Due to our deadlines we were also not able to obtain information of pesticides (L-3) and their use on the University of Prince Edward Island campus. We hope that the University is not currently using any pesticides or at least limiting the use of pesticides on our campus. If the campus is currently using pesticides, we encourage the University to stop using them. If the UPEI campus is not using pesticides we would recommend that they continue not using any pesticides. According to the Concordia University website, their University is currently not using any pesticides on their campus. We hope that our campus can follow in their footsteps by not using pesticides (Davis, Lamarca, Guerin and Larsen, 2003).

The native plants (L-4) indicator contained a very large amount of research and was very time consuming. Due to our time deadlines we were not able to obtain any information. As a recommendation, even though we did not complete this indicator, we would like to see the University of Prince Edward Island plant more native plant species on our campus. Maybe as a short-term goal, of all the plants that the University of Prince Edward Island plants each year at least 50% of them should be native to Prince Edward Island, with a long-term goal of 100%. According to the Concordia University website they currently plant 52% of native plants on their campus each year, their short-term goal was 50% and their long-term goal is 100% (Davis, Lamarca, Guerin and Larsen, 2003).

Conclusion

In conclusion to the managed greenspace section of the Land indicators of the CSAF report, it has provided us with a view of the way the University of Prince

Edward Island uses their land area. It gives us an idea of how UPEI manages its land area and how much is devoted to greenspace.

11.2 Natural Areas

<u>Introduction</u>

Natural Areas is a subsection of Land, which is found under 'ecosystem' in the CSAF Toolkit. Natural Areas assesses the involvement of the University of Prince Edward Island in its surrounding natural ecosystems. This subsection measures the interest that the University has taken with regard to sustaining its environment.

Human activities have had detrimental affects on this planet's ecosystems worldwide. The pace at which humans are changing the ecosystems has quickened its pace over the past 25 years (Davis, Lamarca, Guerin and Larsen, 2003). Urbanisation and agriculture, in particular, have caused incredible, irreversible damage to Prince Edward Island's ecosystems. Agriculture drastically and permanently changes land and soil, taking away natural habitat and introducing harmful chemicals into the environment. After centuries of harm, it is time that society ceases its rampage on nature and attempts at healing the wounds it has inflicted on the Earth's sensitive ecosystems.

Protection and restoration of the remaining natural areas is so crucial to the sustainability of the planet. Such incredible reduction in biodiversity and destruction of ecosystems must end before it is too late. Because of the positions they hold in society, universities have the opportunity to make changes and set examples for their surrounding communities. The University of Prince Edward Island must protect, sustain, and develop natural areas if it is to become a sustainable institution.

<u>Methods</u>

The first step in assessing the total area of the University of Prince Edward Island campus natural areas was to first contact Dr. Christian Lacroix, Professor,

University of Prince Edward Island Biology Department. This was to determine, first, what is considered a natural area, and, second, to locate these natural areas. Dr. Lacroix was contacted by e-mail and he responded on 9 March. Research with regard to Land indicators L-5 Healthy Natural Areas, L-6 Restoration of Degraded Natural Areas, and L-7 Protection of Natural Areas was concluded with Dr. Lacroix's email.

For the indicator L-8 Unresolved Land Claims, Mr. Wendell Labobe, an authority on this subject, was contacted through e-mail on 23 February; he responded on 24 February. Mr. Labobe's e-mail thus concluded research regarding this indicator. However, an effort to confirm which nation of indigenous peoples historically occupied the University of Prince Edward Island's campus lands, G. Edward MacDonald of the University's History Department was contacted via e-mail on 16 March, and Mr. Labobe was again contacted on 10 April. No response was received from either person.

Results

According to Dr. Lacroix, the University of Prince Edward Island has no natural areas, so L-5 Healthy Natural Areas, L-6 Restoration of Degraded Natural Areas, and L-7 Protection of Natural Areas could be assessed no further. As seen in Table 2: Indicators and benchmarks below, L-5 Healthy Natural Areas and L-7 Protection of Natural Areas are both currently at zero percent. Therefore, L-6 Restoration of Degraded Natural Areas is not currently applicable to the University of Prince Edward Island.

According to Mr. Labobe, no current unresolved land claims exist between indigenous peoples and the University of Prince Edward Island. The percentage of campus land with unresolved land claims is at zero percent. The University of Prince Edward Island is already at the long-term goal with regard to unresolved land claims. [Editor's note: have claims ever been made? Have all past claims been settled?]

Table 11.2: Indicators and benchmarks (Cole and Guerin, 2003)

No	Indicator	Measurement units	Results	Short-term benchmark	Long-term goal
L-5	Health Natural Areas	Total area (in hectares) of healthy natural areas, divided by the total area (in hectares) of all natural areas (including healthy and degraded systems); multiply by 100.	Zero	At least 75%	100%
L-6	Restoration of Degraded Natural Areas	Total area (in hectares) of degraded natural areas that have been fully restored over the previous three years, divided by the total area (in hectares) of degraded natural areas; multiply by 100. Note: if all natural areas are healthy, or there are no natural areas on campus, "n/a" should be marked.	"n/a"	At least 25%	100%
L-7	Protection of Natural Areas	Total area (in hectares) of natural areas protected for the long-term through policy, covenant, or other non-alterable protection strategy, divided by the	Zero	At least 50%	100%

		total area (in hectares) of natural areas; multiply by 100.			
L-8	Unresolved land claims	Total hectares of campus land with historic, unresolved land claims by Indigenous Peoples, divided by the total hectares of campus land in assessment year; multiply by 100.	Zero	25% or less	Zero

Discussion

The University of Prince Edward Island currently has no land that can be considered a natural area. As a setting for post-secondary studies, the University of Prince Edward Island is in a position of leadership in the surrounding community, but regarding natural areas and sustainability, it is not, at present, setting the example that it should. To have a sustainable campus, the University of Prince Edward Island must protect, sustain, and develop natural areas where possible, and not preoccupy itself only with physical expansion of the campus. In the future, it would benefit both the campus and the community if the University took a step toward developing natural areas. For instance, the abandoned field between the CARI Complex and the Charlottetown Mall may be a good site to start. The first step is to encourage growth of wildlife by planting native vegetation, and then to protect the area so that natural succession might eventually transpire.

Many universities are taking interest in natural areas and setting good examples for the University of Prince Edward Island to follow. For instance, the University of Waterloo and its committee, the WATgreen Task Force on Turf Grass Maintenance has reduced pesticide use and improved practices regarding pesticide use (see section 11.1 of this report), and has increased natural areas on

campus. They have begun to plant native species on their campus land (WATgreen: The Vision). The University of California at Merced has great plans for recently received land. This university is planning to protect this natural area which will also provide a perfect site for field studies by students and staff, improving the curricula of the university (News Archive, 2004). Another model in McGill University which is currently protecting the ecological integrity of natural areas. McGill University has established the Gault Nature Reserve at Mont St. Hilaire, a large natural area they are protecting for the benefit of future generations (Gault Reserve, 2003).

The University of Prince Edward Island has not been given equivalent opportunities via large tracts of natural area, but can still improve its campus sustainability. If the University followed in these footsteps, protecting and improving what land is available, the greening process would be well on its way. The most crucial factor in making improvements in this area is interest of the campus community. With the support of the campus community, a greener, more sustainable campus is an attainable goal.

Conclusion

By sustaining, protecting, and, when possible, developing natural areas, the University of Prince Edward Island would improve the natural ecosystems of the province. A small step towards recovering Prince Edward Island's natural system could be made if the University could undertake this responsibility. And, hopefully, as a result of this action, the University would be leading a community effort to recover what is left of the Island's delicate, intricate ecosystems.

11.3 Intensity of Use

Introduction

Land is something everyone and everything on earth needs and uses. It is the matter of how land is used that concerns us. This section of the CSAF deals primarily with sprawl, which is how a space is developed. A sprawling complex,

only one level high but with a huge footprint is considered to be sprawling. This is what a sustainable campus would try to avoid. It is more sustainable to have compact buildings that fit in with the surroundings, both from an ecological and sociological standpoint. Having more greenspace than paved spaces on a campus helps the campus to look aesthetically pleasing, but it also means more room for native plants and natural areas that can be used simply as habitats for animals or spaces for learning.

Currently the University of Prince Edward Island along with Charlottetown as a whole are in periods of development. We must as community members make sure that they way they develop is sustainable. The Campus Sustainability Assessment Framework (CSAF) has given us a way to obtain a general idea of how sustainable the UPEI campus is right now. Using this framework, we are able to see the areas the University needs improvement in as well as where we are doing well.

Methods

To determine the amount of impermeable surfaces on campus (L-9), an interview was conducted with Laurie Eveleigh, the Assistant Planner at UPEI on March 15th 2005. She was able to put together a list of all the buildings on campus along with their total floor space and footprints, which gave us the information to calculate building density (L-11) (see Appendix 11.1: Impermeable surfaces). Ms. Eveleigh also supplied the group with a scaled campus map from which we were able to calculate the area of all paved surfaces on the campus, including the area of the parking lots (L-9, L10) (see Appendix 1: Impermeable surfaces and Appendix 11.2: Parking lots). Allen Veale of the Security Department was contacted by phone on March 15th. He was able to supply us with the total number of parking spaces on campus (L-10) (see Appendix 11.2: Parking lots).

Marc Braithwaite, General Manager - Residence, Food and Conference Services, was contacted by e-mail on February 25th. He was able to supply the occupancy rates for all on-campus residences during the year (L-12) (see

Appendix 11.3: Occupancy rates: on-campus residences). Joanne MacVicar, Registration Supervisor, was also contacted by e-mail on March 15th. Ms. MacVicar was able to supply a class registration list for the 2005-2006 school year. From this list, we were able to calculate the classroom occupancy rates (L-13) (see Appendix 11.4: Occupancy rates: classrooms) for the school year not including non-academic bookings.

Results

Using the CSAF framework, we have listed our results in Table 11.3. According to the calculations we made from the map (see Appendix 11.1: Impermeable surfaces) there are 22.64 hectares of impermeable surfaces on the UPEI campus. The total area of the campus within the Perimeter Road is 36.14 acres. The UPEI campus, within and including the Perimeter Road, has 62.65% of its land space covered by impermeable surfaces. Within these impermeable surfaces are the parking lots, which cover 8.26 hectares of the campus. There are 2009 parking spaces on campus, 660 belonging to the CARI facility and 1349 belonging to UPEI. This means that there are 0.004 hectares allotted to each car. Included also in the impermeable surfaces are the footprints of all of the buildings on campus (see Appendix 11.1: Impermeable surfaces). The total amount of space used for buildings is 57063.17 m^2 and the total floor area of all buildings on campus is 98731.80 m^2. This means that the building density of the UPEI campus is 1.73. This figure is an indication of sprawl, having a lower number means that most of the buildings on campus are simple one-floor structures. A higher number would mean that the campus has buildings that have more floors, perhaps meaning also that there is more greenspace.

The residence and classroom occupancy rates are shown in Appendices 11.3 and 11.4. For on-campus residences, the occupancy rate of all buildings year-round is 82.84%. For classrooms, we did not have information for the summer or non-academic bookings. The occupancy rate of classrooms from 8 am to 8 pm Monday to Friday throughout the school year is 42.72%.

Table 11.3: Indicators and benchmarks (Cole and Guerin, 2003)

No	Indicator	Measurement units	Results	Short-term benchmark	Long-term goal
L-9	Impermeable Surface Coverage	Total area of impermeable surfaces (in hectares), divided by the total campus land area (excluding natural areas), multiply by 100.	61.5%	30% or less	10%
L-10	Parking Density	Total number of parking stalls, divided by the total footprint of parking lot areas (in hectares).	243.34		
L-11	Building Density	Total square meters of building space divided by the total footprint of all buildings on campus in square meters.	1.73		
L-12	Occupancy Rates: On-campus Residences	Percent of on-campus residences managed by the university that are at full occupancy year round.	82.84%	At least 75%	100%
L-13	Occupancy Rates: Classrooms	Percent of classrooms at full occupancy year round 8am-8pm weekdays	42.72%	At least 75%	100%

Discussion

Our findings regarding the amount of impermeable surface coverage on the campus are not ideal. The short-term benchmark of the CSAF is 30% (see Table 11.3); UPEI is currently doubling that figure (Cole, 2003). An explanation for this

could be the compactness of the campus as well as the fact that most buildings were built before the 1970s, meaning there are a lot of buildings but each one does not have a large amount of total floor space. Contributing to the shortage of greenspace is also the abundance of paved walkways and drives. Within the space bordered by Main, Cass, Memorial, Dalton, and Steele buildings (see Appendix 11.5: Campus map) there is a great area for greenspace but it is torn up by paved paths and roads.

The parking at UPEI is also a continuing problem. With the increasing enrolment and the construction of new buildings, there are just not enough parking spaces for the amount of campus community members (CCMs). The parking lots do take up quite a large chunk of the campus. This is detrimental to sustainability in a few ways such as the environmental factor of all the water runoff. There is also the fact that it encourages people to take vehicles to school rather than other modes of transportation. If a single parking structure was located at the back of the campus where parking lots A and B (see Appendix 11.5: Campus map) are, CCMs may be more apt to either walk or bike because they would be able to go right to their building rather than having to park and then walk. The other parking lots could then be reclaimed and turned into natural areas, where trees and plants could be added. If a parking structure is not a viable option there is also a new type of parking lot being used by the Vancouver Island Technology Park that could be a viable option for any new parking construction.

The Technology Park is using a grass/gravel pave system. This system is permeable so it allows water to run through it rather than off it. This would decrease water management needs dramatically; the system also "oxidizes and biologically treats oil and gas drippings from cars" so this would improve the sustainability of the UPEI campus (Vancouver Island Technology Park [VITP], 2005, p. 9-10).

The occupancy rate of the on-campus residences is above the short-term benchmark of 75% provided by the CSAF (Cole, 2003). This is promising, but to increase the efficient use of the buildings, UPEI needs to increase the occupancy

rates during the summer months. A way to increase occupancy may be to promote the new residence as a hostel type accommodation for travellers. UPEI could also work on making available summer programs that are attractive to off-Islanders who would then need accommodations. This type of idea is done by Royal Roads University. They offer short three-week courses which require on-campus living (Cole, 2003). It would also increase the occupancy rate of the classrooms.

The current rate of classroom occupancy is well below the short-term benchmark of 75% provided by the CSAF (Cole, 2003). This could be due to the fact that we were not able to access any records of non-academic bookings or summer registration. UPEI first needs to keep accessible records regarding classroom occupancy. We should also promote the University as a well-equipped and desirable place to hold meetings and conferences. As stated above, UPEI should also increase and diversify its summer programs to ensure that the classrooms are being used to optimum capacity all year long, not just for eight months.

UPEI has made the first steps to becoming a more sustainable campus. A Campus Master Plan has been developed [Editor's note: in progress] and addresses some of the issues dealt with in the Campus Sustainability Assessment Framework. The Master Plan is meant to "provide the University with a long-term roadmap to growth…" (UPEI Campus Master Plan, 2004). It will also deal with outdoor spaces and effectively using campus facilities. UPEI is headed in the right direction, we just need to continue.

Conclusion

The state of land use at UPEI is an important issue and this CSAF section, Intensity of use, has given us the tools necessary to carry out an evaluation of the UPEI campus based on its land use. We have found that although land is at a premium there are still ways in which to improve campus sustainability. We are happy to see that the University has taken the initiative to come up with a plan for development that considers sustainability. Unfortunately, making a plan is only

part of the solution. UPEI now needs to set itself some goals and benchmarks like those outlined earlier. As long as UPEI continues with its plan for sustainable development, we will see good things here on campus, like less pavement and more greenspace.

Appendix 11.1: Impermeable surfaces

Building name	Total floor area (acres)	Footprint area (acres)	Total floor area (m²)	Floor area (m²)
Chi-Wan Young Sports Centre	1.39	1.01	5616.64	4069.86
Equipment Depot	0.06	0.07	256.96	276.47
W.A. Murphy Centre	0.89	0.66	3593.37	2654.15
Central Utility Building	1.30	0.43	5258.70	1721.72
Classroom Centre	0.38	0.47	1553.20	1894.88
Main Building	1.03	0.27	4153.56	1089.44
Steel Building	0.59	0.26	2401.65	1046.15
Dalton Hall	0.46	0.11	1880.95	450.94
Memorial Hall	0.48	0.13	1958.89	538.82
Cass Science Hall	0.37	0.12	1499.59	473.70
Kelley Memorial Building	0.66	0.33	2658.98	1322.52
Chaplaincy Centre	0.09	0.09	375.32	381.26
AVC	5.66	3.38	22885.54	13689.74
Robertson Library	2.58	1.09	10429.23	4391.10
Duffy Science Centre	1.06	0.35	4299.04	1426.02
Marian Hall	0.44	0.17	1766.87	679.56
Bernardine Hall	0.93	0.27	3754.55	1094.36
Wanda Wyatt Dining	0.30	0.29	1199.80	1167.01
Blanchard Hall	1.34	0.50	5408.27	2025.03
K.C. Irving Chemistry Centre	0.59	0.32	2404.72	1294.47
Totals	*20.60*	*10.31*	*83355.83*	*41687.20*
MacLauchlan Arena	2.75	2.75	11125.70	11125.70

INH	0.24	0.24	990.31	990.31
New residence	0.43	0.43	1754.97	1754.97
Food Technology Centre	0.37	0.37	1504.98	1504.98
Totals	*24.39*	*14.11*	*98731.80*	*57063.17*
Paved area		2.13		
		7.67		
		4.79		
		11.06		
		3.87		
		2.30		
		10.00		
Total paved		*41.83*		
		55.93		

Total impermeable surfaces: 22.64 hectares

Appendix 11.2: Parking lots

Parking lot	Size (acres)
A	1.29
B	3.47
C	2.72
D	0.45
E	0.70
F	0.51
G	0.14
H	2.16
I	7.58
J	0.29
K	0.29
L	0.45
CARI small	0.06
Paid	0.29
Total parking	20.40

Parking spaces	
CARI	600
UPEI	1349
Total spaces	2009

Appendix 11.3: Occupancy rates

INDICATOR L-12: Occupancy Rates: On-campus Residences			
	Month	**Percent Full**	**Equivalent**
	January	**98.00%**	0.98
	February	**98.00%**	0.98
	March	**98.00%**	0.98
	April	**98.00%**	0.98!
	May	**38.30%**	0.383
	June	**38.30 %**	0.383
	July	**66.70 %**	0.6670
	August	**66.73%**	0.6673
	September	**98.00%**	0.98
	October	**98.00%**	0.98
	November	**98.00%**	0.98
	December	**98.00%**	0.98
Total			**9.9403**
Percent of year at full occupancy:			**82.84%**

INDICATOR L-13: Occupancy Rates: Classrooms			
*occupancy rates of all classrooms from 8 am to 8 pm weekdays			
	Month	**Percent Full**	Equivalent
	January	**42.72%**	0.4272
	February	**42.72%**	0.4272
	March	**42.72%**	0.4272
	April	**42.72%**	0.4272
	May	**0.00%**	0
	June	**0.00%**	0
	July	**0.00%**	0
	August	**0.00%**	0
	September	**42.72%**	0.4272
	October	**42.72%**	0.4272
	November	**42.72%**	0.4272
	December	**42.72%**	0.4272
Total			**3.4176**
Percent of year at full occupancy:			**28.48%**

Appendix 11.4: Campus map

[Editor's note: the map the students included in their report could not be reproduced for the pdf version of this document. Please see Appendix 12.1 for a campus map or refer to the printed version of the UPEI CSAF 2005.]

References

Cole, L. and Guerin, G. (2003). *Campus Sustainability Assessment Framework Toolkit.* [no place of publication given]: Sierra Youth Coalition.

Davis, J., Lamarca, M.G., Guerin, G. and Larsen, A. (Eds.)(2003). *Concordia campus sustainability assessment 2003.* Concordia University, Montreal, QUE, Canada: Sustainable Concordia Project.

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News Archive: Land gift may enrich research, benefit other campus projects (8 September 2004). Retrieved on 8 April 2005, from http://www.ucmerced.edu/news_articles/09082004_land_gift_may_enrich.asp.

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Appendix 12

Appendix 12.1: UPEI campus map
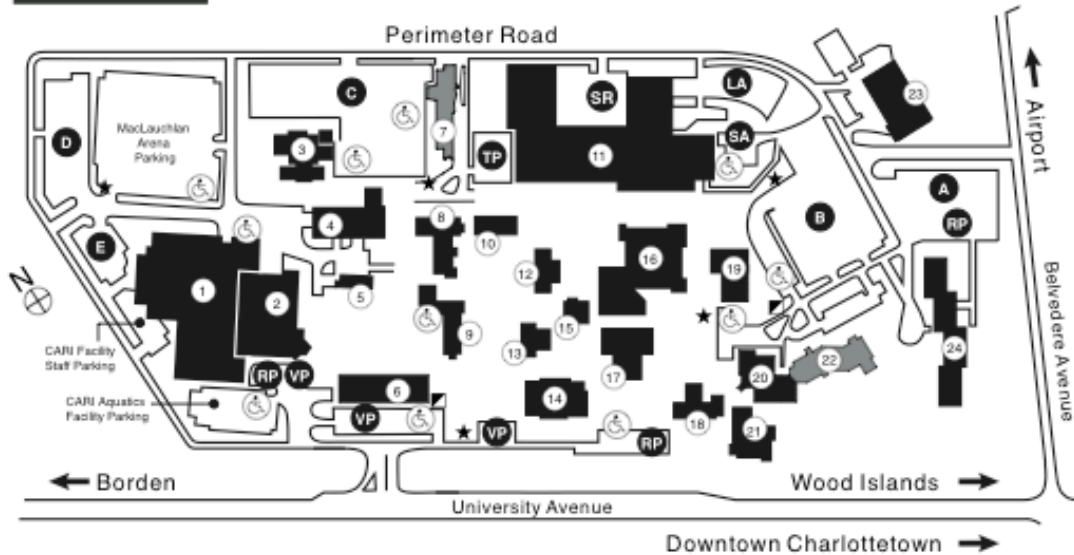
[NB: scale of 1:3300 means 1mm = 3.3m]

See also: www.upei.ca/campustour/html/highres.html

University of Prince Edward Island

550 University Avenue, Charlottetown, PE C1A 4P3
(902) 566-0300

Perimeter Road

MacLauchlan Arena Parking

CARI Facility Staff Parking

CARI Aquatics Facility Parking

← Borden

University Avenue

Wood Islands →

Downtown Charlottetown →

Airport

Belvedere Avenue

CAMPUS BUILDINGS

1. MacLauchlan Arena/ CARI Aquatics Facility
2. Chi-Wan Young Sports Centre
3. Classroom Centre
4. Central Utility Building
5. Equipment Depot
6. W.A. Murphy Student Centre
7. Institute for Nutrisciences & Health
8. Steel Building
9. Main Building
10. Dalton Hall
11. Atlantic Veterinary College (AVC)
12. Memorial Hall
13. Cass Science Hall
14. Kelley Memorial Building
15. Chaplaincy Centre
16. Robertson Library
17. Duffy Science Centre
18. Marian Hall (Residence)
19. K.C. Irving Chemistry Centre
20. Wanda Wyatt Dining Hall
21. Bernardine Hall (Residence)
22. New Residence
23. Food Technology Centre
24. Blanchard Hall (Residence)
★ Emergency Call Station
▧ Weather Shelter
▦ Under Construction

PARKING

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Lot A   General parking & overnight parking during winter months)
Lot B   General parking & reserved)
Lot C   General & reserved parking)
Lot D   General parking)
Lot E   General parking)

LA AVC large animal client parking
SA AVC small animal client parking
♿ Designated Parking

VP Visitor Parking, Metered Parking
RP Reserved Parking
TP Temporary Parking
SR Shipping and Receiving

www.upei.ca

Revised 12/04

Source: www.upei.ca/map.html

<u>Appendix 12.2</u>: Sierra Youth Coalition Greening the Ivory Towers Academia to Action Project, incl. Campus Sustainability Assessment Framework (CSAF)

Greening the Ivory Towers
Academia to Action

A project of SYC

What's the Greening the Ivory Towers Project?

Universities are leaders in researching and teaching innovative solutions to society's current social and environmental problems, but these solutions are often not reflected in the day-to-day operational aspects or governance of the university itself. Understanding the social and environmental impacts of Canadian universities and colleges is the first step towards making fully informed campus decisions for a sustainable future. Just as a doctor needs to examine a patient in order to prescribe the best treatment, we need to examine the current practices of our educational institutions in order to identify the best path to ecological and social well being.

The Greening the Ivory Towers Project (GITP) was developed by the Sierra Youth Coalition (SYC) to reflect a holistic definition of sustainability while promoting commitments to this definition at the institutional level. This initiative aims to assist post-secondary students to understand the socio-economic and environmental impacts of their campuses, both locally and globally. SYC offers support, resources and training to students seeking to develop solutions that address both campus specific challenges and the overarching structural problems that influence society's current unsustainable path. The GITP also aims to bridge the gap between students, faculty and administrators by promoting the creation of a diverse community united by a desire to direct the knowledge generated on campus towards improving the ecological and social integrity of their own campus community.

Project goals and objectives

The goal of *Greening the Ivory Towers Project* is to aid universities in creating sustainable social systems as well as in minimizing their impact on the natural environment. We aim to do this by creating an improved understanding of where campuses have substantial ecological and social impacts. Through this understanding we hope to see universities develop more committed and integrated action plans towards making improvements in their levels of campus sustainability. The *Greening the Ivory Towers* Project will:

- Engage, empower and inspire youth to work with their campus community to assess and become aware of their university's impacts on the sustainability of social and ecological systems locally and globally.

- Facilitate this action by providing resources, training and support in using Canada's first **Campus Sustainability Assessment Framework (CSAF)** as a tool to indicate the level of campus sustainability performance.

- Partner with the on-campus academic community to use the information from the sustainability these assessments to make attainable recommendations on how the university can improve its sustainability performance.

- Encourage concrete improvements in the ecological and social sustainability performance of Canadian universities.

Promote the results of the campus sustainability assessments regionally and nationally to act as a

- catalyst for institutional change.

Greening the Ivory Towers Project Tools...

The Campus Sustainability Assessment Framework…

The *Greening the Ivory Towers Project* is based on an academically developed Campus Sustainability Assessment Framework (CSAF) which was designed to help students assess campus sustainability by gaining a holistic understanding of the socio-economic and environmental impacts of their schools. The CSAF is the result of more than two years of intensive work by a Masters student at Royal Roads University and an advisory group of over 30 students, professors and experts in the field of sustainability. This framework is a direct response to a common need identified by students across Canada for a consistent way of measuring socio-economic and ecological sustainability on their campus.
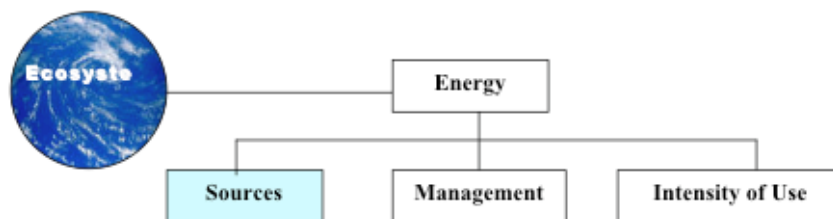
The CSAF assesses campus sustainability by looking at two systems, People and Ecosystems, and how they are interconnected in the sacred balance of life on this planet. The figure below shows the *model of sustainability* used by the CSAF. The people system lies within the eco-system, representing the supportive function of the environment in sustaining human life. Within each of these systems are five sections, representing the key campus sustainability issues identified by the framework's co-research team.

The CSAF Model
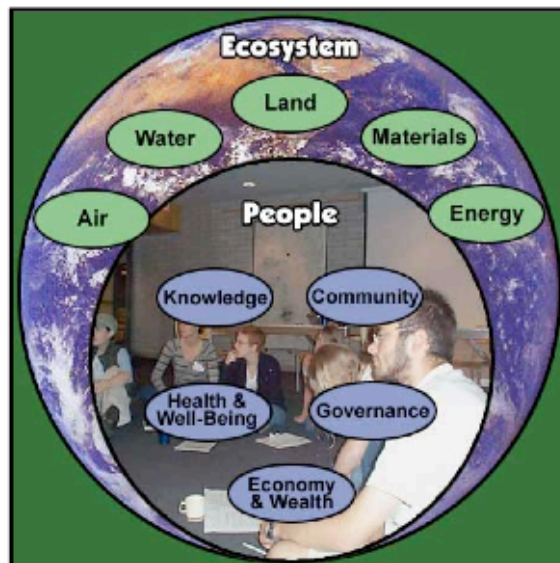
The ecosystem subsystem contains air, water, land, materials and energy. The people subsystem contains knowledge, community, economy and wealth, governance, and health and wellbeing. Each of these sections is then further broken down into specific indicators. There are over 160 campus specific indicators of sustainability in the framework.

Below is a closer look at one of the ten sub-sections of the framework. The energy sub-section examines the sources, management and intensity of use of energy on campus.

No	Indicator	Measurement Unites	Short-Term Benchmark
	Percent of total energy used (in GJ) from renewable, clean, non-nuclear, and perpetual sources for heating, cooling, ventilation and electrical systems.	Total GJ of energy consumed annually for the uses listed in the indicator from renewable sources, divided by the total GJ of energy consumed annually for the uses listed in the indicator; multiply by 100. Note: large-scale hydroelectricity is not considered renewable or clean in this indicator, although small-scale or micro-hydro is.	At least 20%
	Percent of total energy used (in GJ) from renewable, clean, non-nuclear, ad perpetual sources for fleet and grounds vehicles and equipment.	Total GJ of energy consumed annually for the uses listed from renewable sources, divided by the total energy consumed annually by those listed uses; multiply by100.	At least 20%
	Percent of total energy (in GJ) for all energy uses produced locally.	Total GJ of energy (for all uses) consumed annually by the campus that is produced within 500 kilometers of the campus, divided by the total energy (for all uses) in GJ consumed annually.	At least 20%

The Greening the Ivory Towers Project Toolkit...
In order to make the CSAF more accessible and user friendly SYC developed the Greening the Ivory Towers Project Toolkit. This is a how-to guide for using the CSAF, offering tips on where to find data, links and references to best practices, case studies, recommended survey questions and approaches, as well as laying out a model for reporting findings.

Other Resources...
As part of the Greening the Ivory Towers Project SYC will offer training in using the CSAF, ongoing support from staff, access to the Sustainable Campuses network, the Sustainable Campuses Resource Guide and the advice and input of long-time participants in the campus sustainability movement.

Greening the Ivory Towers can be suited to meet the needs of your unique campus and community. We recommend that a core committed group take on the main coordinating and outreach tasks of the project. Often this group consists of a small number of students and expands to include several campus stakeholders as the project progresses. Ultimately, the goal of the project is to build strong unity and alliances amongst students, faculty, and staff to achieve the assessment and the campus sustainability goals.

Phase One: Doing the Assessment GITP is designed for students to incorporate the assessment research into their course work, thereby receiving credit for their efforts. While it may be difficult for a group to assess the entire framework in one year, we recommend that a balance of ecosystem and people system sections be chosen. The coordinating group can set short and long term goals for when specific sections will be assessed and when the entire framework will be completed.

Phase 2: Improving the Sustainability Rating: In moving to implement the recommendations from the sustainability assessment report, we suggest that students perform feasibility studies of these recommendations with the goal of implementing the most pressing, relevant and critical recommendations. Students are encouraged to work with faculty, staff and administration to develop an action plan with specific targets and goals for acting on the recommendations.

The first assessment will give each campus a baseline from which to set goals and measure progress. We encourage participants in the project to work towards having the recommendations from the assessment inform policy, planning and management decisions on campus.

Regional Support and Contact Information...

The Sierra Youth Coalition wants to help all interested students bring the *Greening the Ivory Towers Project* to their campuses. Regional Coordinators are here to support students in building their capacity to perform sustainability assessments and build relationships with campus stakeholders. The project is focused on empowering students to tap into the knowledge generated within their campus and to address structural institutional problems in a democratic and transparent fashion. The model relies on increased involvement and active participation of campus community members in the university's decision-making processes.

<table>
<tr><td>**Kristin Howe**
Atlantic Coordinator
Kristin@syc-cjs.org</td><td>**Melanie Macdonald**
Quebec Coordinator
Melanie@syc-cjs.org</td></tr>
<tr><td>**Jeca Glor Bell**
Ontario Coordinator
jeca@syc-cjs.org
(613) 241-1615</td><td>**Murray Birt**
Prairie Coordinator
murray@syc-cjs.org</td></tr>
<tr><td>**Kerri Klein**
British Columbia Coordinator
kerri@sierraclub.bc.ca</td><td>**Geneva Guerin**
National Coordinator
Geneva@syc-cjs.org
1-888-7907393</td></tr>
</table>

Visit the Greening the Ivory Towers Project website at:
www.syc-cjs.org/gitp

The Greening the Ivory Towers Project
www.syc-cjs.org/gitp

4

SYC Coalition Partner form

ABOUT YOU AND YOUR GROUP

Your Name: **Dr. Almut Beringer**

School/Organization (if applicable): **University of Prince Edward Island**
(i.e. University of Canada; Ontario Association of Young Activists)

Student Group/Office or Department (if applicable): **Environmental Studies Program**
(i.e. University of Canada Environment Group; Office of Physical Development)

Student/Group Phone Number: **+61 3 5348 1230, (902) 566-0307**
(If your group does not have a phone number, please include your own phone number)

E-mail: **beringer@netconnect.com.au**
(If your group does not have an e-mail address, please include your own e-mail address)

Mailing Address:
Environmental Studies & Sustainability
Faculty of Arts, UPEI
Charlottetown, PEI C1A 4P3
(SYC will send all correspondence to this address)

CHOOSE YOUR COALITION PARTNERSHIP STATUS

I would like to become a Coalition Partner! Choose one of the following:
☐ Individual Coalition Partner: $10 +
☐ Group Coalition Partners: $50 +
☐ **Institutional Coalition Partners: $100 +**

Address your money order or cheque to the "Sierra Youth Coalition".
** Please note you can request a charitable tax receipt if you make a donation of $100+ **

ORDERING EXTRA COPIES OF THE TOOLKIT

Group and Institutional Coalition Partners can order extra copies of the Toolkit at cost
production and shipping. Please indicate if you would like to receive extra copies:

I want **_5__** additional copies of the Toolkit.

Number of Copies ___ x $1 + postage cost = **7.10**
Add this amount to money order or cheque

Canadian Postage
1 extra copy = $1.00
2 extra copies = $1.60
3 extra copies = $1.60
4 extra copies = $2.10
5 extra copies = $2.10
For 6+ copies, please contact us

MAIL YOUR FORM AND DONATION

Print, sign and send this form accompanied by your money order or cheque to the
address bellow.

Sierra Youth Coalition
412 – 1 Nicholas Street
Ottawa – Ontario
K1N 7B7

signed: **Almut Beringer**	9 Nov. 2004
Your Signature	Date

Appendix 12.3:

ENV 202 *Introduction to Sustainability* students semester 2, 2004/'05

Name of student	Study year	Major	CSAF section
Breeze, Andrew	4	Biology	Air
Chua, Soon Cherng (Kent)	2	History	Materials
Coady, Shaun	3	Sociology	Governance
Conrad, Jennifer	4	Biology (?)	Health & wellbeing
Darrach, Joshua	2	Biology	Materials
Driscoll, Ryan	4	Sociology (?)	Community
Ellis, Derek	3	Biology	Energy
Francheville, Collette	4	Psychology (?)	Health & wellbeing
Gallant, Lacey	2	Science	Community
Heddle, Niki	1	Arts	Air
Hurry, Eliza	3	Arts (Pre-Psych.)	Energy
Johnston, Wesley	3	Arts [no major]	Economy & wealth
Keeping, Matthew	4	Philosophy	Knowledge
Long, Christopher	3	History	Knowledge
Lutz, Vanessa	2	Biology	Land
MacAdam, Karen	4	Biology	Air
MacArthur, Justin	2	Arts (Pre-Psych.)	Knowledge
MacAusland, Marla	2	Biology	Materials
MacBeath, Colin	4	Business	Governance
McCarthy, Mark	4	Biology	Community
MacDonnell, Cory	2	Biology	Water
MacKay, Laura	3	Arts (Pre-Psych.)	Energy
MacLeod, Christina	2	Arts (Pre-Psych.)	Water
McNeill, Ainsley	2	Biology	Water
McPhail, Cameron	4	Sociology	Land

Name of student	Study year	Major	CSAF section
Mader, Neil	3	Political Studies	Economy & wealth
Moore, Benjamin	4	Biology	Economy & wealth
Privett, Johanna	4	Biology	Health & wellbeing
Roggeveen, Rebecca	4	Biology	Health & wellbeing
Skipper, Sarah	4	Biology (?)	Air
Stevenson, Devin	4	Psychology	Economy & wealth
Thompson, Susanne	4	Biology	Community
Tweedy, Amanda	2	Arts	Land
Whitlock, Mitchell	4	Sociology (?)	Governance
Willcock, Michael	1	Arts	Energy
Zabel, Mark	2	Biology	Materials

Appendix 12.4: ENV 202 *Introduction to Sustainability* syllabus

University of Prince Edward Island

Faculty of Arts

Environmental Studies Program

Semester 2, 2004/'05

ENV 202 Introduction to Sustainability

UPEI Sustainability Apprenticeships™

Dr. Almut Beringer

Office: Main Building, room 236

Office hours: Mondays and Wednesdays 2:45 – 3:30pm or by appointment

Contact details: phone: (902) 566-0509, e-mail: aberinger@upei.ca

Course description

This course explores the fundamental ideas and 'tools' related to environmental sustainability. Topics critically examined include the relationship between sustainability and current environmental problems, sustainability indicators and plans, decision making and public policies, and issues of consumption patterns.

Credit points: three (3)

Course aims

At the conclusion of the course, students will have

• reflected on meanings and definitions of sustainability

• critically evaluated ethical and scientific-technical sustainability assessment frameworks

• explored sustainability indicators, key performance indicators and assessment targets

• learned about human dimensions of sustainability, e.g., models of behaviour change

• researched a sustainability topic and implemented change: identified unsustainable practices, learned about benchmarking and 'best practice,' and initiated practical, more sustainable alternatives

Course objectives

• to introduce students to the sustainability literature, and to further develop critical reading skills
• to further develop students' research and writing skills
• to help students gain the confidence to identify unsustainable practices in their personal lives and the larger community, and to develop abilities to implement change toward more sustainable practices

Prerequisite: second year standing

Class times and location: three hours a week (some field trips may be required)
Mondays and Wednesdays 1:30 pm – 2:45 pm, room Main 220

Assessment

• one 1500-word essay, 35%
• one research report, 50%
• one seminar presentation, 15%

Teaching approach

UPEI is seeking to become a sustainable campus: improving resource/energy efficiency, conserving non-renewable resources such as fossil fuels, minimizing greenhouse gas emissions, and increasing awareness of environmental and sustainability issues through engaging students and faculty in more sustainable practices. A 'green(er)' UPEI will showcase sustainable living to the wider community, thereby helping to transform PEI, the Atlantic Provinces, and eastern Canada into a more sustainable region.

Students in ENV 202 *Introduction to Sustainability* will be directly involved in 'greening' the UPEI campus. The course is taught by the Director of Campus Sustainability under whose guidance small teams of students will be working on sustainability projects. This practical

project work is the medium to teach sustainability theory as well as academic skills such as research, writing, and critical reading skills. Acquiring practical expertise and engaging in more sustainable behaviours is balanced with building academic knowledge and skills.

This teaching and learning approach is similar to a trades apprenticeship where trainees work under an experienced master tradesperson, learning respective skills 'on the job' and obtaining theoretical expertise through accompanying study. As such, ENV 202 *Introduction to Sustainability* can also be conceived of as an apprenticeship in sustainability, with ENV 202 students becoming 'sustainability apprentices' and the UPEI campus being their learning laboratory. Respective course requirements, such as regular course attendance, result from this teaching and learning model.

For semester 2, 2004/'05, the ENV 202 project is a comprehensive and systematic campus sustainability audit, using the Sierra Youth Club Coalition's Greening the Ivory Towers assessment tool.

Readings

• Highly recommended: Norberg-Hodge, H. (2000). *Ancient futures: Learning from Ladakh*. London: Rider. – on reserve in the Robertson Library

• Recommended text: Wackernagel, M. & Rees, W.E. (1996). *Our ecological footprint. Reducing human impact on the earth*. Gabriola Island, BC: New Society Publishers.

-- on reserve in the Robertson Library

• Readings packet and/or readings on reserve in the Library

• UPEI Campus Master Plan

• WWF (2004). *Living planet report 2004*. Available:

http://www.panda.org/downloads/general/lpr2004.pdf

• Selected websites (see *Weekly readings and references* list below)

• Subscription to e-mail lists:

   Worldwatch Institute, www.worldwatch.org

   Earth Policy Institute, www.earth-policy.org

   Global Footprint Network, www.globalfootprintnetwork.org

Additional/recommended readings

• Brown, L. (2001). *Eco-economy: Building an economy for the earth*. New York, N.Y.: W.W. Norton & Co. (downloadable pdfs available on www.earth-policy.org)

• Chambers, N., Simmons, C. & Wackernagel, M. (2000). *Sharing nature's interest: ecological footprints as an indicator for sustainability*. London, UK: Earthscan.

• Halweil, B. et al. (2004). *State of the World 2004*. New York, N,Y.: W.W. Norton & Co.

• Hawken, P., Lovins, A. & Lovins, H.L. (2000). *Natural capitalism*. London, UK: Earhscan.

• McKenzie-Mohr, D. & Smith, W. (1999). Fostering sustainable behaviour: an introduction to community-based social marketing. Gabriola Island, B.C.: New Society Publishers.

Weekly schedule

Week	Date and time	Topic
1	week of 5 January	What is sustainability? Definitions of sustainability
2	week of 10 Jan	Toward sustainable living: the campus as a learning laboratory (SYC campus audit tool)
3	week of 17 Jan	Why sustainability? The Earth Charter ethical framework, the UN Decade of Education for Sustainable Development; project work
4	week of 24 Jan	How is sustainability measured? Sustainability assessment frameworks and tools: ecological footprint, triple bottom line/triple bottom-line accounting, sustainability management systems; project work
5	week of 31 Jan	How is sustainability measured? (continued); project work
6	week of 7 February	How do we know sustainability has been achieved? Sustainability indicators and evaluation: key performance indicators, targets, benchmarking and best practice; project work **First essay due**
	week of 14 Feb	*mid-semester break*
7	week of 21 Feb	Writing a research report; project work
8	week of 28 Feb	Human dimensions of sustainability: behavior change; project work

9	week of 7 March	Human dimensions of sustainability: organisational and institutional change; project work
10	week of 14 March	Project work
11	week of 21 March Fri 25 March	Project work *Good Friday*
12	week of 28 March Mon 28 March	**Seminar presentations** *Easter Monday*
13	week of 4 April Fri 8 April	**Seminar presentations** **Research report due**

Weekly readings and references

week 1

• Orr, D.W. (1992). The problem of sustainability. In Orr, D. *Ecological literacy*. Albany,

N.Y.: State University of New York. (3-21). – on reserve

• Orr, D.W. (1992). Two meanings of sustainability. In Orr, D. *Ecological literacy*. Albany,

N.Y.: State University of New York. (23- 40). – on reserve

• Institute for Research and Innovation in Sustainability, www.sustreport.org

        http://www.sustreport.org/background/definitions.html

        http://www.sustreport.org/background/history.html

        http://www.sustreport.org/resource/es_timeline.htm

week 2

• Sierra Youth Club Coalition Greening the Ivory Towers website, http://www.syc-cjs.org/gitp/en/index2.htm,

• University Leaders for a Sustainable Future (ULSF), www.ulsf.org

• Cole, L. (2000). *Sustainability at the University of Victoria: a discussion document*. Unpublished term paper.

• Brunetti, A.J., Petrell, R.J. and Sawada, B. (2003). SEEDing sustainability: Team-project based learning enhances awareness of sustainability at the University of British Columbia. *International Journal of Sustainability in Higher Education* 4(3), 210-217.

• Ferrer-Balas, D. (2003, November). Global environmental planning at the Technical University of Catalonia. *The Declaration* (Association of University Leaders for a Sustainable Future) 6(2), 4-7, 25.

• Kelly, T. (2003, November). Building a sustainable learning community at the University of New Hampshire. *The Declaration* (Association of University Leaders for a Sustainable Future) 6(2), 1, 18-25.

• Simpson, W. (1996, January). Environmental stewardship and the green campus. *Facilities Manager*, 39-45.

• [no author] (2003, November). The Oberlin Design Initiative: connecting campus and the community. *The Declaration* (Association of University Leaders for a Sustainable Future) 6(2), 8-10.

week 3

• The Earth Charter, www.earthcharter.org

• Clugston, R.M. (2002). Teaching sustainability with the Earth Charter. In Leal Filho W. (Ed.), *Teaching sustainability at universities: towards curriculum greening*. Frankfurt/M., Germany: Peter Lang.

• Rockefeller, S.C. (2003, Fall). Education, ethics and the ecozoic era. *Earth Ethics*, 3-12.

• Vilela, M. (2003, Fall). The Earth Charter and education. *Earth Ethics*, 12.

weeks 4 and 5

• Wackernagel, M., Schulz, N.B., Deumling, D., Linares, A,C., Jenkins, M. Kapos, V., Monfreda, C, Loh, J., Myers, N., Norgaard, R. and Randers, J. (2002). Tracking the ecological overshoot of the human economy. *PNAS* 99(14), 9266-9271.

• [no author] (nd). *Ecological footprint accounts: moving sustainability from concept to measurable goal*. Oakland, CA: Redefining Progress.

week 6

• Institute for Research and Innovation in Sustainability, www.sustreport.org
    http://www.sustreport.org/indicators/index.html

week 8

• Kollmus, A. and Agyman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research* 8(3), 239-260.

• Hawken, P. et al. (1999). Case study: one can of cola. In National Centre for Sustainability (2004). *Sustainability and education: professional development kit for teachers and trainers – teacher resource*. Hawthorn, Victoria: Swinburne University of Technology. (58).

week 9

• Institute for Research and Innovation in Sustainability, www.sustreport.org
    http://www.sustreport.org/indicators/os_corporate.html

• Newport, D., Chesnes, T. and Lindner, A. (2003). The 'environmental sustainability' problem: ensuring that sustainability stands on three legs. *International Journal of Sustainability in Higher Education* 4(4), 357-363.

• Sharp, L. (nd). Green campuses: the road from little victories to systemic transformation. Available: www.greencampus.harvard.edu/green_universities.pdf

Appendix 12.5: ENV 202 Assignment 2 – CSAF report

Abegweit 'Cradled on the Waves' University [University of Prince Edward Island]

Faculty of Arts - Environmental Studies

semester 2, 2004/'05

ENV 202 Introduction to Sustainability

Assignment 2

Research report - Campus sustainability audit

_____

Purpose

• to document research conducted as part of the Sierra Youth Coalition Greening the Ivory Towers UPEI campus sustainability assessment

• to provide documentation to continue the CSAF [Campus Sustainability Assessment Framework] research in the future with other classes and research participants

• to provide recommendations for future research and campus sustainability initiatives

• to disseminate the research findings of the UPEI Greening the Ivory Towers Project (via the SYC website, as a printed document, etc.)

• to develop and apply skills in research data collection and analysis

• to develop and apply research reporting and writing skills

Assignment

(1) To write a research report on your CSAF section and indicators to professional standards, to a specified format (see below).

(2) To give a public presentation on your research findings (date and time tbd).

Task

1.   collate and analyse your research data and information according to indicator

2.   write a research report **_following the format below_**

Please follow this outline – the standard format of a scientific report -- ***and subtitle the different parts of your research report as given.***

• use 1" (1 inch) margins for top, bottom, and both sides

• use font Arial 12, 1.5 spacing

• use the footer to provide page numbers – *include the CSAF section*

      e.g., the footer might read: 4. Knowledge, page 2/20

• follow the CSAF numbering system and adhere to the section titles

    -- clearly identify the CSAF section with chapter number and description in the title

        e.g., 3. Community

    -- clearly identify the CSAF subsections by number and description

        e.g., 3.2 Diversity

    -- in case there are sub-subsections (subsections within the subsection), clearly identify these

        e.g., 3.2.1 Disabilities

Research report outline

Title -- e.g,

4. Knowledge

8. Materials

Names of group members – alphabetically by surname

Abstract

• one paragraph which summarises your research -- which CSAF section, what you did, what you found, recommendations in brief

following the Abstract, for each CSAF *subsection* (**NOT** indicator), follow the following format to the Conclusion:

NB: count appendices, tables, figures, etc. by **SECTION** – i.e., keep counting up as you write the subsections and sub-subsections – do <u>not</u> start over with 'Appendix 1,' 'Table 1,' 'Figure 1,' etc. per subsection

Introduction

• gives the reader an introduction and background information – sets the stage for the importance of the topic you are addressing

• you MUST make the link to sustainability – how does this subsection relate to sustainability? -- see your worksheets 1

• questions to address: what is the issue? why is it important and relevant? what is currently unsustainable about it? and others

• estimate: 1 - 3 paragraphs

References you can draw on:

• CSAF introduction to your section

• Concordia Campus Sustainability Assessment 2003 (on reserve in the library)

• UNB campus sustainability audit (on reserve in the library)

• www and refereed sources

Methods

• describe how you collected the data/information – be specific, i.e.,

      -- include names, position, and dates of people you talked to

      -- which kind of maps you analysed

      -- which figures you calculated based on what data

      -- how you calculated the values

      -- etc.

• your description of the methods needs to be so specific that an outsider can take your description and can replicate (re-do) your research

• use appendices to show raw values that went into the calculations (for replication purposes) – number and title the appendices

      e.g.,   Appendix 1: UPEI student numbers 2003/'04

      Appendix 2: Waste produced by category in 2002/'03 at UPEI

• estimate: 1 - 2 pages

Results

• describe what you found, summarising the indicators by subsection, i.e., refer to each indicator by number and what you found but talk about them as a group of indicators

      e.g.,   6.1.1.1 Costs [NB: this is a sub-subsection in section 6. Economy and
                     Wealth]

          The 'costs' indicators measured the total annual number of FTE graduating students with a loan (EW-1), student debt load (EW-2), and student fees (EW-3). Results indicate that in 2003, 675 graduating students out of a total of 891 graduating students (75.75%) left UPEI with a debt load of CDN$2000 or higher.

• be specific and provide details – for replication

• use tables, figures, etc. to display the information clearly and professionally — number and title the tables and figures,

      e.g.,   Table 1: UPEI recreation space by building

      Figure 3: Campus map – areal view

• **if there is an indicator we left out and/or which can not be calculated, you MUST provide justification why the information does not exist or could not be included** – i.e., it is _not okay to just not address an indicator_ (i.e., leave it out without talking about it)

• a very important part of the report

• estimate: 3 – 10? pages – depends on how many subsections you have

References:

• Concordia Campus Sustainability Assessment Framework 2003 [they provided the CSAF description of the indicators as given in the CSAF Indicators and Benchmarks tables]

• UNB Campus Sustainability Audit 2004

Discussion

• discuss the results/findings – what do they mean?

• discuss any plans you hear about regarding improvement within the University

• provide specific and realistic recommendations: make suggestions for how and where improvements could be made, suggest campus sustainability initiatives

e.g.,   We recommend the University install secure undercover bike parking to the east of the Main Building and on the north entrance to the AVC (see Appendix 2: Campus map) by September 2005 to encourage alternative non-fossil fuel transport along the Confederation Trail to campus.

• if possible, provide an indication how feasible your recommendations are – i.e., costs, politically sensitive?, what will it take for campus community members to adopt the recommendation?

• **you must use literature references** here to support the discussion

• probably the most important section of your report

• estimate: 4 – 10? pages

References:

• the Concordia assessment

• the UNB report

• refereed journal articles and books

• www

each subsection finishes with the Discussion

Conclusion

• one conclusion for your report (i.e., you do not need to provide a separate conclusion for each subsection)

• summarise and tie it all together

    -- similar to the abstract but without reference to methods, looking more toward the future

    -- can bring in your own opinion here (and ONLY here) – e.g.,

The research on air quality on the UPEI campus has made us aware of the desperate and urgent need to install ventilation systems in the older buildings which rely on natural air flow rather than chemically-supported air conditioning systems. As documented, people are getting sick from the existing air conditioning systems. We sincerely hope the senior management of the University takes our recommendations to heart and finds funding to replace these systems as soon as possible.

• estimate: 1 – 5 paragraphs

References

• make sure you use correct referencing!

• list only those references in the reference list that are cited in the text

• please call this section 'References' rather than 'Works cited' or 'Bibliography'

[adapted and expanded from Gray 2004, UNB BIOL 4861]

Anticipated length

15 - 20 pages of text plus appendices (tables, figures, etc.)

• no need to ring-bind, have a plastic cover page, etc.

• you **MUST provide an electronic copy**, preferably in Word but WordPerfect will do also

• if possible, please provide an additional pdf file electronically

Assessment citeria

(1) Quality of research and thoroughness of data analysis

(2) Quality of research reporting (i.e., succinct abstract and conclusion, detail of description of methods and results, depth of discussion)

(3) Professionalism of report (style, spelling and grammar, referencing)

Weight: 50%

As previously mentioned, you will receive ONE overall mark per group, with some adjustment for individual effort (as per my impression and feedback from group members).

Due dates

Presentation: week of 4 April (date/s and time/s tbd) - 15% of total mark

Report: **Thursday, 14 April 4pm – submit to [name], [room number]**

_____

3. Community

Jean Asher, Peter Deddleston, Roberta C. Smith, Mark Vining

Abstract

The 'Community' section, under the People System section of the Campus Sustainability Assessment Framework (CSAF), is the most comprehensive of all CSAF sections, comprising 25 indicators which assess the on- and off-campus communities in the areas of 'involvement and cohesion,' 'diversity' and 'services.' 19 of these indicators were researched. Results indicate little sense of community on the UPEI campus and a lack of belonging, a homogenous campus community consisting primarily of 'Islanders' between the ages of 17 and 45, and the need for more services compared to other Canadian universities. Recommendations are made as to how the University can increase campus community members' sense of belonging, increase the diversity on campus, and find funding to improve services.

3.1 Involvement and cohesion

Introduction

Community is an indicator of human well-being. A strong sense of community contributes to people's productivity and happiness (Smith 2002, Guerin and Cole 2003). Productivity and happiness, in turn, are important aspects of sustainability; unproductive and unhappy people are burdens on society, demanding financial and human resources which instead could be used to restore degraded natural environments and curb greenhouse gas emissions.

Methods

To determine the number of volunteers on campus and amongst the alumni population (C-1, C-3), interviews were conducted with [insert name], Assistant to the Registar on 27 February and [Rosie Smith], Alumni Officer on 16 March. These interviews

yielded little information, so the records in the PEI Statistics were searched to find the total number of volunteer hours committed by current and past UPEI students, faculty and staff. No records of this kind are kept by PEI Statistics.

Sample interviews were conducted at random with campus community members regarding their sense of belonging to the UPEI community (C-5) (see Appendix 1: interview protocol). 'Voter turnout' (C-6) could not be assessed as UPEI has never held student elections.

Results

According to the Assistant to the Registrar (pers. comm. 27 February 2005), 987 volunteer hours per month are provided in a variety of fields by current UPEI members who are active as volunteers. 2098 CCMs of the total appr. 4800 CCMs (appr. 43.7%) volunteer regularly, at least once per fortnight. Alumni apparently commit less – 834.5 hours total amongst 5621 UPEI alumni.

As stated by those sampled for their sense of community, only 7 out of the 50 students, faculty and staff (14%) reported a strong sense of belonging or feeling welcomed on the campus. Of those 7, 6 (85.7%) were of Caucasian background, and had never left the Island.

Discussion

The findings regarding volunteerism by UPEI members and alumni contrast with those reported for Canada overall, as reported by Statistics Canada (Statistics Canada 2003). UPEI member and alumni volunteer much less than the average Canadian; reasons for this could be: the low pay on the Island, which forces people into higher work hours, the comparatively high number of children per Island family which demands financial and time commitments which do not allow for much else than care-taking of children and working, and others.

The lack of sense of community which this research has found is perhaps not surprising, given that most UPEI CCMs live off campus and only come to campus to work or study. Also, UPEI does not provide many non-academic 'fun' activities and intramural sports programs (see section 3.3 of this report) so there is little reason to come to UPEI to play and be social. UPEI, in essence, seems to be a university to work and study, with everyone having to find friends elsewhere as many people seem to do nothing but work.

We recommend UPEI look into improving UPEI salaries and student bursaries so that people don't have to work such long hours to make ends meet and can be a bit more social.

Conclusion (provided here but not necessary for a subsection)
This section of the CSAF report has provided insights into the social and community climate at UPEI. This climate seems to be much less friendly than what is acceptable and what we would like. We thus strongly urge those responsible at UPEI to make money available to increase salaries and provide more scholarships to students so that people don't have to work so hard to make ends meet. Better pay and more opportunities for student financial assistance would, in our opinion, improve the social climate on this campus to the extent that people are actually friendly toward each other rather than appear stressed all the time.

3.2 Diversity
3.2.1 Disabilities
Introduction
[text]

Methods
[text]

Results
[text]
Table 1: Number of UPEI CCMs with disabilities according to type of disability
Appendix 2: Disability services at UPEI
> – **NOTE: the number of the Appendix is 2, not 1, as App. 1 has been used in section 3.1**

Discussion
[text]

3.2.2 Ethnicity

…

3.2.3 Gender

…

3.2.4 Indigenous peoples

Indicators in this section were not researched in February - March 2005 due to time constraints.

3.3. Services

…

Conclusion

[text]

References

> *-- NOTE: only ONE reference list for your report – list here all references for ALL subsections*