

*Academic Conference Proceedings of*

# Salt of the Earth:

Creating a Culture of Environmental Respect and Sustainability



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**Sponsored by the**  
**Canadian Network for Environmental Education and Communication (EECOM)**  
**Interpretation Canada & The Nova Scotia Environmental Network**

*Papers Presented at*  
White Point, Nova Scotia  
October 18 - 22, 2006

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## Introduction

*Salt of the Earth: Creating a Culture of Environmental Respect and Sustainability* was a special national conference of environmental educators, researchers and policy-makers sponsored by a partnership of the Canadian Network for Environmental Education and Communication (EECOM), Interpretation Canada and the Nova Scotia Environmental Network in October 2006. It was a diverse gathering of more than 300 people. These proceedings represent a selection of the peer-reviewed academic papers that were presented at the conference, which are now made available on line for all participants and the academic and practitioner communities at large.

“Salt of the Earth” was chosen as the theme to harken back to the local working people who have lived close to the land with commonsense and a respect for each other and the natural world. Traditionally they are indigenous peoples, farmers, fishers, parents, elders, craftspeople, shopkeepers. They are people working in their communities for a healthy world. Today the circle must be expanded to include young people, immigrants from other cultures and regions, interpreters and teachers, to name a few. We must combine traditional knowledge and values with new ideas and practices to bring about greater respect for each other and the earth.

The vision and purpose of the conference was to explore how we can use education to inspire and transform our human and ecological communities for the benefit of future generations, nature and ourselves. It is not surprising that this diverse group of papers is tied together by this vision and makes a very positive contribution to it.

We have organized the proceedings from those that are more theoretically oriented to those that have a more applied focus. The Elshof article, entitled *Interdisciplinarity and Worldview Work to Foster Environmental Education* is a philosophical and conceptual call to action to revolutionize and address environmental education at a practical level in teacher training and public school classrooms. There is tremendous urgency to do this given the state of the world environmental crisis, and Elshof provides conceptual prescriptions for action. Paul Heintzman follows with a description of how the philosophy of Bill Mason can be a model for renewed environmental education efforts in classrooms and communities, in keeping with a new interdisciplinary and grass roots approach.

The Conrad paper on the development of a community based environmental monitoring network and Courthoy’s contribution on the interpretive possibilities of storytelling place in communities argue for tools that link the research expertise of the university with the practical, commonsense expertise of local citizens. They are tools through which the “salt of the earth” can inform knowledge and environmental program design and action. Bushell et. al describe a similar process in a challenging international context, linking the resources of a university in Japan with community environmental education in Nepal. Mrazek in turn examines how the environmental education resources of the university can attempt to promote a “pedagogy of place” and action within the university community

Finally, the Macleod article examines the roles and challenges of community members, specifically organic farmers, as environmental educators in themselves. Clearly they would value additional resources from universities and government to assist them in an educational role that is somewhat beyond what would be expected of farmers.

The message is clear from these papers. Community members have a lot to contribute to environmental education and their expertise needs to be recognized. There are numerous ways that they can and need to be supported by the theory, research and knowledge base of the university. Time is short to accomplish the major social changes required with respect to moving toward sustainability.

## **From Worldview Reflection to Interdisciplinarity, Crucial Paths in Teacher Preparation**

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### **Abstract**

This paper explores the role of worldview work to transform sustainability education within faculties of teacher education. It will emphasize the need for interdisciplinary approaches within schools of education if deeper understandings of the sustainability crisis are to be understood.

Nations and peoples are largely the stories they feed themselves. If they tell themselves stories that are lies, they will suffer the future consequences of those lies. If they tell themselves stories that face their own truths, they will free their histories for future flowerings (Okri quoted in Jensen, 2006, p.5).

In this paper I will argue that teacher education programs need to critically assess the manner in which they prepare teachers to deal with the complexities and interdisciplinary nature of modern sustainability issues. Schools of Education need to do more within their programs to promote interdisciplinarity if deeper understandings of the sustainability crisis are to be understood and taught within public schools. Developing teachers require opportunities for interdisciplinary curriculum work which crosses existing disciplinary 'silos', and learning activities through which they can critically and collaboratively reflect and work through the sustainability dimensions of the worldviews that inform their practice. Teachers with these types of experiences will be better prepared to develop effective interdisciplinary environmental education programs. Such programs have the potential to re-invigorate our conceptions of environmental and sustainability education and may help move sustainability from the academic margins into the broader mainstream consciousness of both teachers and students.

Meeting the ingenuity challenge of maintaining ecological integrity, human health and well-being will require the equivalent of an 'ecological enlightenment' (Orr, 1992) to revolutionize both our built world and our worldviews concerning our relationship to the natural world. Universities have a key role in developing effective and interdisciplinary environmental education programs. Unfortunately, themes related to education *for* sustainability are often neglected in higher education, even in teacher education programs (UNESCO, 2005). Of critical importance is the envisioning of a near-future which contains an impending 'peak oil' scenario, the possibility of abrupt and catastrophic climate change and pressures on natural systems, all of which are unprecedented in human history. The recently completed Millennium Ecosystem Assessment, the most comprehensive analysis of the health of the planet's ecosystems found that 60 percent of the ecosystem services that support life on Earth – such as fresh water, capture

fisheries, air and water regulation, and the regulation of regional climate, natural hazards and pests – are being degraded or used unsustainably (Millennium Ecosystem Assessment, 2005).

Our highly interconnected and interdependent global chains of production are not robust when faced with an unexpected breakdown or threat. This increased fragility can lead to what Homer Dixon terms a '*synchronous failure*' of these key systems whereby one failure cascades down a system causing untold ripple effects. He suggests that we may be sliding toward a planetary emergency, and that a future filled with ecological, social and technological breakdowns, are not remote possibilities but instead probabilities that we should all expect (Homer Dixon, 2006).

Environmental education as Hart (2003) argues, presents profound moral/ethical and political challenges to educational theory and practice. Hart's research with teachers' stresses the importance of enabling them to create a 'recontextualized narrative of place' embedded within an ethics of social consciousness. Post-modern visions of environmental sustainability employ language and metaphors drawn largely from the disciplines of ecology and Earth Systems science. These include concepts such as: systems thinking, metabolism, energy flow, symbiosis, entropy, embodied material energy, webs of relationships, life-cycles, interdependencies, system dynamics, stocks and flows, feedback systems, emergence, symbiosis, non-linear dynamics, unpredictability, precautionary principles, and intergenerational effects. Despite their importance in promoting deeper understandings of sustainability, these key transformative ideas and metaphors are for the most part absent from the disciplinary curricula of teacher education programs. Interdisciplinary courses and practices within schools of education are not commonplace. The traditional model of teacher education consisting of separate disciplinary courses in science, technological studies, social studies etc., remains 'standard' practice within universities. We might begin to ask whether schools of education are preparing teachers to be 'critical intellectual workers' or simply supporting them to continue to think and work effectively within the confines of their own discipline's implicit rationality (Gallagher, 1999)?

The manner in which the science and technology curricula is developed and undertaken in the classroom has an enormous impact on whether students experience these subjects as socially transformative or simply as inert blocks of content information, a means to an end. Do our education systems do enough to challenge what Berry terms a "plunder-consumption economy" based on the North American consumer dream in which "from an early age, students understand that they are being prepared to take their place within the existing economic structure?" (Berry, 2006, p.103). To begin to think critically about the root or systemic causes and not merely the symptoms of the sustainability crisis requires renewed attention to the suppositions and presuppositions that inform our attitudes and beliefs about how the human economy and the biosphere interact.

The fragmented and disciplinary-based approaches to teaching science, technology, economics, social studies, political science and human health in secondary school through university can leave us with relatively shallow understandings of the nature of the depth of interrelationships between these academic areas. This specialization in turn is often reflected in our reluctance to critically examine the nature of our own worldviews and the presuppositions that inform them as well as the disciplinary blind spots within our own area of specialization. Our public institutions often leave us with policies and structures that can be ineffective with respect to the magnitude

of the sustainability challenges facing us or even counterproductive and socially alienating. One need only examine North American energy and transportation policies and trends over the last twenty years to see how shortsighted and ineffective we have been in reducing the need for transportation and the pollution it generates. Urban commuters today spend more time in their cars and produce more pollution in total than twenty years ago. Homer Dixon suggests that we need to urgently prepare people for a very different future:

We can't possibly flourish in a future filled with sharp nonlinearities and threshold effects—and, somewhat paradoxically, we can't hope to preserve at least some of what we hold dear—unless we're comfortable with change, surprise, and the essential transience of things, and unless we're open to radically new ways of thinking about our world and about the way we should lead our lives. We need to exercise our imaginations so that we can challenge the unchallengeable and conceive the unconceivable. Hunkering down, denying what's happening around us, and refusing to countenance anything more than incremental adjustments to our course are just about the worst things we can do. (Homer-Dixon, 2006, p. 282).

The first step in preparing for this emergent future entails the ability to discern how some of our existing patterns of economic, social and political organization and thinking are now counterproductive to the visions of sustainability which we hold.

Worldview reflection involves exploring in a dialectical way how people make sense of and connect their immediate experiences, their learning processes and their cultural inheritance to their mental representation or world model. To enter into a discussion of worldviews is to enter a discussion about mental models about how people think the world 'works'. As Coombs explains:

Unquestioned beliefs are the real authorities of a culture. Therefore, if an individual can express what is undeniably real to him without invoking any authority beyond his own experience, he is transcending the belief systems of his culture (Coombs quoted in Jensen, 2006, p.5).

Our interconnected or relational and associative worldview emerges through a process of 'conceptual closure' whereby in coming to understand and develop a coherent and useful worldview, we accept some particular patterns of understanding while rejecting others (Gabora, 2004). A similar process of 'disciplinary closure' is *learned* through formal education and the experience in working within a discipline. The ability to invoke disciplinary closure is often conceptually useful, it helps define disciplinary boundaries, expectations and responsibilities and insofar as it allows a complex situation to be defined in simpler terms it is effective in some problem solving situations. The formal curriculum often reinforces the artifice of distinct and easily defined disciplinary borders, boundaries and outcomes. Unfortunately, most real-world sustainability problems are complex, emergent, ill defined and by nature inherently transdisciplinary. Rigid disciplinary thinking can become an obstacle to navigating and developing collaborative multifaceted 'solutions' that reflect the social and techno-scientific complexity of today's world.

Our worldviews impact our perceptions concerning risk (Bouyer & Bagdassarian, 2001) and they shape our cognition. We literally see, experience and respond to different worlds depending on our cultural and historical experiences and backgrounds (Kolto, 2004). Learning to literally ‘see’ with different eyes requires an in-depth engagement with the nature of our own worldviews, the inescapable disciplinary blind spots of our own training and the presuppositions that inform them. This kind of work doesn’t lend itself to modular instruction or short professional development workshops. If we want teachers to think differently about the nature of disciplines, these experiences need to become an integral part of teacher education.

The need to more fully appreciate the role our worldviews play in the sustainability conundrum is not new, but this relationship still challenges the environmental movement:

Today environmentalism is just another special interest. Evidence for this can be found in its concepts, its proposals, and its reasoning. What stands out is how arbitrary environmental leaders are about what gets counted and what doesn’t as “environmental.” Most of the movement’s leading thinkers, funders and advocates do not question their most basic assumptions about who we are, what we stand for, and what it is that we should be doing. Environmentalism is today more about protecting a supposed “thing” – “the environment” – than advancing the worldview articulated by Sierra Club founder John Muir, who nearly a century ago observed, “When we try to pick out anything by itself, we find it hitched to everything else in the Universe” (Shellenberger & Nordhaus, 2004, p.8).

If the health of our living systems continues to deteriorate as the ‘Living Planet Report’ (World Wildlife Fund, 2006) suggests, at what point are the educational systems in the largest consuming nations implicated in these global trends?

### **The Problem with Sustainability & the Science Curriculum**

The secondary science curriculum is firmly based in the ‘rational humanism’ ideology. Rational humanism has its roots in the Enlightenment, and its emphasis is on the ‘centrality of human reason’ (Eisner, 1992), *the* scientific method and a hierarchical anthropomorphic understanding of the natural world, with the rational human sitting at its apex. As Gough states:

Science education grounded in modern science is in trouble: it is more a science education for the nineteenth century than the twenty-first, it has an overemphasis on arbitrarily privileged content, does not relate to society at large, and is of declining interest to students” (Gough, 2001, p. 295).

Gough among others (Bowers, 2005; Blades, 2001) also charge that science education working through content heavy curricula is no longer meeting the needs of contemporary students. One consequence is that sustainability issues are often framed as simple rational technical problems amenable to solution by experts. As Paillotet & Callister state:

It is with such a preunderstanding, an unreflective belief in the naturalness and adequacy of the technical, that we operate our schools and create our curricula, conceptualizing the



process of teaching and learning from a technocratic-minded perspective. By making the educational process technical, we pattern the curriculum after a stair-step model of linear fact-by-fact learning, trivialize teaching as a series of generic “how-to’s” or formulaic “hints and tips,” and too often reduce the act of learning to simple models of behavioural stimulus-response mechanisms” (Paillotet & Callister, 1999, p.165).

What we need is a (post) modern science education, one that is democratic and recognizes the socially constructed, gendered, multicultural nature of science in its global context (Gough, 2001, p. 295). The transition from excitement and wonder to disengagement and apathy and Friere’s notion of ‘banking education’ occurs quickly:

By the time children are attending secondary school, curiosity tends to be replaced with cynicism: the only questions our senior students ask is whether the topic will be on the test or in rare moments, how the topic has any relevance to their lives. This slow destruction of natural curiosity should not surprise us; students worldwide are captive in a system of education that substitutes exploration of the natural world for the contrived experience, understanding for memorization, and personal insight for external authority. One of the most obscene players in this drama operates under the sign of “science education” in schools: As simulacrum of the fourth order where students rarely if ever experience science but certainly receive an education (Blades, 2001, p. 70).

Far too much emphasis within science education has been placed on preparing the next replacement generation of scientists and not enough on preparing engaged ‘citizen scientists’, young people who can appreciate that culture, values, politics and social justice are part of the real-world connections to science. Teachers require an appreciation that “western scientific epistemologies are deeply embedded in cultural values” (Brickhouse et. al., 2006, p.196).

Textbook driven science teaching still exists, and this form of simplistic single answer, per problem approach prompted Kuhn to compare science teaching with orthodox theology (Ravetz, 2005). Emphasis on *the* scientific method and teacher driven inquiry reinforce a misrepresentative understanding of the nature of science itself and enculture a simplistic belief system about how knowledge is produced in a social community. As Ravetz emphasizes:

Of course, the practice of high-quality science at the research front is largely post-normal in this sense. But somehow the teachers and popularisers have been constrained to present an implausible picture of indubitable facts and unalloyed progress. Problematic scientific issues are relabeled as 'environment' or 'health', so that 'science' retains its pristine purity. The great lesson of the atomic bomb, that science too can taste evil, seems to have been forgotten (Ravetz, 2005, p.3).

If mere information is never enough in terms of inspiring, motivating and enabling people to change their behaviors when it comes to sustainability, then it is not surprising that instrumental

forms of science education which provides little or no opportunity for students to *become* citizen scientists, do little to help young people develop an enduring relationship with the concept.

### **Asbestos, cars and ‘externalities’**

Educational discussions concerning some of the most profound environmental problems young people will face in the next fifty years often remain isolated within the curriculum, typically contained within a learning unit or two within the already overloaded science or world studies curriculum. The fact that issues such as climate change or biodiversity collapse are reduced to simple ‘topics’ within these courses often means that they are understood as predominantly ‘science’ issues and not connected in a more fundamental way to current business practices, consumption driven lifestyles, neoliberal economic doctrine and conceptions of social and environmental justice. In many ways the fact that these issues are silos within the science curriculum signifies to young people that they should not be considered as any more important than any other unit of study, nor contain any learning which may transcend the way they understand other disciplines.

Contemporary examples abound of economically productive yet ecologically destructive practices. Many of these economic activities are celebrated daily in the corporate press, yet upon closer inspection found to be entirely at odds with what we know to be ‘sustainable’ from any broad science-based understanding of the principles of sustainable practices such as those embodied in ‘Natural Step’ or the ‘Ecological Footprint’. Sustainability is a conceptually complex and value-laden concept with dimensions that intersect human and ecosystem health, economics, technology, social justice, inter and intragenerational equity and notions of sustainable livelihoods to name a few.

It’s worthwhile to examine a few contemporary Canadian issues which have attracted widespread media attention and also serve to illustrate how powerful economic interests and dominant worldviews pose substantive hurdles to sustainability.

- Over the last twenty years Canada has been an aggressive marketer and exporter of chrysotile asbestos, a carcinogen identified by the WHO, in fact we’re number two in the world and 95% of our exports are destined for poor developing countries ( Mittelstaedt, 2006). If this were not bad enough, the Canadian government:

subsidizes an industry lobby group called the Chrysotile Institute, pouring in roughly \$20-million in taxpayers' money over the past 20 years. The Chrysotile Institute plays down the health risks of chrysotile asbestos and promotes its use in developing countries (Boyd, 2006).

- In Ontario, the provincial government continues initiatives that are pouring \$235 million into subsidies for General Motors to produce the Camero, a 1970’s type muscle car at one of their plants (Osorio, 2006). Historically North American automakers have vigorously fought any form of tougher vehicle emission standards, and they continue to do so today (Simpson, 2006) while touting their ‘green credentials’ at every opportunity. As Simpson states:

Bringing back the Camaro reflects the kind of thinking that still prevails in Detroit. Yes, the Camaro is destined to be a niche car, with a production run much smaller than many other GM models. That the Camaro is back at all reflects both the head-in-the-sand thinking about climate change, and a market response to similar models marketed by GM's competitors (Simpson, 2006).

- Last year Canada's oil and gas industry made a combined \$31.3 billion in profits, while Canadian government subsidies amounted to \$1.4 billion (Koehl, 2006). As Koehl points out:

Since Canada negotiated the Kyoto Protocol in 1997, the federal government has handed out more than \$2 in tax subsidies to these companies for every \$1 it spent on Kyoto compliance...over the last three decades the industry has received more than \$40 billion in subsidies (Koehl, 2006).

Alberta has become the largest greenhouse gas polluter in Canada and expansion of the oil sands continues, often with minimal environmental protection and with no plan to reduce greenhouse gas emissions in any absolute way.

- Over fishing and the use of ecologically destructive fishing practices across the globe has led us to an ocean biodiversity crisis, to the point where some scientists claim that in fifty years commercial fisheries worldwide will collapse. Despite global scientific awareness of the destructiveness of bottom trawling fishing practices, the Canadian government has refused to participate in a moratorium on the practices called for by the United Nations (Mittelstaedt, 2006). In what amounts to the aquatic equivalent of 'clear cutting' Canada's major east coast fisheries companies have gone so far as to claim "there is zero scientific evidence, not one shred of scientific evidence, that these fisheries do any damage to the bottom environment whatsoever" (Mittelstaedt, 2006).
- Discount air travel continues to expand worldwide, as millions of passengers take advantage of cheap flights to participate in activities that only a few decades ago only the super-rich could afford. Want to spend a weekend in New York, London, Paris? Many have come to see cheap air travel not so much as a privilege but a commuting right. People on Canada's east coast often commute to jobs in Alberta, flights are often paid for by employers who are happy to receive workers. Inexpensive unlimited air travel is now often not understood as a privilege but as a right. As demand for exotic foods continues to expand the carbon budget and the contribution of our food system to climate change expands as well. Thousands of tonnes of fresh produce and other goods are exported and imported into major Canadian airports daily.

An approach to inquiry aimed at developing a comprehensive understanding of any one of these issues requires knowledge that transcends any one discipline. None of these situations involves simple 'fixes' but rather the complex negotiation of political ecology, technologies, science, social justice and economics. Even if teachers believe that these types of issues hold educational value, their inherent complexity can become overwhelming when coupled to an outcomes driven curriculum and the traditional disciplinary structure of secondary schools. In short, multiple

factors serve to mitigate against curricula which help young people attain a holistic perspective of real-world problems. To compound the difficulty, some teachers will perceive these problems as too 'political' containing too many 'hot-button' issues for them to deal with without collegial and administrative support.

In a broader environmental sense educational problem solving approaches or public campaigns aimed at informing and mobilizing public attention and action which fail to understand the issues at hand in an interdisciplinary and holistic manner are problematic:

The effect of this orientation is a certain *literal-sclerosis*— the belief that social change happens only when people speak a literal “truth to power.” Literal-sclerosis can be seen in the assumption that to win action on global warming one must talk about global warming instead of, say, the economy, industrial policy, or health care (Shellenberger & Nordhaus, 2004, p.13).

Whether its involving students in exploring how economics, worldviews weave through the Quebec-based asbestos mining industry, the Alberta oil and gas industry, the Ontario automobile manufacturing industry or the Maritime fishing industry, one thing is clear, these are not topics for the fainthearted. Despite the challenges, it is only by exploring these issues from a transdisciplinary perspective, from mathematics, economics, science, political ecology, social justice and health, that we might hope to conceptualize genuine solutions that can claim to be moving towards sustainability. Trans and interdisciplinary work often entails difficult questions of corporate influence on government policy, the nature of subsidies, political hypocrisy, human fallibility and real-politick. For teachers, learning how to navigate these curriculum complexities requires opportunities to work with colleagues in a supportive and critical environment and to develop learning materials that embody these complexities.

One of the curriculum areas that demands immediate scrutiny is the manner in which business and economics is taught both at the secondary and university levels. For example, the principles of ecological economics and externalities, full-cost accounting and the concept of ecologically destructive subsidies, are three crucial concepts for understanding how modern economics and business practices are wreaking havoc on the environment, yet they are not found in many post secondary business curricula. Much work remains for environmental educators to integrate sustainability thinking in courses outside of science and world studies.

### **Preparing Teachers Differently**

How strong is our commitment to collective denial concerning the seriousness of the unfolding environmental crisis? How willing are our professional schools of education to fundamentally reassess the 'fundamentals' in terms of how they prepare teachers to approach the teaching of their disciplines through interdisciplinary engagement? Preparing teachers to acknowledge the serious reality of this unfolding environmental crisis also entails engaging them in a reassessment of how well they are planning to prepare young people who will need to cope and thrive in a world that will be fundamentally shaped by the manner in which societies respond (or don't) to this crisis.

Pessimists such as Jensen (2006) argue that as a species humans have entered the 'endgame' and that the consequences of our collective environmental stupidity will increasingly be understood in harsh terms. While as educators we don't have the option of wallowing in nihilistic doom and gloom prognostications of the future, but neither can we ignore the urgency of helping young people understand the magnitude and opportunities within the challenges they face, or an understanding of our collective peril if they choose to ignore them.

Have we taken a comprehensive and critical look at the nature of present curriculum as it relates to sustainability in all its forms? I will argue that we haven't and that is truly the most important struggle in the next twenty years. As Westley et al. (2006, p.115), describe the word 'Palliative' comes from the Latin 'pallium', meaning a 'cloak', and in palliative care "symptoms are cloaked with treatments whose primary or sole aim is to promote patients' comfort". A severe assessment of much of the scholarly work in this area might conclude that it amounts to little more than environmental 'palliative care' in terms of how slowly scholarship ultimately impacts changes in behavior that in turn produce substantive change. Many might ask, where is the sense of urgency, where are the efforts to transform the manner in which we educate young people so that sustainability becomes a coherent narrative woven through all subjects? The scientist James Lovelock, father of the Gaia metaphor of a living planet states our choices starkly:

With more than six billion hungry mouths to feed, and a burgeoning accumulation of greenhouse gases from our heavy industrial past and present, there is no returning to the romantic illusion of a pre-industrial Earth. We are like the driver of a car going down a steep hill who finds the brakes have failed. We could take our foot from the accelerator pedal but instead we chant the mantras of renewable energy or sustainable development. These will not undo the harm done, and we would have to stop what we call development altogether; there are just too many of us living the way we do now. What we need is damage limitation (Lovelock, 2004).

Despite the importance of sustainability and all of its multifaceted dimensions, few teachers colleges make education 'about', 'for' or 'in' sustainability a central part of their pre-service teacher education programs. Given the enormity of these challenges and the consequences of failure, one of the most distressing and seemingly inexplicable responses from the education community as a whole has been its lack of response, its lack of urgency. This criticism is not meant in any way to diminish the many excellent examples of curriculum and classroom teaching being undertaken as well as the Herculean efforts of some informal educators and organizations in working toward the ideal of education for/about sustainability. But the provocative question I am posing here is why haven't years of efforts in secondary and college-university education reaped more rewards in terms of student and citizen activism in challenging the environmental status quo in North America? There is little evidence that despite our professed good intentions toward environmental stewardship that Canadians are shrinking our average ecological footprint, which remains one of the largest in the world. Similar concerns have been expressed about the mainstream environmental movement today:

in their public campaigns, not one of America's environmental leaders is articulating a vision of the future commensurate with the magnitude of the crisis. Instead they are promoting technical policy fixes like pollution controls and higher vehicle mileage

standards — proposals that provide neither the popular inspiration nor the political alliances the community needs to deal with the problem (Shellenberger & Nordhaus, 2004, p.6).

The focus on the ‘techno-fix’ while crucial is insufficient in and of itself in terms of a response to the sustainability crisis. Technological fixes that leave the root cause(s) of the sustainability conundrum unaddressed often merely delay the onset of symptoms and lull people into a false sense of accomplishment. Conceptualizing the sustainability crisis primarily as a technical problem which can be ‘solved’ through the application of new and improved ‘technical processes’, whether these processes be ecological footprint audits or redoubled recycling efforts is part of the problem. The over-application of technical rationality often means that questions that arise about what and how to teach can only be construed as technical questions, complex value-laden issues are often reduced to mere trivial variables that can be addressed through ‘the’ scientific method. Shellenberger & Nordhaus suggest that:

The entire landscape in which politics plays out has changed radically in the last 30 years, yet the environmental movement acts as though proposals based on “sound science” will be sufficient to overcome ideological and industry opposition. Environmentalists are in a culture war whether we like it or not. It’s a war over our core values as Americans and over our vision for the future, and it won’t be won by appealing to the rational consideration of our collective self-interest (Shellenberger & Nordhaus, 2004, p.10).

Our collective failure to address the climate change crisis over the last twenty years, despite the steadily and overwhelming scientific evidence of its potential seriousness provides evidence to support Shellenberger & Nordhaus’s argument. Collectively we have spent billions on research to increase the scientific certainty of the evidence of climate change, and despite this we will never achieve the one hundred percent certainty that many skeptics and scientifically illiterate pundits demand.

Sterling (1999:4) warns against the naivety of the simple linear relationship implying that environmental education will change society. He suggests that the fundamental question educators must ask changes from ‘*How can environmental education change people’s behaviour towards sustainability?*’ to ‘*How can education and society change together in a mutually affirming way, towards more sustainable patterns for both?*’

Dieleman, (2001) among others (Mercier,2001; Mieg, 2000; Flint, 2000) identify the importance of a multi-disciplinary, a multi-actor and multi-culture approach to environmental education in the university. Yet, as Norgaard explains, environmental higher education often continues to meet stiff internal resistance:

Discussion of the need to have people who can work across disciplines to understand and resolve environmental programmes arose during the 1960s and the initiation of environmental programmes flourished during the 1970s. Today, we marvel at the way scientists in the disciplines continue to denigrate environmental programmes for being too political and too practical and thereby keep these programmes marginalized in the educational structure (Norgaard, 2001:65-66).

## Toward the Education of Citizen Scientists

Creative work is needed to break sustainability out of the science curriculum, in schools of education we need more interdisciplinary work combining all the subjects with sustainability. One might envision a 'mathematics of sustainability' in which students explore through mathematics the relationships and rates at which we consume resources, or using tools of probability, modeling and extrapolation to determine what future scenarios might hold in terms of population growth and nonrenewable resource availability and scarcity. An 'arts and sustainability' program would examine the many ways the creative arts can be used to express the ineffable and affective dimensions of our relationship with the natural world, and importantly how to communicate this to a wider audience. For example, citizen science might engage students in asking the following critical questions about the issues described earlier:

- Why despite ample scientific evidence about the environmental damage caused by ocean bottom-trawling fishing practices, does Canada continue to refuse to support an international moratorium to stop the practice?
- Why does Canada continue to publicly subsidize and promote the use of asbestos in developing countries despite its well-understood health hazards?
- Why do some of the most environmentally destructive international mining companies call Canada home?
- Why do Canadian provincial governments continue to subsidize trans-national corporations who continue to manufacture automobiles with fuel efficiencies more reminiscent of the 1970's than 2006?
- Why does Canada's federal government (and many of its provincial ones) continue to pay lip service to climate change and the serious impacts that many scientists believe will ensue with a 'business as usual' mindset?
- Why do both federal and provincial governments continue to subsidize the oil and gas industry despite record profit levels in that industry and its poor environmental record in responding to climate change?

Complex socio-ecological systems are best studied through transdisciplinary perspectives, with the input of multiple stakeholders and through diverse modes of investigation (Costanza, Graumlich & Steffen, 2007; Clark, Crutzen & Schellnhuber, 2004). No one perspective or singular disciplinary worldview is adequate to the task of encompassing the breadth of human interests, values and objectives involved in working toward the ideal of sustainable development. Sustainability issues lend themselves to interdisciplinary and transdisciplinary approaches to problem solving (Bill, Oetliker & Klein, 2001). Ravetz (2005) refers to 'post-normal science' as a form of community science which moves beyond Kuhn's concept of 'normal' or paradigmatic reductionist science. Educating young people within a 'post-normal' framework of science and environmental education requires an approach that emphasizes the following:

- **Pragmatism and Plurality:** Tools and conceptual frameworks will be appropriate to the solution of the problem, rather than being limited by the tools and conceptual frameworks of a particular discipline.

- **Acceptance of uncertainty as a given:** It is acceptable to ask questions about the real world that at present we do not know how to answer.
- **'Facts' may be uncertain** but despite this, decisions that are often urgent in nature still need to be made. Here the precautionary principle may provide guidance.
- **A Focus on data quality** rather than data completeness
- **Use of a systems approach** that is comprehensive, holistic, global, long-term, and contextual
- **A concern for dynamics, non-equilibrium, heterogeneity, and equity**
- Expression of **social points of view**, as well as individualistic points of view; an understanding that there may be no single privileged or omniscient vantage point from which to understand the issue at hand
- **Concern for the processes** through which the behaviours of individuals and institutions change (Ravetz, 2005; Viederman, 1995, p.42)

It could be argued that embracing the inherent complexity of the concept of sustainability instead of minimizing or simplifying it is a prerequisite for designing an authentic learning program about it. Post normal science education emphasizes knowledge building across the layperson-expert divide, not only as research participants, but in terms of assessors through 'extended peer review'.

Environmental problems seem to arise among the differences between the scientific knowledge of academics and technocrats and the experiential knowledge of those people who are closest to particular social and ecological systems (Norgaard, 2001, p. 60).

Environmental problems are complex, 'messy' and emergent in nature. They often arise from the application of narrow disciplinary knowledge in economics, technology, urban planning etc., in ways which do not acknowledge or comprehend the nature of the problem.

It becomes imperative that if we are going to teach students about the need for systemic behavioural and economic change, the school system must provide them with the intellectual tools to reach beyond trivial green slogan politics. This entails the ability to identify and understand the critical roles of vested interest politics, economic power and worldviews in shaping our understanding of the concept of 'environment' and our complex relationships with 'it'. This necessarily entails avoiding simplistic notions of "us" versus "them" when it comes to good and poor environmental behaviours, avoiding what Sonnenfeld (2006) calls, 'the violence of abstraction' when it comes to defining environmentalism itself. As Sonnenfeld explains, in the minority industrially 'advanced' countries, environmentalism has a "largely idealized 'post materialist' values orientation" while in majority (developing countries "it is focused more frequently on issues of human survival and defense of land and livelihood, against the onslaught of market actors and globalization" (Sonnenfeld, 2006, p. 113).

The problems of preparing teachers to understand the nature of sustainability, the role of education in uncovering, confronting and transforming existing 'unsustainable' worldviews and bringing this knowledge to bear on contemporary education is daunting. This paper has argued that creating forums whereby students and faculty can critically and collaboratively reflect on the implications of their own and the dominant worldviews is crucial for the development of



effective and sustainable interdisciplinary environmental education programs. Such programs have the potential to re-invigorate the conceptions of science and environmental and sustainability education and may help move them from the academic margins and into the mainstream consciousness of both teachers and teacher educators. When Nobel laureate Leon Lederman was asked to describe the type of science education required to meet the challenges of living in a world characterized by ever-escalating levels of social and technological complexity he stated:

The 21st century is a strange land. They will do things differently there... It implies increased costs as teachers must be given several hours a day to work with colleagues to stress the key ideas in this new pedagogy, invent techniques for improving the learning process, and propose interdisciplinary and transdisciplinary problems that will further *use* the students' growing mastery of disciplines. It will require a new effort to marry the knowledge of the physical and biological universes with the wisdom of the humanities and with the essential creativity of art, music, and literature. Transdisciplinary challenges must be part of the new pedagogical practice (Lederman, 2001, p.265).

The measure of our collective success as a species may very well depend on whether teachers are empowered the world over to make this vision a reality in their classrooms.

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## **The Environmental Philosophy of Bill Mason: A Model for Environmental Education**

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### **Abstract**

Almost 20 years after Bill Mason's death, the writings and films of this legendary Canadian canoeist, filmmaker and artist remain popular: "Few people of any nation have been so influential in creating a sense of responsibility for the environment" (Buck, 2005, p. 12). Supported by statements in Mason's writings and films, this paper presents 9 tenets of Mason's environmental ethic which reflect a Christian perspective on caring for the earth. Haluza-Delay (2000) argued that religious understandings can be influential in developing meaningful environmental ethics and environmentally friendly lifestyles as religious membership and practice are a significant source of values and motivation for behavioural change for many people. Thus for many Canadians, Bill Mason's environmental philosophy may be a good model for constructing their own environmental ethic. Implications for environmental education are discussed.

Almost 20 years after Bill Mason's death, the writings and films of this legendary Canadian canoeist, filmmaker and artist remain popular. The 2005 film *Things that move—Canoe*, winner of the Best Canoeing Film in the 2006 Reel Paddling Film Festival, has several references to Mason's writings and films. The book *Bill Mason: Wilderness artist from heart to hand* by Ken Buck who worked as a cameraman with Mason was released in late 2005. Buck writes that "few people of any nation have been so influential in creating a sense of responsibility for the environment" (p. 12). Although books and articles have been written about Mason's life and art (e.g., Buck, 2005; Raffan, 1996), there has not been an in-depth analysis of his environmental philosophy which was strongly influenced by his spirituality. In a review of Raffan's book *Fire in the Bones*, Gardner (1996) comments that "Raffan admires the depth and flow of Mason's spirituality though he is less clear about its source."

### **Purpose of Study**

What exactly was Mason's environmental philosophy or ethic? How is Mason's environmental philosophy relevant to environmental education? The *objective* of this paper is to investigate the main tenets of Mason's environmental ethic and to discuss the implications and application to environmental education.

### **Method**

The method used in this study was an analysis of Mason's writings and films, primarily: the books *Path of the Paddle* (1980), *Song of the Paddle* (1988), and *Canoescapes* (1995); quotations of Mason's letters and other writings found in Raffan's (1996) biography of Mason titled *Fire in the Bones*; and Mason's feature film *Waterwalker*. Although not all of Mason's

films have been thoroughly reviewed in this study, *Waterwalker* is probably the most important film to consider as Raffan (p. 27) noted: “It was not until his final film “Waterwalker,” that he actually makes an overt statement about his views on wilderness spirituality...espousing what had been intuitively evident in all his work...”

## Results

The *outcomes* of this study may be summarized in nine principles all supported by statements in Mason’s writings and films.

### 1. *The Earth is God’s Creation*

Mason’s frequent references to God and God’s creation suggest that his environmental views were theocentric rather than anthropocentric or biocentric. For example in *Canoescapes* (p. 157) Mason writes, “The forest that God created inspires me to create a painting...” Elsewhere he writes “When I draw or paint...something happens between me, the land and the Creator who put it all together so long ago” (Mason, 1982, p. 9). From an early age he believed that God was the creator who created the earth. In *Canoescapes* (p. 15) he explained how he learned in school why ice forms on the surface rather than the bottom of a lake. He concluded: “This fact, as well as many others that I learned in science, convinced me that God really knew what He was doing when He created the Earth.” In the 1950s in Winnipeg he would frequently give a slide show of his wilderness photos accompanied by a commentary. In the notes for this slide show he stated, “For nature is part of the glorious fullness of God’s creation no less than man” (as quoted by Raffan, 1996, p. 80). In *Path of the Paddle* (1980, p. 194) he rejected the anthropocentric view: “It might seem that we own the earth, and we certainly act that way, but I don’t believe we do.” He lamented the fact that there is little support for the theocentric position in our society: “Our culture, so far removed from the natural world... continues to debate over whether or not the Creator even exists” (*Canoescapes*, p. 157).

### 2. *God the Creator Communicates*

For Mason, God the creator was not an absent or distant God who created the world and then left it alone. An analysis of Mason’s works indicates that he believed not only that God created the world, but that God communicates to humans through the Bible and through the created world. This is what is known theologically as revelation: God communicates through the bible (special revelation) and through creation (general revelation). It is interesting that Mason titled his early slide show in which he combined photos of creation with biblical quotations, “God Revealed” (Raffan, 1996). In regards to special revelation, in *Song of the Paddle* ( p. 179) Mason wrote the following about the Bible: “It’s a must if you believe God created the world and lived in the person of Jesus Christ.” Although Mason did not quote the bible frequently in his writings and films, many of his underlying principles reflect biblical values. More references can be found in his works about general revelation than about special revelation. For example in *Path of the Paddle* (p. 3), he wrote, “A journey by canoe along ancient waterways is a good way to rediscover our lost relationship with the natural world and the Creator who put it all together so long ago.” He reflected upon God speaking to him through creation in the catalogue for his 1980 art show, “Wilderness Impressions: A Dialogue with the Arts”: “It has taken me almost a lifetime to learn to look and to listen to what God has to say through His creation. The more I am

able to do this the greater the pleasure I derive from what I create” (as quoted by Raffan, 1996, p. 228).

### *3. Creation is good and we can learn from it.*

In Mason’s writings and films we see the idea that God’s creation is a good creation and that humans can learn from it. This third point flows from the second point that God communicates through creation. In his feature film *Waterwalker*, Mason stated “I look around me at the colours, the textures, the designs. It is like being in an art gallery, God is the artist. And he has given us the ability to enjoy all this, and to wonder, and in our own small way to express ourselves in our own creativity and that’s why I like being here.” The notion that humans can learn from the created world, is also communicated by Mason when he quotes Job 12:7-10 at a central place in *Waterwalker*: “But ask the animals, and they will teach you, or the birds of the air, and they will tell you; or speak to the earth, and it will teach you, or let the fish of the sea inform you. Which of all of these does not know that the hand of the Lord has done this? In his hand is the life of every creature and the breath of all mankind.” It is interesting to note that Ken Buck (2005) places this quote, superimposed on a photo of Mason canoeing, at the very beginning of his book.

### *4. Humans have a unique place in creation.*

In Mason’s works you can observe his view that humans are not just one of many creatures, but have a unique place in creation as God has given them the ability to create. In the catalogue for his 1980 art exhibit, Mason wrote: “Creativity is one of God’s greatest gifts and in fact is one of the things that differentiates us from the rest of the animal kingdom. As an artist the urge to create almost consumes me” (as quoted in Raffan, 1996, p. 228). Mason makes a somewhat similar statement in *Canoescapes* (p. 156), “The ability to create is one of God’s greatest gifts to mankind. It’s one of the things that separates us so dramatically from the rest of the animal kingdom.”

### *5. Humans destroy creation*

Although humans have a unique place in creation, they often misuse their gifts to destroy and change the environment. The above quotation continues immediately with the following statement: “But it’s (human ability to create) also at the root of our destruction of the natural world. In so many of our activities we have to destroy something in order to create something else” (*Canoescapes*, p. 156). In *Path of the Paddle* he laments both the taming and changing of God’s creation:

Today the land, to a great extent, has been “tamed.” It’s getting harder and harder to find those remote hidden places where we can enjoy the natural world as God created it. (p. 191)

We have become so totally committed to changing our environment that we have become oblivious to the fact that the world around us is a creation itself—God’s creation. (p. 194)

In a form letter written shortly before his death, Mason wrote:

God has created us, placed us in a wonderful and beautiful world and set us free to create and utilize it and delight in it. We have the capacity to use it with

compassion for all the creatures that share it with us, but we have turned the air, water, and land into chemical soup.” (as quoted in Raffan, 1996, p. 265)

Although he does not label this human destruction of the earth sin, he associated it with two human behaviours—ruthlessness and greed—often associated with sin: “The changes being wrought by the James Bay project, acid rain, and the pollution of lakes and rivers are the result of stupidity, ruthlessness and greed” (Mason, 1982, p. 10). In a writing titled “Some Private Thoughts” he also associated environmental problems with human alienation from God:

I am convinced that our problems in relation to nature and also in human terms are because of our alienation from God the Creator. An alienation caused by us. Not God. It is not His fault that we prefer to leave him out of our lives. (as quoted by Raffan, 1996, p. 188)

#### *6. Humans are to Care for Creation*

Mason believed that humans “have a moral obligation to preserve and care” for the created world. In the notes for his “God Revealed” slide show he quoted from the biblical book of Revelation, “Cried the angel in Revelations: ‘Hurt not the earth, neither the sea, nor the trees’” (as quoted in Raffan, 1996, p. 80). In *Canoescapes* (p. 150), he wrote that “I cannot believe that God ever intended us to overrun the earth at the expense of all other living creatures. Somewhere on earth a species of life becomes extinct every day.” In *Path of the Paddle* (p. 192) he stated “I believe that we have a moral obligation to preserve and care for the habitat of animals and plant life because, like us, they were created by God and have a right to exist too.” Subsequently in *Song of the Paddle* (p.179), he made a very similar statement: “for the sake of all the myriad forms of life that live there, we have a responsibility to ensure that they continue to exist because they, like us, were created by God and have a right to exist.” Mason learned from Dr. Fred Mitchell, pastor of Elim Chapel in Winnipeg, that the word “dominion” in the King James’ version of Genesis should be interpreted as “responsibility” and this understanding became a cornerstone of Mason’s environmental theology (Buck, 2005).

#### *7. A Theology of Humility*

While Mason’s environmental philosophy is rooted in Christian theology, his theology was characterized by humility in that he was able to learn from other traditions. In *Canoescapes* (p. 157) he wrote: “The words of the native people reflect a relationship with the land that does not come easily or naturally to our culture. Almost all the recorded speeches of the native people reveal a profound belief in a Creator...” Also, in *Canoescapes* (p. 38) he gives an example which illustrates that he could be critical of his own faith tradition and that he could learn from other traditions:

There is an island off Gargantua Harbour in Lake Superior with the ominous name of Devil’s Warehouse. ...I was intrigued by the name Devil’s Warehouse. No doubt this name was given to the island by the voyageurs. They were a superstitious lot and inclined to attribute any strange or unusual land forms to the devil. In stark contrast, the native peoples tended to think of these same places as having special spiritual qualities. Not far from Devil’s Warehouse Island, another island bears a startling resemblance to a chair. The white man calls it Devil’s

Chair Island. The native peoples regard it as the chair from which the Creator or Great Spirit created the world. Their attitude to things natural suggests that they had a more harmonious relationship with the natural world than did some of those who were strongly influenced by the church.

As Buck (2005, p. 56) notes, “Interestingly enough, in *Waterwalker* there are more references to aboriginal tenets of faith than to Christian ones.” At one of the central points in *Waterwalker*, Mason quotes aboriginal voices and then turns to his own Christian tradition and quotes Job 12:7-10. Mason’s approach seems to be like that of the Apostle Paul in Athens when he began by discussing the Greeks’ statue to the unknown God and then moved on to presenting the Christian good news (Acts 17: 16-34).

#### *8. Caring for Creation is energized by faith in God.*

For Mason, the task of caring for creation is energized by faith in God such as the apostle Peter had when he walked on water. He wrote that “Since it is humans that are causing the degradation of the world around us, the only hope for stemming this tide of destruction lies within all of us (Mason, 1982, p.10). However for Mason, this was not an anthropocentric solution, but a theocentric one because of who God created humans to be. In the pivotal scene in *Waterwalker*, and also the one that gives the name to the film, Mason states:

I think that the only hope for what is left of the natural world is to rediscover that love and compassion for it that the native people talk about. And I think that is possible because God created us with the ability to do the impossible. When Jesus called Peter to walk to him across the water, Peter was just fine until he remembered that people were not supposed to be able to do that. I think that we have just forgotten to walk on water.

Mason’s views are very similar to those of Christian author Madeleine L’Engle (1980, p. 196) who wrote:

When Jesus called Peter to come to him across the water, Peter, for one brief, glorious moment, remembered how, and strode with ease across the lake. This is how we are meant to be, and then we forget, and we sink. But if we cry out for help (as Peter did), we will be pulled out of the water, we won’t drown...The impossible still happens to us...

#### *9. Ultimately the fate of the earth is in God’s hands.*

Mason’s environmental ethic was an optimistic one as he believed that ultimately the fate of the earth is not in human efforts but in God’s hands. In a letter written as he was approaching death Mason wrote:

I spend considerable time lamenting about what a mess I’ll be leaving it (the earth) in. However, I have never believed in harping on the negative. My obsession has been to share the wonder and infinite beauty of the world God has created and to help people develop an appreciation and concern for it. My optimism is rooted in my faith that God has not forsaken us. My relationship with



God in his son Jesus Christ, and with a relationship like that there's really not a lot that can go wrong." (as quoted in Raffan, 1996, p. 265)

### Discussion

The tenets of Bill Mason's environmental philosophy, as identified in this study, are congruent with Christian understandings of caring for the earth. Firstly, Mason's view is thoroughly theocentric which is a basic tenet of the Christian view: "God is the measure of all things, not humans...one consequence of this starting point is that both human uniqueness and the continuity humans have with all other creatures are affirmed (Bouma-Prediger, 2001, p. 120). Second, Mason viewed God as a Creator who communicates with humans through both the bible and the creation: "God creates and sustains all things and enters into covenant relationship with the world...the earth and its plethora of creatures" (Bouma-Prediger, p. 121). Third, Mason saw creation as being good and that we can learn from it. Numerous biblical passages, especially in Genesis, the Psalms and Job, demonstrate that creation is good for its own sake (Wilkinson, 1991). Mason's description of creation as an art gallery that he could learn from is reminiscent of Calvin's description of creation as a "most glorious theatre" or a "magnificent theatre" which, as a constant source of revelation, informed Calvin's writings (Bouma-Prediger, p. 178).

Fourth, Mason saw God's gift of creativity to humans as giving humans a unique place in creation. The Christian view is that "humans do have a unique place in creation and a unique responsibility to all of it" (Wilkinson, 1991, p. 283). Theologically this is what is known as being made in God's image or being image-bearers:

Though, like all creatures, made from dust, we humans are unique. We do not have the sight of an eagle or the strength of a lion. We do not run like gazelle or swim like a dolphin. We cannot hear like a bat or smell like a bear. But the bible attests, we are made in God's image, after God's likeness....We are unique, but our uniqueness implies not superiority but service. (Bouma-Prediger, 2001, p. 123).

Fifth, Mason observed that humans abuse their God-given creativity and as a result destroy the earth. Again this reflects the orthodox Christian view of sin: "Indeed, the world is out of whack because of what we, God's image-bearers, have done and left undone. A contagion like sin haunts our lives and affects all we touch, and so we bear the weight of inherited sorrow and perpetuate in ways known and unknown the brokenness of our lives in the world" (Bouma-Prediger, 2001, p. 123).

Sixth, Mason articulated that humans are to care for the created world. His understanding of the interpretation of "dominion" as "responsibility" reflects extensive Christian literature on dominion as stewardship (Wilkinson, 1991). Mason's view is consistent with the Christian motif of earthkeeping: "God is the rightful and proper owner of the earth, but God gives us the calling to be earthkeepers. We are given the joy and responsibility to lovingly keep the garden that is the earth—in all its intricate fullness and dynamic relatedness" (Bouma-Prediger, 2001, p. 154). Or as Wilkinson (1991, p. 308) puts it, "we are *stewards* of God, managers of this particular part of

his household...to preserve, enhance, and glorify the creation, and in so doing, to glorify the Creator.”

Seventh, Mason’s environmental philosophy reflected a theology of humility; he could be critical of his own tradition and learn from other traditions. Mason’s observations reflect that “Christians—and Christendom—have often failed to live according to the truths they have affirmed” (Wilkinson, 1991, p. 276). Granberg-Michaelson (1988) critiques the church’s care of creation: the church has often forgotten creation and has been inattentive toward other perspectives. He suggests that Christians have much to learn from other religious traditions. Mason is an example of a Christian who did not forget creation and who also learned how to care for creation from those who held perspectives different from his own.

Eighth, Mason believed that we cannot care for creation on our own. Like Peter walking on water we need faith in order to do the impossible. Humans cannot do it on their own but need the help of God: “Through his (Christ’s) life, death, and resurrection the alienation between ourselves and God has been broken down, and we are invited, through the power of God’s Spirit, to take part in the healing and reconciliation which our Creator and Redeemer is bringing about” (Wilkinson, 1991, p. 276). For the Christian, work as an earthkeeper is grounded in Christ’s work which involves the “restoration and consummation of all creation” (Bouma-Prediger, 2001, p. 124).

Nine, Mason’s environmental ethic was an optimistic one as he believed that ultimately the fate of the earth is not in human efforts but in God’s hands. Throughout the bible, the visions of the kingdom of God are visions of humans living in harmony with creation (Wilkinson, 1991). Mason’s views are consistent with a Christian understanding of hope in God:

An orthodox Christian eschatology speaks not of the annihilation of the earth but of its renewal and restoration.... As many prominent theologians from the mainstream Christian tradition have insisted—from Irenaeus and Augustine through Luther, Calvin, and Wesley—we hope for the redemption of creation....Christian eschatology is earth-affirming. Because the earth will not be “burned up” but rather purified as in a refiner’s fire, we can act with confidence that our actions today are not for naught. Because we await and yearn for a renewed heaven and earth, we can work in expectation that our faithful deeds here and now will be gathered up in the eschaton. Because we rely on God’s promises and faithful character rather than human ingenuity or skill, we know that, despite the despoliation of our planetary home, the whole word is, as the song says, in God’s hands. (Bouma-Prediger, 2001, pp. 125-126)

Raffan (1999, p. 27) suggested that “Like his predecessor, Jonathan Edwards, who had blurred the Calvinist distinction between God as being *in* nature and God as being one *with* nature, Mason moved from a solid fundamentalist Christian foundation to assert the belief that wilderness was the divine on earth.” However, the following statement from Buck (2005, p. 11) is probably a more accurate reflection of Mason’s environmental ethic:

The single most compelling force behind Bill Mason's passion for keeping the wild in wilderness was his deep unwavering Christian faith. He believed that man did not have "dominion over," but "responsibility for" the world. God did not create the world for man to abuse it, to exploit it, to destroy it. Man must nurture it.

While Mason may have moved away from some of the more fundamentalistic Christian teachings of his youth, the analysis of his writings and films completed in this study suggests that his environmental philosophy is consistent with Christian teachings on caring for the environment.

### **Implications and Applications for Environmental Education**

Haluza-Delay (2000) has suggested that traditional religious understandings are often ignored by environmental and experiential educators. He argued that religious understandings can be influential in developing meaningful environmental ethics and environmentally friendly lifestyles as religious membership and practice are a significant source of values and motivation for behavioural change for many people. Haluza-Delay (p. 146) recommended that educators should not neglect religious perspectives: "educators holding to the idea that religious worldviews are inherently anti-ecological will be less likely to be able to fully support program participants and engage in meaningful and respectful dialogue."

In his book *Restless Gods*, Bibby (2004) noted that 75 percent of Canadians had spiritual needs, 70 percent said that spirituality was important to them and 60 percent saw themselves as "a spiritual person." Bibby observed that 53 percent of Canadians have conventional spiritual understandings (e.g., praying, relationship with Jesus) and 47 per cent have less conventional understandings (e.g., inner awareness, belief in a universal force).

A Statistics Canada study titled "Who's Religious" released in May 2006 (CBC, 2006) found that less than one-third of Canadians attend a religious service once a month, one-half do something religious, but 21% carried out some religious practice, such as praying or meditating, in private. The study used a "religiosity" index, based on four characteristics—affiliation, attendance, personal practices and importance—to categorize Canadians. Forty percent had a low degree of religiosity, 31 percent were moderately religious and 29 percent were highly religious. The study concluded that Canadians are more religiously devout than is often assumed.

Thus for many Canadians, Mason's environmental philosophy may be a good model for constructing their own environmental ethic. The author teaches a second year university course related to the environment. The last part of this course covers different environmental ethical perspectives: rights, eco-utilitarian, the land ethic, deep ecology, and eco-feminism. Aboriginal and religious views are also covered although more briefly than the other five perspectives. For the section on the religious perspective, the author shows a clip from *Waterwalker* where Mason quotes from the book of Job about how humans can learn from other creatures. At the end of the term the students have a final assignment where they are to develop and write their own personal environmental ethic within the context of critiquing the main environmental ethical frameworks presented in the class. A number of the students in class present a religious perspective, and the

instructor believes that the use of the Mason film clip facilitates some of the students to think about environmental ethics from a religious perspective.

A second example is a chapter on recreation that the author (Heintzman, 2006) was asked to write for a study book on caring for the environment. The authors of the chapters in this book were asked to write their chapters for a lay audience and to use a case study or famous role model to help the readers understand the concepts presented in the chapters. The author chose Mason as the role model in the chapter on caring for the environment through recreation as Mason was someone who was wildly enthusiastic about creation-based recreation and who cared deeply for creation. Quotations and stories from Mason's books and films worked well to bring to life the principles that were presented in the chapter.

The above two examples are appropriate for university students and adults. For younger youth Mason's many films can be used to encourage environmental attitudes and behaviours. Although Mason's personal environmental philosophy is not explicit in all of these films, as Raffan (1999, p. 27) notes, Mason's views are "intuitively evident in all his work..." Furthermore his views are embodied in his life that is captured by the camera.

Haluza-Delay (2000, p. 146) stated that "In some ways, the church's writings on ecotheology are one of its best kept secrets." While the church's writings on ecotheology may be read by a small number of people, the writings and films of Bill Mason may be used as tools by environmental educators to communicate a Christian view of caring for the environment to a greater number of people. As has been demonstrated in this study, Mason's works embody the main tenets of a Christian environmental ethic. When alive, Mason's "wonderful and engaging abilities as a storyteller and his pictures from a canoeist's point of view swept people with him into the wild, leaving them moved and fulfilled by the experience, and hungry for more" (Raffan, 1996, p. 79). Bill Duffy, a minister at the church Mason attended stated:

One of the things that greatly impressed me about Bill Mason is what one might call his "theology of creation," which is just one way of describing his great love for God's world. He respected it; he appreciated it; he sensed he was a steward in it. He had such a great love for God's creation because he *knew* the God of creation. That was the key. And that came through to those young people like a passion. (as quoted in Raffan, 1996, p. 147)

Mason's books and films remain as a legacy of his passion and his theology of creation. These books and films are tools that can be used by environmental educators as they are relevant to environmental education participants who hold religious worldviews.

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## **Storytelling Place through Community: Interpretive Possibilities**

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### **Abstract**

This story took place along the beautiful northern shores of Lake Superior in North Western Ontario. Community members were invited to share their connections to home-place through story. The purpose of the research was to explore the role of storytelling place as part of a community-directed interpretive planning process. Although the gathering was small (five community members and three researchers), the unfolding event offered insight into the rich interpretive potential of community story sharing. Analysis of the two-hour story sharing event and subsequent reflection by the story participants suggest that the event was equally as valuable as the stories themselves. Findings of this study support existing knowledge that storytelling place is an important way to create a culture of bioregional respect and sustainability. Thus community story gatherings deserve greater attention during the interpretive planning process and as a worthy interpretive event in itself.

### **Re-imaging Interpretive Planning**

What might community-driven interpretive planning offer? What outcomes can we envision if community members from all walks of life joined the interpretive arena, taking lead roles as experts in exploring their home's interpretive potential? What if discovering and celebrating local distinctiveness was regularly incorporated into regional planning efforts? What if consciously sharing community stories became a popular way to spend time with neighbours? Re-imaging interpretive planning from a community perspective has been an eventful journey. This paper shares one aspect of this journey: an exploration of the role of sharing stories in and about home-place as part of a community-directed interpretive planning process. First, it is useful to share some background on this planning approach.

The interpretive profession has evolved in significant ways from its initial emphasis on *in situ* grandeur phenomena of national significance to a broader focus on everyday features and processes occurring both within and beyond park boundaries (Butler & Hvengaard, 2002; Parks Canada, 2000). This shift is encouraging, yet the transformation of the interpretive profession seems incomplete. For example, the heritage interpretation profession still caters predominantly to *visitors* at heritage sites and other tourism destinations. Meanwhile, escalating threats to ecological integrity continue to challenge heritage communicators to engage *all citizens* in a broader landscape dialogue that forges deeper connections and commitment to legally protected and non-protected landscapes alike.

It was this challenge that initiated development of a new interpretive planning tool. Approaching interpretive planning through a landscape ecology lens (Caza, 1993; Crow, 1991; Heron-Promaine, 1998; Noss, 1983; ZONEVELD & FORMAN, 1990), the original framework aimed to give greater voice to communities of life surrounding protected areas, and to promote sustainable ways of *being* in all landscape types: wilderness, rural and urban. The planning framework also drew upon work in interpretive planning (Bringer, 1989; Carter, 2001; Ham, 1992; Hudson, 1992; Ververka, 1994); community heritage (Binks, 1989; Carter, 2000; Simmons, 1994; Tabata, 1989); ecological literacy (Orr 1992; Orr 1994); bioregionalism (McGinnis, 1999; Snyder 1990); and community development (Berry, 1997; Clifford & King, 1993; Hester 1990; Hough, 1990).

In cooperation with several towns along Lake Superior's north shore (Nipigon, Rosspoint, Schreiber, and Terrace Bay), my colleagues and I have applied the framework in various ways (Clark, 1999; Curthoys & Clark, 2002; Curthoys & Cuthbertson, 2002). See Figure 1 for the location of these towns. Through ongoing reflection and input from north shore residents, the planning framework has undergone a complete transformation. The framework is now designed for communities to take a *lead role* in identifying, celebrating, and sustaining locally significant places and stories through an inclusive planning process. Thus, rather than a planning process that reaches out from protected areas to engage nearby communities, the site of interpretive planning has migrated to the communities themselves. We are currently ground-testing the community-directed interpretive planning framework in co-operation with the Schreiber Public Library, the Schreiber Archives and Historical Society, and the Schreiber Heritage and Tourism Committee.



Figure 1. Location of north shore towns.

## Interpretive Planning With and For Community

The community-directed interpretive planning framework embraces the dynamic interplay of culture and ecology. Through collaborative development of locally appropriate interpretive services, the planning process aims to: (1) promote direct and meaningful experiences of local landscapes; (2) catalyze shared and ongoing dialogue about place-based experiences; (3) enhance intellectual and emotional connections to cultural and ecological dimensions of home-place for both community and tourists; and (4) increase capacity for community building and life-sustaining actions.

The framework is founded on four guiding principles. First, if interpretive planning is to contribute toward landscape health and vibrant communities, then all aspects of the planning process should aim to sustain ecological integrity, economic vitality, and social equity. Second, inclusive interpretive planning requires a broad conceptualization of “expert” knowledge, whereby local knowledge systems gain authority alongside scientific knowledge systems. Third, to enable free expression and joyful community work, planning events should take on the ambience of informal social gatherings that provide open and creative spaces for all ages to investigate and celebrate their bioregion. Fourth, collaborative planning is an organic process, requiring both the time and flexibility to discover complex, pluralistic place-based meanings, and address diverse community aspirations in meaningful ways.

The community-directed interpretive planning process involves five action steps, each with the goal of addressing regional realities and engaging local experiences, knowledge, and expertise.

- **Step One:** Explore community connections to home-place to assess interpretive potential (community assets, unique experiences, topics and themes).
- **Step Two:** Consider local visions and goals, realities, and sensitivities (ecological and cultural) that should guide strategic interpretive planning process.
- **Step Three:** Identify existing and potential target audiences (local and tourist).
- **Step Four:** Design regionally meaningful, capacity-building interpretive services; and
- **Step Five:** Evaluate process and products with respect to relevant community aspirations and interpretive objectives. *Celebrate!*

The framework is not meant to imply a rigid, technical step-by-step planning process, but rather a guideline requiring adaptation to specific local realities. Furthermore, the planning framework is intended to work in conjunction with, rather than replace, existing interpretive planning models. Carter (2000), Pieresené (1999), and Taylor (1998) also describe planning approaches that highlight community engagement. Readers are referred to Lisa Brochu’s 5-M Planning Model (Brochu, 2003) for an in-depth explanation of strategic interpretive planning.

## About the Study

The first step of the planning framework (the focus of this paper) seeks to gain a dweller’s perspectives of and connections to home-place. The framework suggests community story



sharing as one way to articulate local experiences. In exploring the utility of place-based storytelling as part of the interpretive planning process, the study applied both participatory action research (Kemmis & McTaggart, 1988) and narrative inquiry (Bochner, 2001; Silverman, 2003) methodologies. Here I share general reflections on the interpretive possibilities of engaging in community story sharing. A more detailed analysis of the story gathering will be available in a forthcoming article (Curthoys, Cuthbertson & Clark; in review).

Story--in its many variations--has long been recognized by First Peoples as a fundamental way of passing on teachings about right relations with place (Abram, 1996; Campbell, 1988; Chamberlin, 2003; Cheney, J. 2002; Cruikshank, 1998; Knudtson & Suzuki, 1992; Profeit-LeBlanc, 2002). Literature specific to the fields of environmental education (Caduto & Bruchac's "Keepers Series" 1991, 1994; Henderson, 2005; Lutts, 1985) and interpretation (Bruchac, 2005; Carter, 2001; Gyorgyfalvy, 2002; Kohen & Sikoryak, 2001; Mills, 1920; Pieresené, 1999; Strauss, 1996; Tilden 1957/1977) further add to knowledge of narrative's utility in coming to know and care about place. The impetus for this study (in addition to narrative's value expressed by traditional and scientific knowledge systems) was the concern of north shore residents about the need to capture their history to avoid erasure from collective memory. For example, during one focus group meeting, a local commented, "I fear that this town is losing a fair bit of its first hand data because they're all gone, I don't know that much of it was ever written down from other years." Other community members expressed similar worries.

Heeding the request to capture community stories, we gathered at the Rainbow Falls Provincial Park located along the beautiful northern shores of Lake Superior in North Western Ontario. Sitting around a campfire with mugs of tea in hand, community members were invited to share their connections to home-place through story. All the participants knew each other and had previously participated in developing the planning framework. Immediately following the story-sharing event which lasted two hours, we re-grouped at the Serendipity Gardens Restaurant in Rosspport. Fuelled by fine food and ambience, we discussed the impacts of hearing and telling local stories within an interpretive planning context.

## Findings

Although the gathering was small (six community members and three researchers), the storytelling event offered *insight* into the colourful interpretive potential of the north shore, as well as the beneficial outcomes of coming together to exchange place-based experiences. Insight is a key word here for two reasons. First, it is important to stress that in no way could a two-hour story event capture the diverse and perhaps contested history of Lake Superior's north shore. Second, the viewpoints shared may or may not be representative of the north shore communities. Bearing these limitations in mind, the findings are none-the-less revealing.

### Storytelling Place: Exploring Interpretive Potential

A wide variety of captivating north shore stories (from cross-country skiing on ice waves to being followed by a caribou) flowed in response to an open invitation to share regional experiences. Not surprisingly, Lake Superior was a common motif across these narratives. The range of emotions evoked was as varied as the stories: frustration, pride, wonder, amazement,

excitement, disbelief, admiration, and happiness were readily apparent from the participant's comments and body language. Explicitly the narratives reveal potential interpretive topics, while implicitly, the emotional context suggest universal themes—messages that strike a common chord (Larsen, 2002). For example, a main message I came away with was that the life giving and taking power of Lake Superior should never be disregarded.

All the stories emerged from actual experiences with nearby land and waterscapes. As such, all who were present had the opportunity to tell and hear about particularities of home-place, what the British-based organization *Common Ground* calls “local distinctiveness.” Founder and Director Sue Clifford (2000) elaborated on the importance of knowing intimate details:

Our understanding of a place is deepened by detail, such as a bridge or a song, a field name or a shop front, for the smallest of things can act as a lightning conductor to rouse curiosity and impart fragments of knowledge. (p. 10)

During our story event, the fragments of knowledge were woven into a richly layered and collaborative north shore narrative.

General insights regarding the area's interpretive potential included: (1) “pride and joys” of community members; (2) range of stories from local to international appeal; (3) interpretive “hot spots” and potential flow of interpretive experiences; (4) storylines across communities and distinct storylines clusters within communities; and (5) sense of cultural and ecological sensitivities. In thinking about the role of place-based narratives as a way to explore a community's interpretive potential, I am reminded of Rachel Carson words, “To understand the shore, it is not enough to catalogue its life.” Stories counteract our tendency to create one-dimensional resource inventories by bringing a lively, embodied knowledge of place to the interpretive planning table. Here I speak from personal experience as a participant of the community story-sharing event. Several stories have stayed with me, even years after their telling. In my mind's eye, there is a vividly etched image of a fear-struck caribou swimming away from an enthusiastic boater that approached too near and too quickly. And I shudder at the thought of being caught on spring ice so thin that a skier felt the surging power of Lake Superior's hidden currents. These and other north shore tales were much more than entertaining; they influenced my relationship to specific places and beings in very real ways. Storytelling place through community experiences adds depth to exploring interpretive potential, in ways that far exceed a list of interpretive topics.

### **Storytelling Place: Community Outcomes**

Analysis of the two-hour story sharing event and subsequent reflection by the story participants suggest that the event was equally as valuable as the stories themselves. When asked what impact telling and hearing stories had on them, the community members said, “enhanced local knowledge” and “realization of shared north shore connections.” As one participant commented, “[the stories] made me realize we're all connected to the area. You've been places I've been, you know, we've both felt the same things when we've been out there . . .” Community members also expressed their appreciation of learning about their home-place from each other. Participants remarked on their surprise and pride in the group's collective knowledge of the region.

Statements regarding the need to protect fragile areas, to take action to keep favourite recreational places trash-free, and to publicize the area's unique qualities, also speak to the regional pride felt by the storytellers.

Everyone around the campfire had stories to share. Not only were the stories engaging, the telling of stories was highly contagious. The mention of a specific place or experience would spontaneously trigger related stories, providing opportunities to elaborate, ponder, question, and laugh. Hearing stories altogether provided a joyful way of re-living events and savouring subtleties of place. The authority to story-tell place moved readily amongst the group, as the interchanging role of storyteller and listener ricocheted around the circle. The fluid nature of informally storytelling place lends itself to extending Larsen's (2002) concept "sovereignty of the visitor" to "sovereignty of the dweller", (i.e., that each community member has the right to his or own values and beliefs). This potential for openness to diverse meanings and multiple truths has important implications for negotiating contested community histories and enabling movement toward shared futures.

In addition to positive impacts of sharing regional stories there are several contentious issues to consider. The research participants noted the challenge of "so many stories." Story selection will benefit from reflection on key messages a community wishes to communicate, target audiences, and desired outcomes. The latter relates to the more complicated problem of what narratives should and should not be told. During the discussion following this paper, conference participants raised the challenge of a region's "dark stories." In thinking about the matter of what stories a community should interpret, I am drawn to the words of two authorities on narrative. In his Massey lecture (*The Truth About Stories: A Native Narrative*) Thomas King (2003) cautions that a story can hurt or heal, and once told, is difficult to control. Julie Cruikshank also offers wisdom regarding storytelling and desired outcomes. Cruikshank's (1998) many years of work with Yukon elders revealed that, "storytellers of Yukon First Nation ancestry continue to tell stories that make meaningful connections and provide order and continuity in a rapidly changing world." (xiii) Thus stories, both oral and written, are told in the service of community endurance.

So perhaps a preliminary answer to the question of what stories should be told via interpretive services, is to carefully weigh each narrative against its perceived ability to contribute toward an inclusive sense of place, community wellbeing (as defined by residents), and hope.

### **Connecting Through Story**

Overall, the findings highlight the connective power of storytelling place. Ian Sewall's (1998) research on folklore teaching indicated that, "In the oral world, the telling is itself a joining act. It brings people together. The storyteller creates an audience, a campfire circle, a hoop, in a way the writer can only imagine." (p. 5) Yukon native and well-known storyteller Louise Profeit-LeBlanc commented, "I feel very strongly that it is the human voice that connects, human beings speaking to each other is the greatest connector." (p. 49) Thus it is plausible that gathering around the campfire to tell of local experiences strengthened relationships between the participants, and possibly strengthened relationships with the north shore as well.

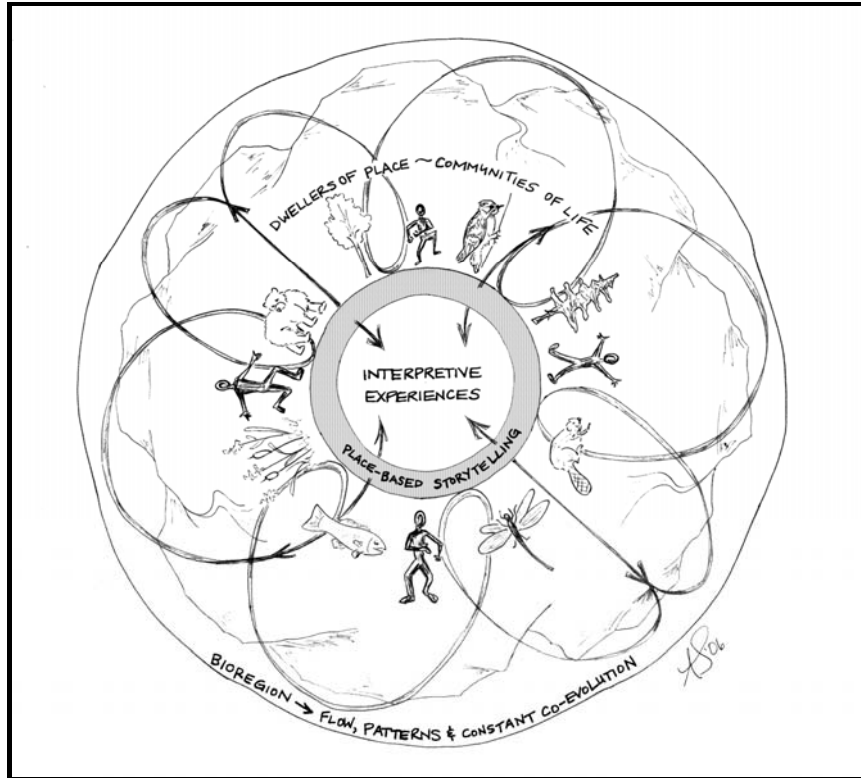


Figure 2. Bioregional story flow.

Figure 2 illustrates how sharing place-based stories enables a cyclical exchange of information from place to community members and back to interaction with place again through regionally appropriate and life-sustaining interpretive opportunities. Bioregional stories flow from the dwellers of the place—their interactions with each other, with more-than-human community members, and with nearby land/waterscapes. Fritjof Capra suggests that, “...what links a human community is a network of conversations with feedback loops, and one of the best ways to nurture the community is to facilitate and sustain conversations” (p. 6).” He also states that community conversations are essential to co-operation, learning, and resilience. Stories grounded in experience with one’s local bioregion, give voice to ecological dimensions of community, opening the dialogue loops to include this larger network of life. Furthermore, community stories provide a wellspring for creating locally distinct and meaningful interpretive opportunities. And if these interpretive services are consciously planned with ecological integrity, social equity, and economic vitality in mind, the stories interpreted will amplify a community’s capacity for bioregional sustainability. Vibrant communities of life, in turn, will continue to provide rich storytelling opportunities. And so the story goes.

### Conclusion

This study confirms the value of story as a way to express, evaluate, and re-interpret bioregional connections. It further indicates that gathering to share place-based stories is time well spent, both for the purpose of interpretive planning and as a powerful interpretive event in itself. Storytelling place contributed to experiencing Lake Superior’s north shore (albeit vicariously) through the passionate voice of local residents. Each participant left with an enlivened sense of

the area's communities of life, as well as greater awareness of shared connections to the bioregion. Storytelling place achieved a fundamental goal of heritage interpretation: revealing "meanings and relationships about places, events and people through first-hand experiences" (Interpretation Canada, 1976/2006).

Additionally, Ham and Weiler (2005) suggest effective interpretive experiences afford opportunities for visitors to think deeply about place:

The primary purpose of thematic interpretation is not just giving entertaining facts to visitors but to lead visitors to draw conclusions from those facts—and in doing so, to provoke them to think more deeply about place its features, and the qualities that make it special. (p. 7)

Both the process and outcomes of the story gathering indicate that community-story sharing is a prime site for residents to thinking deeply about their local life regions, which I suggest will result in provocative and meaningful community-directed interpretation.

Story form animates one-dimensional resource inventories. Stories hold the power to move us, to alter perceptions, to create real change. Stories can bring to light sometimes obscure or forgotten meanings and values associated with natural phenomena, places, citizens, past events, and other features. And if a particular story happens to resonate with us, then we too might attach meaning and value to the story's subject. We may even go on to re-tell the story, widening the circles of awareness, connection, and care.

In conclusion, the community story was a delightful event with both anticipated and unexpected benefits for community-directed interpretive planning. Storytelling place through community deserves greater attention as a playful yet productive way to celebrate heritage values and to think more deeply about the water/landscapes where we live, work, and recreate. Simply put, we need to create the time and space to share more place-based stories, more often.

### Acknowledgements

Gratitude is extended to the north shore residents who willingly gave up a Saturday afternoon to share their wonderful stories and valued opinions. Thank you to Serendipity Gardens in Rosspoint, Ontario for providing the indoor venue. Financial contributions from Lakehead University's Regional Research Fund made the event possible. Thank you to the participants of Salt of the Earth 2006 Conference for the stimulating discussions, which deepened my thinking on the community storytelling. In particular, Eimear O'Neill's thoughts on deep structures sparked creation of the bioregional story flow diagram. Finally, I would like to acknowledge Rusty Brown and Ali Solaja for their artist contributions (Figures 1 and 2, respectively).

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## **Environmental Education within the Stewardship Community: The Community-Based Environmental Monitoring Network**

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### **Abstract**

This paper examines the origin of the Community-Based Environmental Monitoring Network ([www.envnetwork.smu.ca](http://www.envnetwork.smu.ca)) and issues related to environmental education experiences between academia and community based stewardship groups in the Atlantic Provinces. Community-based ecological monitoring in Nova Scotia is discussed, with an emphasis on watershed stewardship groups. It presents successes to date and future challenges, drawing on examples from the Atlantic Coastal Action Program (ACAP) and other community groups. The barriers to the generation of robust monitoring datasets and effective participation in watershed management are examined. The paper concludes with a discussion of issues to be addressed to ensure that community groups can both gather scientifically valid ecological data and have meaningful input into the management of their local natural resources.

### **What is Community-Based Research?**

Community-based research (CBR) is "...a partnership of students, faculty and community members who collaboratively engage in research with the purpose of solving a pressing community problem or effecting social change" (Strand et al. 2003). As opposed to traditional academic research, CBR finds research questions in the needs of the community. It is characterized as being collaborative (academic researchers; professors and students and community members), it validates multiple sources of knowledge, promotes the use of multiple methods of discovery and dissemination of the knowledge produced, and its goal is often social action and social change (Strand et al. 2003). CBR projects usually link citizens' groups with university experts, permitting collaborative research that is both credible and relevant, while drawing on valuable local knowledge (Savan, et al., 2003, Mackinson, 2001). CBR "...can provide a good model for launching and maintaining projects, especially when quality assurance and quality

control are fundamental to success" (Savan et al. 2003). Community-based research has a strong tradition in the health field, but more recently, there have been significant applications in environmental sustainability work (i.e. Savan & Sider 2003).

### **What is Community-Based Monitoring?**

Community-based monitoring is "a process where concerned citizens, government agencies, industry, academia, community groups, and local institutions collaborate to monitor, track, and

respond to issues of common community concern” (Whitelaw et al., 2003, p.410). The current increase in volunteer and community environmental monitoring is in part the consequence of a reduction in funding for the environment by governments. Given the importance of informed environmental stewards, the ability to have access to environmental monitoring methods and technology is critical. While the scientific literature indicates that community stewardship groups have the ability to generate data of adequate accuracy and precision, this can only be achieved with sufficient resources, through the use of standardised protocols, and use of Quality Assurance/Quality Control (QA/QC) procedures. There are a diversity of mandates among CBM initiatives, including education, the establishment of states of the environment, determining background levels against which future impacts can be compared, and habitat restoration. Citizens can gather monitoring information to produce long-term data sets that help them understand environmental change and possibly lead to influencing local planning and decision-making (Pollock & Whitelaw, 2005). Regardless of the specific mandate, they all tend to have the hope that their efforts will be utilized to assist in local decision making. Further proliferation of volunteer monitoring groups will undoubtedly influence environmental protection, stewardship and rehabilitation in North America (Savan et al. 2003). Constraints to CBM include data fragmentation, loss of interest by volunteers, inconsistent funding, data inaccuracy due to lack of standardized methods, quality control and participant objectivity (Stokes et al., 1990; Sharpe & Conrad, 2006). Community-based ecological monitoring programmes are on the rise (Spellerberg 2005) and with this expansion; there is a greater likelihood that they will generate data that will be used as a basis for decision-making. It is incumbent upon those with ecological monitoring expertise, to share their knowledge with the widest community possible, in order to address inevitable education and training implications.

### **Environmental Education: The Role of the Community-Based Environmental Monitoring Network**

In 1999-2000, the author became a member of a local watershed group (the Sackville Rivers Association) and was amazed by the level of involvement and spectrum of environmental activities that this organization was involved in. As an academic, the author was perceived as someone with an “in”, with access to knowledge and expertise. As monitoring efforts got underway and a program was being developed within this organization, it became quite evident that there were many stewardship groups in the province of Nova Scotia and in the Maritime provinces in general, that would benefit from access to a variety of researchers in a university setting. It was also noted that stewardship groups would benefit from a formalized “network”, where they could seek advice from one another on their environmental monitoring activities.

In Saint Mary's Academic Plan, it describes the university as being “... uniquely committed to service to the local, regional, national and international communities, a commitment which it realizes through outreach activities, community-based research programs, and contributions to life-long learning. Its reputation as an open and responsive educational institution has brought it a large measure of goodwill in the community.” To this end, seed funding from the university was sought and provided to establish the Community-Based Environmental Monitoring Network (CBEMN). The CBEMN was founded to further existing relationships with community groups and foster new ones. This Network, housed within the Department of Geography at the Saint Mary's University campus, serves as a location that members of the community can contact

when they have a question about:

- How to monitor/measure the environmental quality of the ecosystems in their community (based on Environment Canada’s *Ecological Monitoring and Assessment* (EMAN) Protocols.
- How to “access” scientific and social scientific data related to the environment.
- How to use these data and utilize technology as a tool to further their understanding of their communities.

The CBEMN serves as a source of information through direct contact with our office and through a mechanism for knowledge transfer across groups. In addition to the web site ([www.envnetwork.smu.ca](http://www.envnetwork.smu.ca)), newsletters are produced and training workshops are held. The Network takes a holistic and interdisciplinary ecosystem approach, advancing monitoring protocols that are aquatic, marine and terrestrial in scope.

The CBEMN is mutually beneficial to the University as well as the stewardship community. While helping the University to fulfill a component of the mandate of its Academic Plan, students have the opportunity to have applied, experiential learning experiences. Many students express an interest in learning while working on “real-world” problems. Since the creation of the CBEMN, students have worked on course work placements, through the Environmental Studies program, assisted stewardship groups in monitoring, through courses in the Geography Department and been employed through co-op work placements, through the Government of Nova Scotia’s “Nova Scotia Youth Conservation Corps” program, and the Federal Government’s Science Horizon’s internship program. The environmental stewardship community is therefore able to access students and have work projects completed at no cost to their organization. As well, a large number of groups are able to take advantage of monitoring protocols, as well as our monitoring “toolkit”. To-date, over 100 groups from across the country have requested and received our monitoring toolkit.

Province	# of Binders	# of CD's	Total
Alberta	1	1	2
British Columbia	5	5	10
Manitoba	2	2	4
Newfoundland	2	2	4
New Brunswick	4	8	8
Northwest Territories	1	3	4
Nova Scotia	22	25	47
Ontario	8	12	20
Quebec	1	1	2
Saskatchewan	1	1	2
Yukon	1	1	2
			105

**Table 1:** Distribution of the Community-Based Environmental Monitoring Toolkit across Canada since 2004.

One of the most widely utilized resources provided by the CBEMN is the “Equipment Bank”. Through small grants from the TD Friends of the Environment and the Halifax Regional

Municipality, as well as through donations of equipment from Environment Canada, and the Department of Fisheries and Oceans, the Equipment Bank was established. A wide variety of monitoring equipment is housed and maintained at the University and is loaned to groups at no expense to them. The benefits of this include the ability for groups to conduct monitoring with sophisticated equipment that they might otherwise not be able to afford. They are trained in the proper use of the equipment by students and staff at the CBEMN and they do not have to worry about annual maintenance, proper storage and calibration. Now almost three years since the Network was established, it is a very active and dynamic place for faculty, students and community members.

### **Examples of CBM: Experiences from the CBEMN**

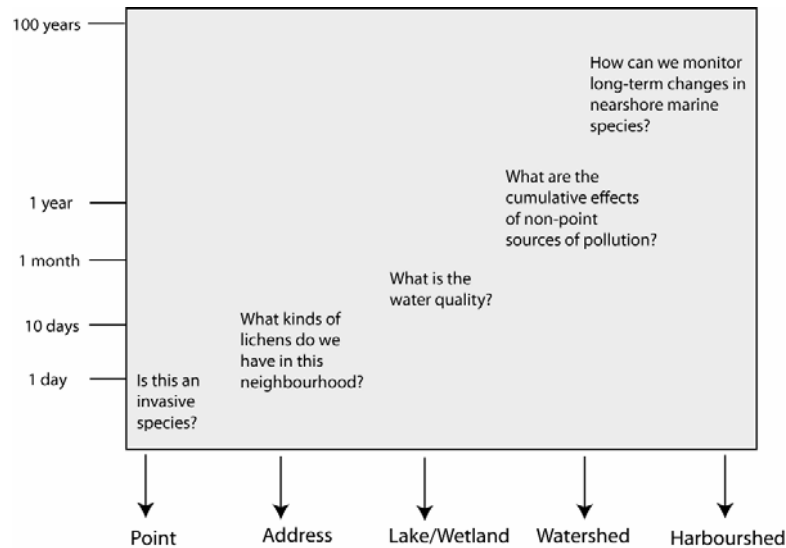
There is no precise count of how many stewardship and/or CBM groups are currently operating in Nova Scotia, but it is believed that the number is close to fifty. Most of the CBM groups in the Province engage in some sort of watershed monitoring, testing for variables such as pH, temperature, dissolved oxygen, salinity, macroinvertebrates, and various bacteria, while fewer undertake terrestrial or wildlife monitoring. Oddly, there are few marine monitoring programs being undertaken in the Province, even though most CBM groups are based on or near the coast. This is a function of the fact that Nova Scotia's Department of the Environment is not specifically mandated with protection of non-drinking watersheds, and therefore communities have assumed, by default, the concern and burden of understanding the state of their fresh water systems. Groups that are linked with the CBEMN have primarily been concerned and therefore engaged in freshwater monitoring. Their work is either baseline or in response to a perceived impact; with very little results and in-put in terms of integrating into the decision-making structure. Community watershed groups undertake water quality monitoring activities in more than 10 of Nova Scotia's watersheds. Since the early 1990's they have gathered in excess of 55 monitoring-years of water quality data at over 200 sampling sites.

Even though CBM is a relatively new phenomenon, there are still groups that have been involved in the monitoring of their environment for many years. The many groups that make up the landscape of CBM in Nova Scotia carry with them many different experiences and attitudes when it comes to CBM. It is difficult to gauge the success and effectiveness of such groups, especially when it comes to linkages to environmental management and decision-making (Conrad, in press). Regardless, one of the most acknowledged outcomes of community-based environmental monitoring programmes is environmental education (Spellerberg 2005).

There is a wide variety of monitoring methods that groups can undertake, from simple Nature Watch programs, through to more complex and long-term monitoring of their ecosystems and watersheds. Some groups are involved in a variety of monitoring activities and at a variety of scales. A notable example in Nova Scotia is the Clean Annapolis River Project (CARP), which is one of the Atlantic Coastal Action Plan (ACAP) sites, provided with core funding from Environment Canada. For those groups who are not provided with core funding from a government agency, it is particularly important that they have access to educational resources. Many groups that approach the CBEMN express an interest in doing multiple types of monitoring. Sometimes they have a very specific purpose in mind (i.e., they feel that a river in their community is polluted and want to verify this or not; or they want to know if a particular

species in their lake is native or invasive) and sometimes they do not (i.e., they want to get an understanding of the “state of their environment”).

Citizens in general are interested in learning more about their local environments on a variety of scales (Figure 1). The literature indicates this to also be the case elsewhere in Canada (i.e., Pollock and Whitelaw, 2005).



**Figure 1:** The scale and duration of a spectrum of monitoring questions posed by community-based environmental organizations.

The importance of environmental stewards and volunteers filling in gaps of knowledge about our ecosystems should not be ignored, although many groups have recently expressed frustration regarding their inability to link their monitoring efforts to the management processes (Sharpe and Conrad 2006; Conrad, in press). Although there are many examples that could be cited to demonstrate this, one recent example stands out.

In the spring of 2006, residents backing onto a small lake in the Halifax Regional Municipality started expressing concern to their city councillor about the health of the lake, which had recently become over-run by lily pads. The councillor brought in city staff who conducted physical water quality testing of the lake and sent a letter to all the residents backing onto the lake that the water tests came back indicating very good water quality. The letter indicated that the city staff member held a Ph.D and that this individual would be back to conduct further water quality tests in the fall. In the meantime, the CBEMN was contacted by an individual who resides on the lake. She mentioned that the lily pads were their greatest concern, because the lake was filling in and people were having trouble manoeuvring their canoes and kayaks through the dense vegetation. She also noted that the flowers on the lily pads were yellow, and that in the nearly thirty years that she had lived there, the flowers had always been white, not yellow.

Based on this information, faculty, staff and a student from the CBEMN went to the lake, and took both water samples as well as samples of the water lily. Although our water quality tests indicated good health, the lily posed a few questions. Based on the individual residents' piece of key information, the species was analyzed by a faculty member of our biology department. It was determined to be a non-native species (*Nymphoides peltata*, or Yellow Floating Heart) that should not be there, and which had never been documented in Nova Scotia before. It is believed that it is likely sold at an aquatic nursery and transplanted or escaped from someone's water garden. It is native to Europe and is widespread in Asia, but is declining in parts of its native range and actually endangered as a native species in Japan. The Atlantic Conservation Data Centre website indicates that it has not been reported from PEI, or NB, (NF data not currently available). This is the first record in Nova Scotia (Lundholm 2006). The species is known in Maine where it is considered to be invasive (Maine Volunteer Lake Monitoring Program 2004). This provides an example of local knowledge serving both the environmental stewardship community as well as municipal decision-makers. The city is now taking an inventory of water lily species in a variety of lakes in order to determine if this is an invasive situation or an isolated case.

### Conclusions

There are similar initiatives in Canada to the CBEMN. The Citizens Environment Watch (CEW) in Ontario is one example. While the CEW has established partnerships with many organizations to promote volunteer monitoring, the relationship with the University of Toronto is most central to their operations (Savan et al. 2003). This author also notes that as useful and beneficial as linkages between the environmental stewardship community and academia may be, there are a number of notable caveats.

Associations with university experts can undermine citizen confidence in their own ability to produce credible results, and academic focus on peer-reviewed publications might influence the goals and focus of the monitoring work. Therefore some degree of autonomy is critical. The CBEMN does not drive the agenda of monitoring efforts. Groups approach us with their questions and we provide assistance and guidance. It is important to note, as the foundation of community-based research implies, that we are not conducting research *on* members of the community, but rather provide research assistance *for* communities. It is important for groups to feel in control of the purpose, and methodologies of the work being undertaken, for ownership of the monitoring. In many cases, groups request that the CBEMN conduct an extensive program of monitoring, but we emphasize the need for volunteers from within the community to be fully interested and engaged, and to direct the purpose and goals of the program in order for it to be a useful and successful initiative. Caveats aside, making strong linkages between dedicated university researchers with community members can result in meaningful and useful environmental education for everyone involved.

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## **Farmers' Perspectives on Education related to Organic Agriculture in Nova Scotia**

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### **Abstract**

Semi-structured interviews were conducted with 12 organic farmers in Nova Scotia to examine their perspectives on the opportunities and obstacles in organic agriculture and how they have changed over the past decade. Three aspects of education and organic agriculture were examined: consumer awareness, government and education, and access to resources and research. Most farmers had seen an increase in consumer and governmental awareness of the issues surrounding organic agriculture and were involved in public education themselves. Farmers noted an increase in the resources and research available to organic farmers. While the overall environment for practicing organic agriculture had improved in these respects and demand for organic products has increased, most of the participants said were still struggling to make a living from farming.

### **Introduction**

In the past decade, the organic food industry in Canada has experienced rapid growth, reflecting increased consumer awareness of health and environmental issues and of the benefits of organic farming (Lohr, 2001; Lotter, 2003). Today, most mainstream supermarkets carry a wide array of organic foods from several continents. Organic foods can also be purchased at natural food stores and farmers' markets, and through community supported agriculture (CSA) operations, buying groups and other food box programs. Such was not the case just over a decade ago when Wiebe (1993) conducted three case studies of farmers' perceptions of obstacles and opportunities to organic farming in the Maritimes.

The present paper summarizes results from a follow-up study (MacLeod, 2005), in which semi-structured interviews were conducted with 12 organic farmers in Nova Scotia to explore the following questions:

- What is the current state of organic agriculture in Nova Scotia?
- How has the situation changed since 1993?
- What key challenges must be addressed to strengthen the organic industry in Nova Scotia?
- What are the most promising opportunities for farmers and organics?

The focus is on three aspects of education related to organic agriculture: consumer awareness, government and education, and farmers' access to educational resources and research. The farmers were chosen to include a wide range of types farms, but as much as possible, to be representative overall of organic farm size and type in Nova Scotia. Two of the twelve farmers reported gross incomes of over \$100,000; however, they would not be described as large on a national or continental scale; the others had gross incomes less than \$60,000 and would be described as small on a national scale. Five of the farmers were male, seven were female. Main products for nine of the farmers were primarily vegetables, herbs or flowers; livestock was the main product of three farmers.

### **Consumer Awareness**

When asked to describe their typical customer, many farmers described not just their physical and economic characteristics, but also some of their values. Half of the farmers said that their customers were well-educated, particularly about food issues. As one farmer remarked, “my typical customer is fairly enlightened around issues relating to food production. They understand price, economies of scale, the importance of buying local and the availability”. Other characteristics noted by farmers include: creative cooks, health conscious, appreciative, value good food, and enjoy having contact with the grower. Two farmers observed that their customers are supportive of them personally. As one said, “along with them supporting the organic vegetables, they support who we are and what we do with the farm and outside of the farm, ...[partly] because of how we’re gaining our customers, just through other things that we’re involved in”.

Participants were also asked if they had seen an increased awareness of social and environmental issues related to agriculture. While three of the farmers said they did not know, or that they had not seen any real increase, three farmers thought that they had seen some increase in awareness. One farmer, who sells mainly at the Halifax Farmers’ Market and Great Ocean (a natural food store in Halifax, now called Planet Organic), noted that the social issues are harder to talk about. He said:

People are aware that there are fewer farms and farmers are in dire straits in Canada right now and that since the economies interconnect the whole planet really that if you are buying imported food [...] in some way you are impacting the people that live and work where that food was produced. And so there is a little bit more awareness of that, [but] that’s very hidden and people don’t seem to catch on to things that are hidden very quickly. So most of it still revolves around health questions rather than social questions. Social questions are more complex. People aren’t all that smart about complex things, so it’s taking longer for people to get it.

Many of the farmers interviewed were or had been actively involved in public education about organic agriculture, whether formally or informally. Three farmers commented that the presence of organic farmers at farmers’ markets is in itself educational. Two other farmers commented that personal conversations with friends, family and others are educational. Said one farmer: “I

feel like my whole life is just a big discussion about organic and farming and how to support the good stuff’.

In a more formal capacity, some of the participants had given talks at organic agriculture conferences. Farmers have been involved in educational initiatives through their certification agencies, CUSO, Great Ocean, local universities, Slow Food, the World Food Day Association, Genuine Progress Index Atlantic, and the Food Action Committee of the Ecology Action Centre.

Some of the farmers had run educational activities in conjunction with their farming operations or said they planned to include educational elements. One farmer had operated a CSA during which time she produced a weekly newsletter and held farm gatherings. She said, “It was very education oriented in the sense that I felt like consumer satisfaction with the whole CSA process went up if we told them why it was important, the context in which their decision to support our farm was making a difference socially [and] politically”.

Three farmers mentioned the need for more education around farming issues and others wished they had more time to devote to educational initiatives. One farmer commented that education helps create a connection between the farmer and the consumer and results in more long-term customers.

### **Government and Education**

The farmers noted many positive aspects of government involvement in organic agriculture. Five farmers felt that government understanding of organics was increasing, although one of those farmers added the caveat that their understanding of the associated philosophy or empathy for organic agriculture had not increased. Two of the five farmers, both of whom have been involved in farming in Nova Scotia for over 15 years, noted a marked change in government attitudes towards organics in recent years. As one farmer stated:

In 1990 there was outright hostility towards organics... But now there’s a fair amount of sympathy for it. But the sad thing is that it had to become rather industrialized before sympathy developed. Although I wouldn’t say that in the Maritimes that organic has become super industrialized or anything...

Increased government interest in organic agriculture has led to some financial support. The provincial agriculture departments of each of the three Maritime provinces have provided funding for the Atlantic Canadian Organic Regional Network (ACORN). This non-profit organization, which has been in operation since 2000, promotes local organic agriculture. Organic Agriculture Centre of Canada (OACC) was founded in 2001. This academic institution, based at the Nova Scotia Agricultural College and affiliated with other universities across the country, has received both federal and provincial government funding.

Farmers felt that there are still important issues to be addressed by government. Six farmers felt that the playing field (between conventional and organic farmers) was still uneven. As one farmer articulated:

There are a lot of government policies that favour conventional farming. The fertilizer subsidies for years and years and years were— people who bought fertilizer never paid the full price. They just paid it, sent their receipts to the government and they got their money back. Most of the established farms were built on that practice. That's not really a fair shake. That's ... an artificial economy.

Three farmers felt that government officials did not really understand organic farming and two believed they still had misconceptions of organic agriculture. One farmer stated:

I think they understand its timeliness, its appeal, its market appeal. But, I don't—I really, truly don't think they understand how fundamentally it would be beneficial to the area and to the economy and farmers. They still think it's a pie in the sky concept that might work for some, but ... The thing about organic farming, it benefits the farmer and the consumer to a higher degree than it benefits the system, the structure that supports farming.

One farmer expressed some frustration with the tendency for government officials to think linearly. She found that government, in order to justify supporting organic agriculture, wanted to see the numbers growing. They wanted to see more farms, larger farms, and more money from exporting. She found that they were not focusing on feeding our own population, even though we import the majority of the food we eat.

### **Access to Resources and Research**

The participants of this study were involved in a wide variety of organic and agricultural organizations including ACORN, Canadian Organic Growers, Maine Organic Farmers and Gardeners Association, Slow Food, and the Nova Scotia Federation of Agriculture, all of which provide some educational resources to farmers. Three farmers were members of the Ecology Action Centre, a provincial environmental organization. Farmers had attended various organic agriculture conferences in the Maritimes and throughout North America. Three farmers had participated in European conferences. One farmer mentioned that she really enjoys attending conferences and finds it a good way to learn; however, she also cited difficulties in attending conferences. Because she has livestock and had previously been farming on her own, she found it difficult to leave the farm to attend conferences, but she and her partner were now trying to make it a priority for her to attend more conferences. Beyond the educational benefits of conferences, several farmers mentioned the networking opportunities and inspiration they receive from attending conferences. One noted that he found it “morale-boosting” to be in a room with so many like-minded individuals.

When asked if they felt that they had adequate access to current organic agriculture related research, six of the participants said yes, two said no, and the others gave mixed responses. For example, one noted the need for more regionally relevant research. Another felt that there was a lack of easily accessible information on small-scale agriculture. Others found that they lacked the

time to search for current research or found that they needed to filter it in order to identify that which was quality information.

Several farmers had suggestions as to how organic agriculture research could be made more accessible to farmers. Suggestions included sending an electronic newsletter containing highlights of studies being conducted, with a link to the full study, should one wish to see more details. Another farmer noted that abstracts from academic publications were not always of practical interest and that there was a role for magazines like Rural Delivery and The Canadian Organic Grower to report on research results in a way that is useful for farmers. Another farmer thought it would be nice to have traveling agricultural representatives, a person who could visit the farm to address specific questions. This person would also be versed on the latest agriculture research and pass this information along. While this farmer said that he finds the internet useful at times, he also noted that you are not always sure what you are looking for, and thus an agricultural representative would be useful. Finally one other farmer felt that increased on-farm research would allow research to be more accessible to farmers, and in fact, four of the farmers had participated in on-farm research. He stated that:

There has been a trend to do more on-farm research and I think that's a good road to continue to go [down], so when farms get even more involved in research, there will automatically be easier access to research results. [...] There could be more co-operation amongst farmers who initiate research projects. I could see that being a good strategy and there's very little of that happening right now.

When asked about their main sources of information on organic agriculture, eight of the farmers said that other farmers were one of their most important resources. Seven mentioned magazines and five mentioned books. Five farmers regularly use the internet as a source of information. Older farmers tended to rely mainly on their own experience. Additionally, local vets, organic list serves, organic inspectors, and certification bodies were mentioned as main sources of information.

### **Summary of Perspectives on Other Issues**

The participants who felt optimistic about the future of farming in Nova Scotia cited reasons including the favourable Nova Scotia climate, a strong history of farming, farm diversity, a good knowledge base, a good population base and a strong community of organic farmers. Additionally, the number of certified organic farmers is growing, with 46 Nova Scotia farmers certified in 2003 (ACORN, 2005) as compared to 28 in 1995 (NSOGA, 1995).

Some other positive opportunities for organic agriculture in Nova Scotia that were cited included the success of direct marketing methods, such as farmers' markets, Community Supported Agriculture arrangements, and farm gate sales. Direct marketing methods allow the farmer to capture the highest percentage of the consumer dollar. Some participants noted an increase in their customer base over the past decade and have also noted an increase in public awareness of organic agriculture.

There are a number of challenges yet to be overcome. Participants cited numerous reasons to be pessimistic about the future of farming in Nova Scotia. These reasons included climate change,

global economics, the farm income crisis, various food crises, lack of strong advocates in government and industry, lack of farm succession, and the demise of the family farm. The scale of these problems cited was particularly discouraging: they are beyond the control of individual farmers, leaving them highly vulnerable.

Almost half of the participants expressed frustration in dealing with the supermarkets. Several of the participants could no longer sell to the larger supermarkets, as the supermarkets have established centralized distribution centres and unless a farmer can supply all the locations in the region, the supermarkets are often uninterested in carrying their products. Several participants noted that the lack of processing and infrastructure for organic products was a barrier to the further development of the industry.

While resources for organic farmers have improved, there are still many needs to be addressed. Most of the participants in this study are involved in the both the production and business ends of the farm. In addition, many of the participants were also involved in building local, organic infrastructure and/or educational activities to promote the local, organic movement as a whole. Some of the participants expressed concerns about their time constraints. Furthermore, a number of research needs were expressed, most notably the need for more regionally relevant research on organic agriculture.

### **Changes since 1993**

Comparing this study, conducted in 2004/2005, with that of Wiebe (1993) suggests that a number of factors have improved, one has worsened, and some have remained the same since 1992/1993.

Three factors that have improved are public perception of organics, government understanding of organics, and access to resources and research. First, according to the participants, the public's understanding of organic agriculture appears to have increased. While many consumers do buy organic products for the personal health benefits alone, many also understand the wider environmental and social implications. Additionally, the number of consumers buying organic products has increased.

Second, government understanding of and support for organics has increased considerably, as demonstrated through the funding of ACORN and the Organic Agriculture Centre of Canada (OACC) and the establishment of organic specialists in each Maritime province.

Third, access to organic agriculture resources and research has improved. ACORN provides a formal network of organic farmers, processors, retailers and consumers within the region. With the internet, farmers have access to organic agriculture information from around the world.

Finally, some farmers were aware of the research being conducted at the OACC, but others were not. Some farmers have been involved in on-farm research, yet there are others who would like to be involved in on-farm research but have not been approached.

While access to research has increased since Wiebe's 1993 study, communication between the OACC and organic farmers could still be improved.

The environment for organic agriculture has worsened since Wiebe's study in one important respect. With the establishment of centralized distribution centres for the large supermarket chains, it has become more difficult for small scale farmers to sell to them. In Wiebe (1993), one farmer noted that supermarkets would sometimes accept small amounts of organic produce to fill a niche market. Today, this is no longer the case. However, it should also be noted that some local organic processors have been able to get their products into some locations of the larger supermarkets, without going through the centralized distribution centres when customers have asked for their products to be carried.

A number of factors have remained unchanged since Wiebe's 1993 study. First, Wiebe noted the willingness of farmers to share information with those in transition. This, fortunately, has not changed. A number of farmers in the current study acknowledged the support of established farmers and the help they received when they began farming. Some had mentoring relationships with other farmers. Many continue to rely on their fellow farmers as a source of information. Second, the preference for direct marketing has remained unchanged. Direct marketing, though it generally requires more work on the part of the farmer, still allows farmers to capture the highest percentage of the consumer dollar. Third, despite the increase in demand for organic products, most of the participants in this study are still struggling to make a living from farming. It is not impossible to do so, yet it is not easy.

### **Conclusion**

Farmers have played important roles in the education of consumers, government, and each other. Most farmers have seen an increase in consumer and governmental awareness of the issues surrounding organic agriculture, and an increase in the educational resources and research available to organic farmers. However, some aspects of government policy such as fertilizer subsidies still discriminate against organic farming. Cuddeford (2003) reported that sales of organic foods in Canada are increasing at a rate of 12 to 14% per year, but that 90% of the organic products sold in Canada are imported. Thus there should be greatly expanded demand for locally grown organic produce in Nova Scotia. However, changes in supermarket buying policies in the past decade discriminate against the small to medium sized farm operations prevalent in Nova Scotia, perhaps forcing these farmers to rely mostly on direct marketing. Regardless, farmers commented that they prefer or enjoy that venue because of the direct interaction with consumers. Direct marketing also facilitates education of consumers by farmers about organic farming.

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## **A Participatory Process toward a Model for Environmental Sustainability**

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### **Abstract**

The paper outlines a collaborative educational approach to environmental sustainability between university teachers and students in Japan and Nepal. The educational model is determined as an information-driven and participatory concept carried out for mutual benefit of teachers, students and various community actors and stakeholders. The objective of this paper is to introduce the key elements and concepts of the model and to consider its strengths and weaknesses.

### **Introduction**

The outcomes of the World Summit for Sustainable Development (WSSD), 1992 and the establishment of the Decade of Education for Sustainable Development (DESD), 2005-2014 aim to promote education as the basis for sustainable human society. The vision as described in the DESD is a world in which everyone has the opportunity to benefit from education and learn the values, behaviour and lifestyles required for future sustainability and for positive societal transformation (UNESCO, 2005a). Although strategies toward achieving such a vision differ due to distinctive educational needs and priorities within local contexts, the fundamental goal is to develop best practices within a society so as to contribute to the sustainability and enhancement of people's lives and their natural environments. To realize such goals educators must reach out beyond the university campus to create a new model of participatory and dialogical teaching and learning. An overarching goal of this model is interdisciplinary and collaborative engagement. Collaborative and interdisciplinary settings permit a collective understanding of diverse issues that cross disciplinary boundaries (Wolman 2000; Bauer 2001). Such settings also promote multi-perspectives with the aim of creating shared visions and understandings; creating situations akin to the collaborative work world students will be entering.

This paper outlines the basic concept and genesis of an environmental education project currently being carried out between students and professors from Japan and Nepal. The project, situated in Nepal is directed at building an education model for environmental sustainability between the North and South. In the paper we discuss the various components and design of the project and then turn to the outcomes and lessons learned. Specific attention is paid to: the rationale for the educational content; the potential for partnership; the capacity for leadership building; and the issues of networking,

### **Concept and Genesis of the Project**

Providing students with opportunities to experience and research the dimensions and scope of environmental problems within an international context allows them to more readily make

connections about their lives and others within the global community. In addition, participatory research together with diverse community members offers a powerful learning experience and a deeper understanding of the problems.

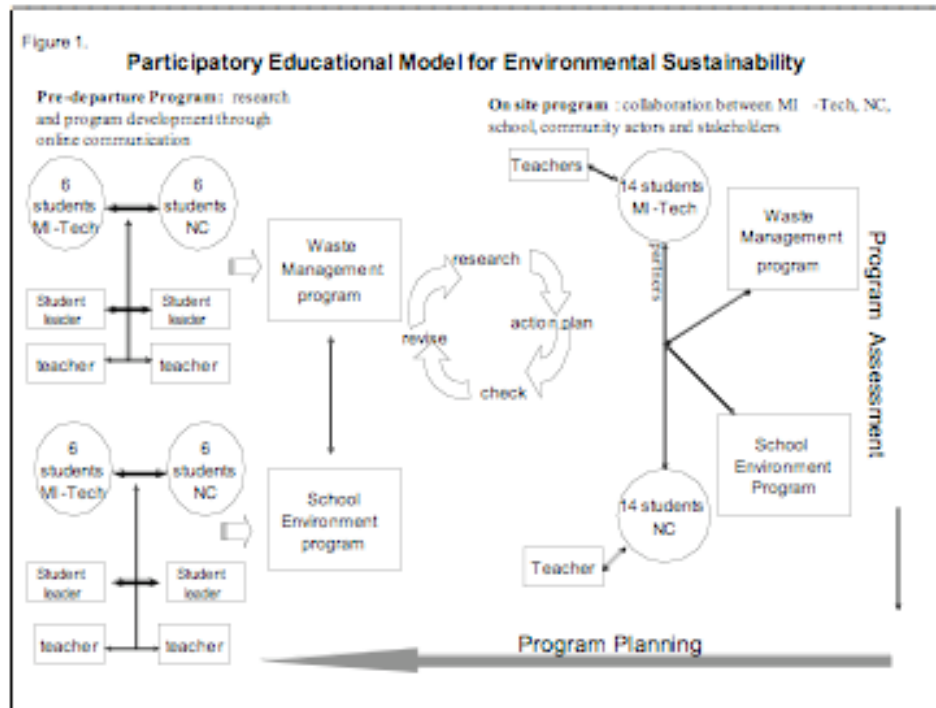
The research project organized by professors at Musashi Institute of Technology (MI-Tech), Yokohama, Japan and National College (NC), Kathmandu, Nepal is focused on the study of community waste management in the capital city, Kathmandu, Nepal. Initiated in 2003 as an exchange of information on waste management issues between university professors and students, it has since evolved into a participatory research project within a dynamic learning community directed toward building an educational model for environmental sustainability. By definition, a learning community is a style of learning in which the general goal is to give students opportunities to experience different perspectives, to develop approaches on integrating these different perspectives and, to focus on the strategies for connecting diverse people as well as diverse disciplines (Gabelnick and others, 1990; Shapir and Levine, 1999). The learning community within this project consists of a variety of environmental actors and community stakeholders. We investigate the strategies used in mobilizing communities to reduce and manage waste and how awareness-raising through environment education activities helps to improve the conditions of the environment and human health. The learning community we established provides students with a personal learning network as well as a virtual network to learn from one another and share ideas, and to interact and collaborate with people from different walks of life both culturally and professionally. In addition, it also motivates students to find and create connections between what they are learning in their classes and how to apply it to the larger community.

### **Background on Kathmandu and Elements Defining the Project**

While the foremost challenge is managing population growth in Kathmandu, the management of solid waste has been identified by the municipal government as one of the most immediate threats for citizens and the urban environment. With a per capita daily waste of approximately 0.5 kilograms, an estimated 500 tonnes must be disposed of daily. Of that, approximately 60% is biodegradable, the majority being kitchen waste and paper, with non-degradable and hazardous waste making up the remainder. Although this is nominal compared to waste generation in industrialized cities, due to the lack of a city-wide management system, the threats posed to the health of humans and their surrounding environment have been increasing. The problem of waste has also made the city aesthetically unappealing for tourism, which accounts for well over 20% of the country's foreign currency income and 3% of its gross national product.

Since 1999, various teams of technical experts from outside Nepal have worked with the central government at different times to establish landfill sites in several locations in the valley. But technology and equipment provided by external donors have not been practical, and the lack of dialogue and collaboration at the ground level between experts and locals has resulted in only limited success. Further, social resistance to the handling of waste, especially for the higher castes in society, combined with a general lack of awareness and skill training on waste separation, reuse and recycling has made waste management one of the most prominent issues in the city. In recognizing that many of the 'best practices' begin at the community level, involving awareness-raising through education programs and activities based on generation of livelihood through recycling strategies (Zurbrugg & Rehan, 1999), we directed our efforts to one

community, developing environment education activities at an elementary school and working together with a grassroots women’s organization on a homemade solution for reducing plastic waste.



### Educational Design

Approximately 14 MI-Tech students along with two professors and media staff go to Nepal for 10 days in March at the end of each academic year. Participation in the project is open to all students from sophomore level to graduate students. Nearly half of the students participate more than one time, with three students having joined the project since its commencement in 2003. Partnered with university students from National College, they have been carrying out a three-day environment education program based at an elementary school and a three-day community program in collaboration with the grassroots women’s organization since 2005. Plans for the year’s program are initiated at the end of the previous program after the program evaluation and continue through online collaboration over the Internet once students return to Japan. Figure 1 illustrates the project’s educational design.

MI-Tech students successfully completing all phases of the project activities, including re-planning, fieldwork, post-evaluation and a written report receive two academic credits. They pay for airfare, accommodation and food, however, travel costs in Nepal and the cost of materials for research and program activities are covered by a research grant from the Japanese Ministry of Education, Culture, Sports, Science and Technology.

**The Elementary School Program:** Ninety-one students from two grade six classes in a government school have been targeted for the school program. Like the majority of government schools in Nepal, this school is structurally in poor condition and lacks even the basics such as running water for drinking and sanitation. The quality of education offered is also limited due to overcrowded classes, underpaid and under-trained teachers, and a curriculum that emphasizes rote learning and memorization with limited opportunities for “experience” outside the



Children investigating waste in the community.

classroom. The school’s population is comprised of approximately 60% migrant families, the majority being of lower caste. Most of the students in our program had only basic knowledge about the environment before beginning the program and little awareness about the importance of managing waste in their homes, community and school. Over the past two years the project team of university students has carried out a program for children centered on “hands-on” investigation into issues of waste management in the local community nearby their school.

**The Community Program:** The non-profit organization “Women in Sustainable Development” (WSD) has been identified as the key environmental actor for research in our community program. Comprised of two staff and five or more volunteers, WSD has been focusing on the reduction of waste since 2000, striving to support other women in achieving a clean and healthy environment in one neighbourhood in Kathamndu. Since 2003, WSD has been targeting shopkeepers to reduce the use of plastic



bags under the project title “Creation for the Environment” (CFE). They gather newspaper from families and offices in the community and using the basement of one member’s home, recycle them into the traditional style of small shopping bags known as *thunga*, marketing them as an alternative to the plastic bag for shopkeepers to offer their customers. The picture at left shows WSD staff and volunteers making paper bags. To date, 45 member-shops buy these paper bags and on average, each shop uses approximately 20 per day. It costs approximately 15 rupees (22 cents) to make 100 bags and they are sold to shopkeepers for 1 rupee per bag. Although the

profit is minimal, WSD tries to provide part or fulltime employment opportunities for women from diverse castes and sectors of society ranging from homemakers to students, giving priority to those who are in need of work. During the past two years the project team of university students has studied their waste management model, worked with them on awareness-raising campaigns, and carried out two surveys on shopkeepers and customers connected to consciousness raising and the acceptability of the paper shopping bag.

## Outcomes and Lessons Learned

Over the past two years we have been developing the educational model, and through an evaluation process we have recognized several strengths and weaknesses of the various components.

**Rationale for the Educational Model:** The educational model is designed to expose university students to alternative learning environments. It is also aimed at building new “knowledge sets” for application within our global society. Particularly for MI-Tech students, the program provides opportunities for students to experience a “bottom-up” approach to solving environmental problems from the community base. For NC students, the learning model offers an examination of the problems from new and different dimensions. Both groups are challenged to think critically about the realities of consumption patterns in their own countries and the various costs and benefits of managing waste. In addition, the program forces them to think about how they learn and what they really need to learn. By carrying out the environment education program at the elementary school, they must consider the information they themselves need to know, and also what they believe is important for the elementary children to learn as agents of change, back at home and in their community.

**Potential for Partnership:** A partnership is generally defined as a collaborative initiative in which partners perform mutually supportive tasks and share responsibility and benefits (Dixit, 2002). The underlying purpose of our partnership is to gain multiple perspectives on the issue of waste management, both in Nepal and Japan for the creation of an educational model for environmental sustainability. The partnering of university students (MI-Tech and NC) offers peer-to-peer education, as both Japanese and Nepali students bring with them knowledge from their classroom as well as practices shaped by their lifestyle experiences. The members of WSD add a richer dimension to the partnership. Through their paper recycle project and grassroots community campaigns aimed at the reduction of plastic waste, both MI-Tech and NC students can learn about various strategies aimed at education for behavioral change at the community level. Establishing the partnership also means we can reach out to a larger population by including elementary school children, shopkeepers and their customers. Although English is taught in the school system from grade six in Nepal and is commonly used in institutions and businesses, the children and the uneducated population do not speak English. Working together with Nepali university students therefore gives use access to a wider population. Important too are the friendships that are built through planning and working together, as is the respect and

cultural sensitivity we gain for one another's culture. It is through this friendship and joint effort that we hope to further define our educational model and increase motivation among the various members, both in Nepal and Japan, leading to environmental sustainability.

**Capacity for Leadership Building:** Today, more than ever before, leaders are needed who understand the value of teamwork and can lead in a democratic and socially just way. This style of "shared leadership" is important for building strong communities, organizations and companies, both on a national and global level. Unfortunately, opportunities for leadership training and experience are limited in most university classes, so one of the key elements of this model is the opportunity for students to take leadership roles in the planning, implementation and evaluation stages of the program.

Once students sign up for the program they are asked to divide themselves into two teams; the environment education team that plans the environment education program in the elementary school; and the waste management team that plans the various ways to work with WSD in the community. A leader is chosen by the students for each team and the students begin building the programs, based on their aims and objectives. Students leading the program in the past take the role of mentors for new leaders.

In the beginning stages much time is spent in discussion, generating ideas about the program focus with opportunities for members to contribute equally. We make an effort to nurture all new team members, encouraging them to share in various leadership roles. In Japan where the senior member receives more respect and tends to take the commanding position, this style of shared leadership and team-member equality is initially intimidating, especially for freshmen and sophomore students, however, as they come to feel more comfortable with the team dynamics, they develop confidence and a strong commitment to the program.

Students are encouraged to chart their own learning and responses as they work on the project. Most frequently students comment about the chances they have to study and plan what they think is interesting and important, and not what their professors tell them to study. They also remark on their new feeling of empowerment. One student wrote, "I'm a new member, but I could give some good ideas for the project, so people saw me as a leader. It's amazing!" Giving students opportunities to work together to develop leadership skills and to take ownership of a project can serve as a powerful tool for their future and the future of their community.

**Issues in Networking:** Just as a human network offers support and enrichment for a project, a virtual network offers to strengthen the human network and contribute to the sustainability of a project. And while we have established both networks, there have been some difficulties. During our time in Nepal the human network comes together and members are motivated to work as a team to achieve shared objectives and goals. However, when we leave, the network tends to break down until it comes time to plan and implement the program the following year. Upon reflection we have several conclusions as to why this happens. First, perhaps the members of the network do not see it as a "home grown" project and therefore are not motivated to continue to work together once we return to Japan. Secondly, as the members have come together through our connections and requests, they may not feel a sense of commitment to each other. Finally, with many NGOs and other aid organizations providing large donations in the

name of waste management, our project, with its limited funding possibilities may not have the same appeal, hence the motivation is not as great.

Similarly the virtual network is not functioning to its full potential. In 2003 MI-Tech students created a homepage to document their program activities and to introduce new students to the project (<http://www.yc.musashi-tech.ac.jp/%7Enepal/>). In 2006 NC students learned how to create web pages and worked with MI-Tech students to update the homepage. While it provides an excellent tool for disseminating information about the program and knowledge gained, it is not being fully utilized. In the case of Nepali members, the lack of a high speed Internet system and frequent technical problems makes access difficult at times. In the case of Japanese members, it holds interest only for new members and when the programs are being updated. The students also created a mailing list and blackboard to exchange information and work on program plans between programs. Similarly the traffic on these systems is highest during the pre-planning stages of the upcoming project. Therefore, one of our future goals is to investigate the relevance of Internet Technology for the project and identify how it can be integrated into our model of education.

### **Conclusion**

Participatory-based research projects including partnership and networking components have great potential to educate and positively impact people, their communities and their environment. Although our total time in Nepal is only 10 days per year, the program is regarded as effective, from the viewpoint of the environmental actors, stakeholders and other participants in our project. Students participating in the program from MI-Tech and NC also deemed the program successful from the perspectives of building new relationships and personal empowerment. Weaving the elements of collaboration and student-centered learning into the program gives students opportunities to not only develop new friendships, but to expand their world vision providing a deeper understanding of the global environment.

The program also encourages students to take responsibility for their learning: to consider the knowledge and skills they require for participation in their global society, to recognize their strengths and build on their weaknesses. Teachers are also learning through feedback from community actors and stakeholders, and from student evaluations on how to move the program forward. It is with these insights that we will continue to develop the educational model and strengthen our program to meet new goals in the future.

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## **Establishing Pedagogy of Place**

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### **Abstract**

Environmental education is not limited to formal learning opportunities. This study explored the influences of an environmental education program on the attitudes and conservation practices towards sustainable living of young adults. Two hundred and thirty nine resident-students from the University of Lethbridge were exposed to a customized education program including methods and ways to conserve energy and water, and a forum for discussion of current environmental issues. Motivation was defined as the key to getting students to conserve energy and water; therefore, we used the Motivation Toward the Environment Scale (MTES) to evaluate these parameters. No statistically significant differences were found between the pre and post surveys. Certain trends and patterns were identified indicating a small positive impact on the students' attitudes and behaviour towards conservation.

### **Introduction**

Many views exist of the human-based management of the Earth's natural resources which governs their uses; sometimes soundly and other times recklessly. We have come to understand that sound management of our natural resources is the key to living sustainably and within our means. A sense of urgency has emerged in managing our natural resources appropriately to ensure that the generations to come will be able to benefit from them. Human actions are producing many harmful and possibly irreversible changes to the environmental conditions that support life on Earth (Oskamp, 2000). We, as inhabitants of Earth, need to learn about sustainability and sustainable living.

Sustainability is neither a vision nor an unalterable state but a creative and local process of searching for balance that spreads into all areas of urban management and decision making (Uzzell, Poi, & Badenas, 2002). The concept of sustainability and sustainable living can become a way of life, which can be adapted to individuals and families, but not be limited to one's home life, work and play. A sustainable environment involves the protection of natural wealth, the controlled consumption of nonrenewable resources, the controlled emission of contaminant agents, the maintenance of biological diversity, the health of the inhabitants, and the preservation of flora and fauna (Uzzell, Poi, & Badenas, 2002).

Educating people is one of the keys to minimizing our impact. People need a basic knowledge about environmental issues and the behaviors that cause them in order to act pro-environmentally in a conscious way (Kollmuss & Agyeman, 2002). It is certainly true that knowledge alone does not lead to environmental action or the development of pro-environmental behavior. However, the insight that knowledge brings can have a number of consequences, one of which is that

interest is often directed toward the development of other factors, such as values, motivation, teachers as role models, etc. (Jensen, 2002).

Within our post-secondary institutions, education cannot be limited to the classrooms and laboratories. Education needs to expand to include teaching the students a sense of responsibility for their actions and ethics throughout their daily experiences. Post-secondary institutions can lead by example and promote sound sustainable management within their own operations. The students' time in college and/or university is an excellent opportunity to instill value, and lasting impressions that will help them develop into environmentally literate citizens.

Taking these matters into consideration (environment, education, and post-secondary institutions) inspired me to try to educate the University of Lethbridge community to make a difference and lessen their own impact on the environment.

#### *Research question and rationale*

Does exposure to an environmental education program modify the attitudes and behaviour of students' views of sustainability? To answer the above question, the rationale for the research has to deal with the relationships between environmental education and the motivation behind changing attitudes and behaviour.

To study this question, the Motivation Toward the Environment Scale (MTES) (Legault & Pelletier, 2000; Pelletier, 2002; Pelletier, Green-Demers, & Menard, 1997; Pelletier, Tuson, Green-Demers, Noels, & Beaton, 1998) was used to elucidate the motivation behind students' attitudes and behaviour before and after exposure to an environmental education program. This study provides a basis to promote further research regarding the value and impacts of environmental education programs within our workplace, schools, and homes.

## **Background**

### *Environmental education*

It is well established that knowledge alone does not lead to environmental action or the development of pro-environmental behavior (Evans, Gill, & Marchant, 1996). Environmental education has become more present in our lives partly due to the increase in the scale of environmental issues and concerns. The goal of environmental education is to instill in learners knowledge about the environment, positive attitudes toward the environment, competency in citizen action skills, and a sense of empowerment (Athman & Monroe, 2001). As suggested by Evans, Gill & Marchant (1996), environmental education's aim is to offer long-term solutions to environmental problems.

The importance of creating environmental awareness is not a strategy but an immediate plan of action (Blewitt, 2005). Creating ecological awareness through teaching about environmentally responsible behavior is important at all educational levels and needs to address three essential factors in behavioral change – information, motivation, and behavioral skills (Oskamp, 2002). David (1974), suggests that environmental awareness generally falls under four classifications: ecological, behavioral, sensory and consumer, to which a combination exists in all audiences and cultures.

As suggested by Iozzi (1989), the key to maximize the effectiveness of environmental education is via the affective domain. Pooley & Connor (2000) take it one step further and state that the affective domain, as well as cognitive domain, is a key indicator of how a person will interact with the environment. These domains are reflective of a collection of environmental behaviors, to which each behavior is adopted by individuals consciously attempting to minimize their negative impacts on natural and constructed environments (Pruneau et al., 2006). Athman & Monroe (2001) suggest these behaviours become new attitudinal and knowledge components that elevate competency in citizen action skill, and a sense of empowerment at individual, group and community levels.

Environmental education is more significant than just dealing with green house gas (GHG) emissions or the future of the marmot on Vancouver Island. Environmental education deals with the future of human welfare on Planet Earth. Though it encompasses the above examples, it is forever linked to the success of the human animal and its survival into some form of a sustainable society. Short sightedness has discredited the environmental education process itself as it continuously provides us warnings to which we have the unfortunate option of not taking action. In developing an appropriate environmental education program, diverse methodologies present themselves, some of which are too complex while others are too simple.

As part of a larger educational system, environmental education programs have been instrumental and adaptive in their efforts to establish and attain both short-term and long-term goals. Their flexibility is observed through the successful application towards both simple and complex problems, ranging from installing a water efficient showerhead, to designing a Platinum LEED facility (Canadian Green Building Council, 2004). McNaughton (2004) suggests that teaching and learning experiences should develop positive attitudes and values about the world within which we live and nurture skills that enable us to be confident to take action for our communities and environment.

### *Pedagogy of place*

To provide a meaningful educational experience for students and teachers, institutions are continually updating resources, facilities, teacher training and learning environments. Though such changes are limited by economics and policy, there are two educational platforms that complement each other to form a *Pedagogy of Place*. The two affected educational platforms are place-based pedagogies to provide relevance and social and ecological experience in one's community and critical pedagogies, to develop theoretical foundations and challenge cultural assumptions (Gruenewald, 2003). According to Woodhouse & Knapp (2000), place-based education includes both conventional outdoor experiences and experimental methodologies, while Knapp (2005) promotes the inclusion of immediate surroundings with lived experiences.

These critical pedagogies involve the inclusion of human-based cultural habits and values as well as ecological systems of the natural world. To challenge our views and assumptions, such values should be put to the test through a relevant application of place-based pedagogies. As practical experiences are gathered, they can be reassessed as to how they can be best utilized by our communities (Woodhouse & Knapp, 2000). The application of place-based education is multi-disciplinary including natural science investigations, historical/cultural studies, identifying

community problems and issues, business opportunities, and a general immersion into community life. Regardless of the methodology used for place-based education, a greater knowledge of nature would emerge (Knapp, 2005).

For example, to understand the riparian aspect of rivers, students at the University of Lethbridge can either review static book or electronic material on the Fraser or St. Lawrence River systems, or walk down to the Old Man River to observe its dynamics through floodplain changes and accompanying fauna and flora adaptations throughout the four seasons. By providing a local experience integrating education, culture and environment, connections become stronger and more relevant resulting in greater meaning. Since this research is based on water and energy conservation, similar processes can be visualized and better understood by observing the operation of mechanical systems with flow and energy meters.

Schools, colleges, and universities hold pedagogical power within their walls but the outer walls of these institutions are often overlooked as a source of education. The dynamic between learning and place is powerful and part of the learning experience in these establishments (Rohwedder, 2004). Within our post-secondary institution, education cannot be limited to the classrooms and laboratories. Institutions need to lead by example. This can be done in part by being civically responsible in their design and construction of facilities as well as through on going operations. Post-secondary students are our future leaders. Their time in college and/or university is a great opportunity to instill values, and lasting impressions that will help them develop into environmentally responsible adults. Many young people obtain the level of education and training that will provide the foundation for their incomes making them eager to learn (Arnett, 2002).

This however, is only one foundation. As suggested by Orr (1996), university and college campuses need to rethink the design of the places where learning occurs. Thoughtful design, construction, and operation of these buildings creates positive learning environments by which the students learn not just through formal education but also through a hidden curriculum. This unseen source of knowledge contains the link between formal and informal education. Students have the opportunity to learn about the various levels of relationships between people and places through architecture, engineering, landscaping and their impacts on the local environment. Since many universities are liberal education oriented institutions; the freethinking open-minded character of their individual programs needs to be expanded to include multidisciplinary ethics and critical thinking to illustrate responsibility for actions. As proposed by Orr (1996), the act of building is an opportunity to stretch the educational experience across disciplinary boundaries and across theory and application. Post-secondary institutions need to lead by example and to promote sound sustainable management within their own operations and their own walls by revealing the relationship between ecology and economy. The end goal of pedagogy of place is to prepare people to live, work and sustain the very places they once observed through the educational lens.

#### *Self-determination theory*

Since this study is partially based on establishing a measurement of the motivational perspective of the students living in the residence, a brief overview of self-determination theory is provided.

Self-determination theory (Deci & Ryan, 1985) is based on the assumption that people have inborn tendencies to grow and develop psychologically, to strive to master challenges in the environment (Pelletier, 2002), and to integrate experience into self-concept. Self-determination plays a role in understanding the issues related to environmentally responsible behaviours. Pelletier (2002) defines the reasons for this relationship between self-determination theory and environmental behaviours as follows:

- It distinguishes between different types of motivation which have direct impacts on the integration of behaviours
- Interpersonal and contextual settings deter or encourage people's motivation to adopt new behaviours
- It delineates the various consequences (cognitive, affective and behavioural) that are associated with different types of motivation
- Self-determination deals with the issue of internalization

People are now being challenged to adopt environmentally responsible behaviours, maintain them, and integrate them within their lifestyle (Legault & Pelletier, 2000; Pelletier, 2002; Pelletier, Green-Demers, & Menard, 1997; Pelletier, Tuson, Green-Demers, Noels, & Beaton, 1998; C. Seguin, Pelletier, & Hunsley, 1998; S. Seguin, Pelletier, & Hunsley, 1999). According to self-determination theory, behaviour is influenced by three types of motives characterized by the level of self-determination (Deci & Ryan, 1985):

- Intrinsic motivation - Intrinsically motivated behaviour is carried out for pleasure and freedom. A person acting out of intrinsic motivation sees their action as pleasurable and satisfying.
- Extrinsic motivation - The goal of an extrinsically motivated behaviour is to bring a positive outcome or to avoid a negative one. A behaviour performed for instrumental reasons is extrinsically motivated. Four types of extrinsic motives have been identified (Pelletier, Green-Demers, & Menard, 1997): *external*, *introjected*, *identified*, and *integrated regulation*. *External regulation* refers to behaviours that are controlled by rewards or punishments. More generally, external regulation is in evidence when one's reason for doing a behaviour is to satisfy an external demand (Reeve, 2002). Behaviour motivated by *introjected regulation* is fueled by feelings of guilt and anxiety. It is when behaviour has been internalized but not truly accepted as one's own. When behaviour is freely undertaken following someone's goals and values, it is said to be an *identified regulation*. *Integrated regulation* occurs when behaviour becomes part of a person's self-concept. Integration is the highest level of self-determination because of compatibility between the behaviour and a person's self-concept maximizing the perception of free-choice (Pelletier, Green-Demers, & Menard, 1997).
- Amotivation - Amotivation entails the inability to predict the consequence of a behaviour which renders it meaningless, mechanical, and dispirited (Pelletier, Green-Demers, & Menard, 1997). People display an absence of motivation. Individuals do not understand the connection between their behaviour and its outcome, so they do not act with the intention to reach an outcome.

As a whole, the continuum of self-determination reflects the person's level of commitment to environmentally friendly behaviours (de Young, 1996).

## Methodology

This study focused on attitudes and behaviors regarding water and energy conservation on a university campus, more specifically in the residences. Participants were residents of the two main residence buildings (Kainai and Pikani) located in Aperture Park on the campus of the University of Lethbridge. Both residences are coed and accommodate 239 students ranging from 19 to 21 years old. The group involved in this initiative was diverse. Upon contacting the Housing Office (Nordin, 2005), the majority of students living in these residences were from rural areas of Southern Alberta and Southern Saskatchewan.

Participants were encouraged to partake in the study as the initiative is supported by the Organization of Resident-Students (ORS) and by the Housing Department. The study was conducted over a six-month period from October 2005 to March 2006. During this time resident-students participated in an environmental education program. The program consisted of exposing the participants to information on water and energy issues through conservation tips on the closed-circuit television network.

Participants were asked to complete two surveys; one in early October and another at the end of March. Both surveys contained measures relevant to the current study of attitudes and behaviors related to sustainability. The survey distribution was done during the monthly residence floor meetings and participants were asked to return the questionnaire to the Conference Services office located in the Kainai residence.

The Motivation Toward the Environment Scale (MTES) was the basis of the survey. MTES consists of subscales that measure an individual's level of intrinsic, extrinsic, and a motivation for environmental behaviors (Pelletier, Tuson, Green-Demers, Noels, & Beaton, 1998). The scale is composed of twenty-four items divided into six subscales (S. Seguin, Pelletier, & Hungsley, 1999), which represent the motivation construct identified by Deci & Ryan (1985). Participants rated the 24 statements to which they agreed or disagreed using a Likert-type scale (1- strongly disagree to 7- strongly agree).

The quantitative analysis included a compilation of demographic information including age, gender and study major. The results were organized by subscale and averaged per related question. Using these averages, paired sample t-tests were conducted using the before and after survey results. The null hypothesis for this study was no significant change. The significance value was set at 95%.

From an administrative perspective, savings or surplus use can be easily measured by comparing the usage of these buildings through the past three years. The two residence buildings are metered individually. These buildings also house two offices: Organisation of Resident-Students and Conference and Event Services. Within the time period of the study, an assumption was made concerning the consumption of water and electricity from the offices. Since their operations have remained the same for the past three years, we can assume that their rates of consumption also stayed the same. Within the residences, electricity is used for personal consumption but also supplies the ventilation system and other security devices, which operated

constantly 24 hours a day. Using Kainai and Pikani residences provided a manageable number of participants for the study. These residences are also equipped with meters to provide the energy and water consumption rates for the study period.

The limitation that impacted the study the most was participation. Another limitation was the timing within the academic year to administer the surveys without causing a scheduling conflict such as during final exams in late March and early April. Communication with the resident-students was restricted to information posting on the Organisation Resident-Students (ORS) website and on the closed circuit information channel.

The reliability of the study was tested the year prior by subjecting the resident-students to the educational program. Student feedback enabled us to evaluate and modify the program to better suit the target group. We did observe a decrease in consumption during the test.

Cohen, Manion & Morrison (1985) suggest internal validity is about causal control. Within the boundaries of the study, the resident-students were exposed within their residence buildings to the education program. The education program did not begin prior to the survey in early October and stopped being broadcast a week prior to the survey in late March.

## **Findings**

### *Demographics*

The compilation of demographic information is presented in Table 1. One hundred and eighteen resident-students participated in the MTES survey in October 2005. A higher representation of female students (62.7%) than male students (37.3%) took part in the survey. Of the 118 participants, the average age was 20 years old and their fields of study were varied. In March 2006, 25 student-residents participated in the survey. Once again, the female students had a higher representation (76%) than the male students (24%). The average age remained the same throughout the study.

### *MTES results*

Individual results from both surveys were transferred to SPSS for further analysis. The next step was to identify and isolate the results relating to the six subscales for both surveys. The mean and standard deviation were calculated. Further statistical analysis was conducted. The results from the paired sample t-tests (two-tailed) for all six subscales showed no changes based on the significance value of 95%. These results can be viewed in Table 1. In all 6 subscales, we were not able to reject the null hypothesis.

*Table 1: Statistical results for the MTES subscales for the October 2005 and March 2006 surveys*

Subscale	October 2005 N=118		March 2006 N=25		2 tail - t-test	t-test	df	p-value
	M	SD	M	SD	t <sub>calc</sub>	t <sub>crit</sub>		
Intrinsic Motivation	4.21	1.62	4.10	1.59	0.650	3.182	3	0.562
Integrated Regulation	3.23	1.73	3.16	1.74	0.448	3.182	3	0.685
Identified Regulation	4.86	1.61	5.08	1.50	-1.653	3.182	3	0.197
Introjected Regulation	3.75	1.80	3.96	1.92	-1.863	4.303	2	0.203
External Regulation	2.06	1.41	1.64	1.19	3.042	3.182	3	0.056
Amotivation	2.74	1.67	2.50	1.61	2.883	3.182	3	0.063



### Utility readings

The utility meter readings for the two residence buildings are represented in Figure 1 and Figure 2. These readings are for water consumption measured in cubic meter ( $m^3$ ) and electricity consumption measured in Kilowatt hours (KWH). To provide a sound foundation for the analysis of this data, the University's utilities department provided three years of readings.

*Figure 1: Comparison of water consumption between Kainai and Pikani residences for the study period (Oct.-Mar.) from 2003/2004 to 2005/2006*

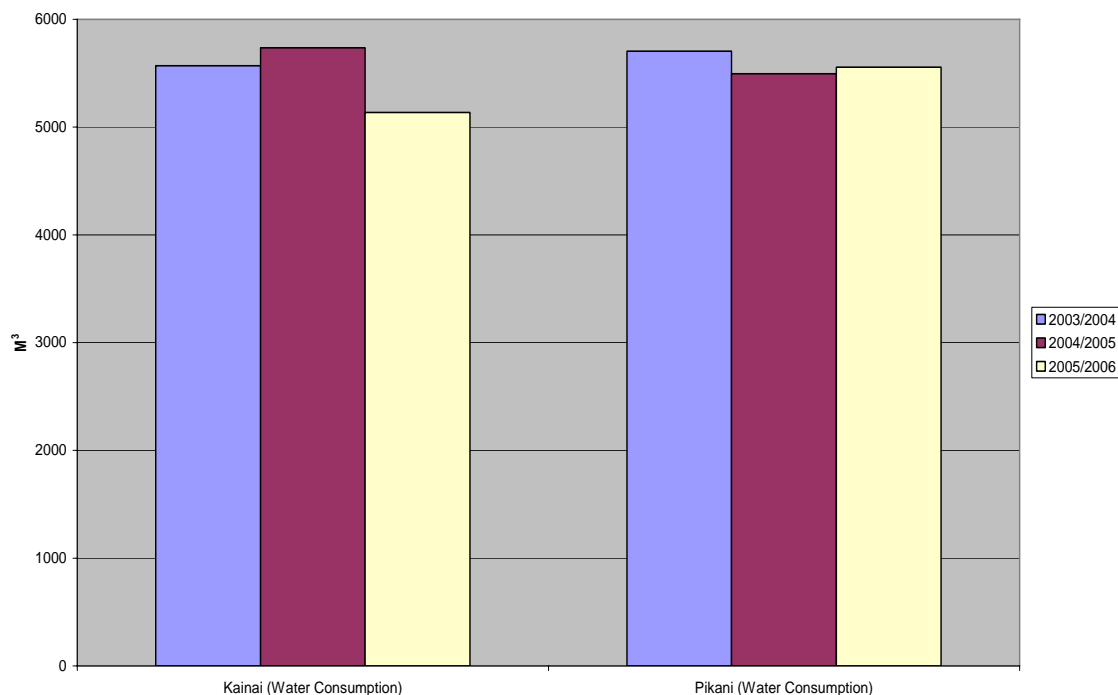
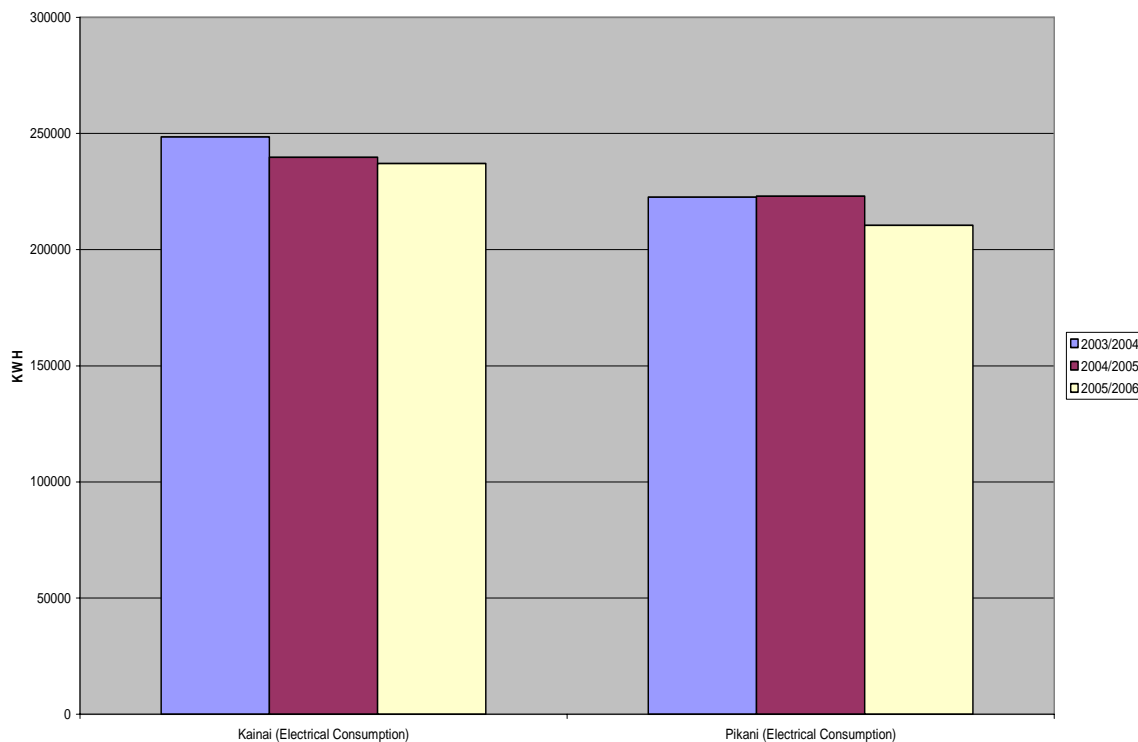


Figure 2: Comparison of electrical consumption for the Kainai and Pikani residences for the study period (Oct. - Mar.) from 2003/2004 to 2005/2006



### Discussion/Conclusion

A 49% participation rate in the 'before' survey provides a good representation of the resident-student population. The 'after' survey, which had a 10% participation rate, makes the data collected less representative of the overall attitudes and behaviours. The resident-students were surveyed in October at the beginning of the academic year.

#### *Attitudes and behaviours before the environmental education program*

In the October 2005 survey, four of the six subscales results stand out. The students possessed above neutral rating (4.21) for intrinsic motivation, meaning that the average student gets some sense of pleasure in participating in environmental initiatives. An above neutral rating for identified regulation (4.86) indicates that students were following their own sets of goals and values. As for external regulation motivation, the students 2.06 rating suggests that rewards or penalties have a limited effect on their behaviour. The results can be interpreted in two different ways:

- The students are acting based on their own set of values. This observation would concur with the previous result of the students utilizing identified regulation motivation as the source of their actions and behaviour.

- On the other hand, the students could be acting contrary to parental expectations just because they are at a transition age; trying to find their own identity as suggested earlier by Arnett (2001).

The score for amotivation was found to be low at 2.74 and concurs with the two previous findings that students are demonstrating a sense of connection with their environment.

#### *Attitudes and behaviour after the environmental education program*

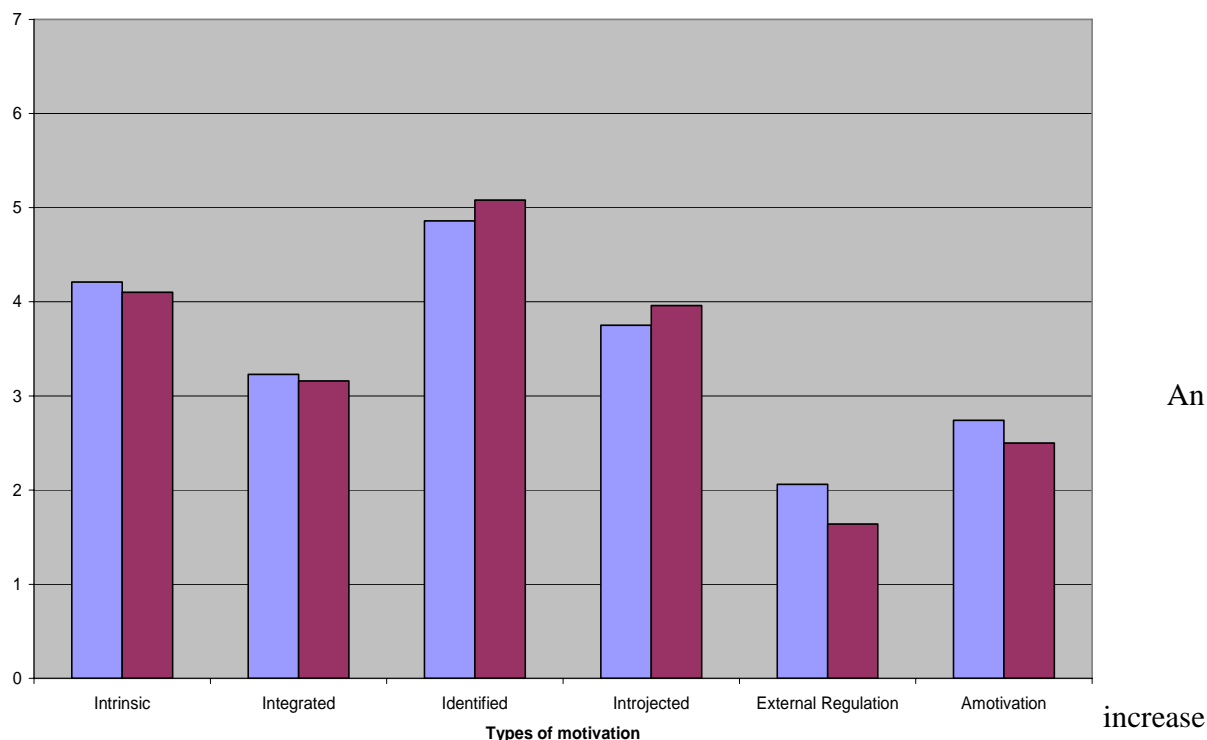
The resident-students were surveyed in March 2006 after being exposed to the environmental education program, with their participation rate being 10%.

Four of the six subscale results were identified as being noticeable: identified regulation, introjected regulation, external regulation and amotivation. The identified regulation result (5.08) is high and represents the students living by their own sets of values and beliefs. The students accept the merits of the behaviour because they see its importance or personal use (Reeve, 2002). The students take in but not truly accept other people's rule or demands to think, feel, or behave in particular ways as reflected by the results from the introjected regulation (3.96). The low result for external regulation motivation (1.64) suggests that students are not acting for something, reward or punishment, but for their own peace of mind. The low score in amotivation (2.5) concurs with the four results presented in this section. The resident-students are showing a sense of awareness and responsibility towards their environment. They are acting according to their own values and beliefs.

#### *Comparison between the before and after survey results*

Since this was ordinal data and the numbers are too small for the t-test to pick-up significant differences, a trend analysis of the data was conducted to detect subtle changes in the patterns. There were no statistically significant differences in the intrinsic regulation and in the integrated regulation from one survey to the other. There were discernible patterns observed in the other 4 sub-scales: identified regulation, introjected regulation, external regulation, and amotivation (Figure 3).

Figure 3: Compilation of MTES scores from the before and after the integration of the environmental education component



in the identified regulation motivation was observed between the initial and final surveys. An approximate 5% increase the students' awareness toward the environment and their issues had an impact on their personal values. As proposed by Kollmuss & Agyeman (2002), people need a basic knowledge about environmental issues and the behaviors that causes them to act pro-environmentally in a conscious way.

A 6% rise in introjected regulation motivation was observed. Since this type of motivation is linked to people's guilt and anxieties, we can speculate that a sense of responsibility toward the state of the environment intensified due to the educational program. Oskamp (2000) proposed that most literate citizens are somewhat informed about environmental issues, and media coverage and popular awareness are increasing.

A 26% drop in external regulation motivation was actually positive since it indicates that students shifted their behavior from reward oriented to personal satisfaction. Within Bloom's taxonomy the affective domain has been reached but we cannot identify to which level. Affect, as well as cognition, is a key indicator of how a person will interact with the environment as observed by Pooley and O'Connor (2000).

A positive drop of 10% in amotivation was detected. Since amotivation deals with the "I don't care" type attitude, the decrease indicates that the responding students showed a sense of connection and awareness of the environment. With a positive attitude towards the environment, it reflects the positive participation in this conservation program, agreeing with Krauss (1995).

### *Utility meter readings during study period*

The meter readings for both electricity and water consumption were used to validate the survey findings. The Utility department provided the data for the Kainai and Pikani residences over the past three years.

As observed in Figure 1 a 12% water saving from the previous year is noticeable for the Kainai residence. A small increase in water consumption for Pikani residence was noted. An unexpected broken water main in December 2005 is suspected to be the main cause for the over-consumption of water in the Pikani residence.

Over 1% in electricity saving was observed for the Kainai residence and a more significant savings of 6% was noted for the Pikani residence (Figure 2). Part of the savings could have been attributed to a higher number of students returning home after December final exams.

### *Observations*

There were three obstacles that could be identified in discouraging change:

- Students felt overwhelmed and helpless when thinking of the global scale of environmental issues and impacts.
- The feeling of resignation could have lead some students to adopt an attitude of adapting rather than changing. The lack of time and daily concerns (attending university) would justify the students' unwillingness to commit to change.
- Student participation could have been associated with timidity and refusal to conform. These causes are fairly common within the age group the study was targeting.

## **Recommendations**

Throughout this study, students and staff provided feedback. Based on this, three levels of recommendations have emerged concerning forms of communication, training, and environmental initiatives.

### *The resident-student level*

More 'green' programs should be created for the resident-students as well as the whole campus. It cannot be assumed that the students will conserve or recycle anything on their own without some guidance. The information provided to the students needs to remain positive, and in context. By reinforcing information and skills that the students already possess, it helps develop their own identity and make the transition into adulthood (Arnett, 2001). Overall motivation needs to be valorized through financial incentives and/or personal satisfaction.

### *The housing department level*

The manager of housing and the manager of hospitality services both are very supportive in promoting green initiatives across their departments (H. Mirau, personal communication, September 10, 2004; M. Nordin, personal communication, May 15, 2005). A training session has been added to the resident advisors' training week prior to the start of the academic year to inform them of the recycling program, water and energy conservation, and other green initiatives on campus. Without the support of the managing entities, green initiatives would not be viable due to the limited numbers of volunteers and the high turn around of students.

### *The institutional level*

The University of Lethbridge has begun to integrate environmental education programs within new projects. The Regional Health and Wellness Centre (RHWC) is one example of utilizing *pedagogy of place* (Orr, 1996) to help educate students, staff, faculty and the community as to its “green” features. The RHWC is almost completed and will be a silver or gold LEED building thus promoting water efficiency, light pollution effect, daylight uses, and many other sustainable features. If this opportunity is used to its full potential, it will re-enforce the power of the learning experience as stated by Rohwedder (2004) and establish a dynamic relationship between learning and place.

Communication gaps within a university can create many issues and barriers for those willing to launch a green initiative. At the University of Lethbridge, the Sustainability Management Committee is trying to bridge the gap between by providing equal representation among its members, and by supporting viable green initiatives. By creating a communication network between administration, staff, and students, the committee balances the task of promoting sustainability at all levels throughout the university.

These communication networks should not be limited to a particular post-secondary institution. Associations such as the Society for College and University Planning (SCUP) are dedicated to sharing, learning, and teaching best practices in planning for colleges and universities. By creating mechanisms for information and expertise sharing among post-secondary education institutions, communication gaps between institutions will be bridged, enabling an open path of information to flow.

### **Concluding Statements**

It is easier to retrofit a facility to save water and energy consumption than to change people’s behaviour and attitudes, since faucets have no emotions or value sets. However education in a formal and informal capacity is a key to modifying behaviours and attitudes. The medium of the message must be helpful to use and easily understandable through illustrations, graphic, and/or drawings. The dissemination of information must be optimized and be available to everyone.

The use of MTES is one research tool that can effectively measure the impact, effectiveness and awareness of energy conservation programs. There are many research variables that can affect the success of any program, including demographics and programs of study. Since individual research tools have benefits and challenges, it would be interesting to use other methodologies to see which would best suit the needs and culture of University of Lethbridge.

Regarding the post-survey of this research, the distribution of energy conservation material from a utility would be one means of formal closure while enhancing student knowledge. However, since the student body is generally leaving University of Lethbridge after final exams, which is soon after the survey is completed; the retention of such information is unlikely.

The understanding of the obstacles present in conducting this type of research such as recognizing concepts, transposing attitudes into behaviours, and developing approaches better adapted to the realities and restrictions that are natural to the students’ lifestyle is vital. Though

we found no significant difference between the pre and post surveys, certain patterns in the students' behavior and attitude were observed. By understanding the students and their needs, we can develop better programs promoting understanding and acting in a sustainable manner.

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