Environmental Education: Goals and Challenges

by

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Abstract

This thesis explores some of the challenges associated with environmental education, particularly those associated with the formal sector, with a focus on Grades 4-6. It is argued that by teaching *children* to appreciate the environment from a wide range of perspectives, they should have better skills for making future decisions regarding the environment. The thesis provides a background on environmental education, and its evolution over the past four decades. It demonstrates the challenges of incorporating environmental education at three increasingly finer levels: the Province of Ontario's elementary curriculum guidelines, two school boards' environmental education strategies, and teachers responsible for the teaching of environmental education. Primary research, involving interviews with nine teachers, helped indicate that while some challenges associated with environmental education remain (e.g., prepared lesson plans, a list of reviewed, recommended resources, and teaching in the environment), other challenges are being satisfied by initiatives within this study's participating school boards.

Acknowledgements

My interest in environmental education has grown out of the appreciation of the environment that I developed while growing up in Victoria, British Columbia. Some of my experiences included: walking on the beaches on the west coast of Vancouver Island, taking hikes, camping in Provincial Campgrounds, going on school fieldtrips (e.g., exploring old growth forests, observing salmon spawning), and thoroughly enjoying the beauty of the coastal mountains. The activities were not only fun and adventurous then, but they have greatly shaped my perception of the environment today. My experiences and the meanings that I associate with the environment are by no means exclusive. Each person's perception of the environment is shaped differently, and can vary significantly depending on the extent of their learning experiences through both the formal and informal sectors. Working on this thesis has allowed me to gain both a broader and deeper understanding of environmental education, and it gave me the opportunity to apply my personal environmental experiences in an educational setting.

I want to express my sincere thanks to my supervisor, Professor Kenneth Torrance, for recommending to me, in the third year of my Bachelors degree in Environmental Studies at Carleton, that I should consider applying for the Ontario Graduate Scholarship, and then recommending that I do my Masters degree. I am grateful for his advice and continued support, which has guided me through the design of the research and numerous thesis edits.

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List of Acronyms

BCRT	British Columbia Round Table on the Environment and the Economy
BSP	Better Schools Partnership
CEE	Council for Environmental Education
CNF	Canadian Nature Federation
CPAWS	Canadian Parks and Wilderness Society
DC	Destination Conservation
DU	Ducks Unlimited
EDC	Earth Day Canada
EE	Environmental Education
ESL	English as a Second Language
EQAO	Educational Quality and Accountability Office
GDRC	Global Development Research Center
GREEN	Global Rivers Environmental Education Network
ICEE	Independent Commission on Environmental Education
IUCN	International Union for the Conservation of Nature and Natural Resources
LSF	Learning for a Sustainable Future
NAAEE	North American Association for Environmental Education
OCUP	Ontario Curriculum Unit Planner
OME	Ontario Ministry of Education
OMET	Ontario Ministry of Education and Training
PLT	Project Learning Tree
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
WWF	World Wildlife Fund

Chapter One

Introduction

The Global Development Research Center (GDRC) defines environmental education as:

“...a process in which individuals gain awareness of their environment and acquire knowledge, skills, values, experiences, and also the determination, which will enable them to act – individually and collectively – to solve present and future environmental problems.”
(GDRC, 2004)

With the recognition that environmental problems range from the local to the global, increased attention has become focused on the importance of people attaining environmental literacy. The availability of environmental education, by providing people with the opportunity to become literate on environmental issues, can improve their ability to integrate ecological thinking into social and economic planning. As Carty (1996, 1) stated, “Our perceived view of the environment is based upon what we have learned, which has in turn influenced the way we interpret, manage and discuss the environment and its potential.”

Environmental education is not intended to be a means of ‘saving the world’; rather it is a means of developing an appreciation of the many roles that nature plays in our lives, and of a sense of *wanting* to protect it. Properly done, it provides people with the opportunity to become literate on environmental issues, it enhances critical thinking, problem solving and effective decision-making skills. I believe that environmental education is important at the primary school level because it lays the foundation for the students to appreciate the environment and also to think critically, examining various perspectives on environmental issues. This prepares them for placing their high school

experience into the environmental context such that, by the end of high school, they should be capable of engaging intelligently in more complex debates about the environment.

The purpose of this thesis is to explore some of the challenges associated with environmental education. In particular, it will address the question: What challenges are associated with environmental education in the *formal* sector, specifically in the elementary school setting, with a focus on Grades 4-6? By concentrating on elementary school environmental education, I hope to contribute to an improvement in the ability of these programs to encourage, in the students, the development of a sense of wonder about the world around them.

My specific interest in the programs offered to Grades 4 to 6 arises partly from the work of William Stapp, an educator who was recognized by The Journal of Environmental Education as “one of a handful of individuals who truly shaped the field of environmental education...” (Simmons et al., 2001, 4). Stapp (1974, 50) argued that:

“The foundation for strong citizen action rests to a large degree in what happens in our homes and schools. Today’s youth will be the voters whose decisions will affect not only the immediate environment in which they live, but also that of our nation. They will make decisions and cast votes about housing, recreation, transportation, beautification, and air and water pollution. It is imperative that schools provide youth with the knowledge and problem-solving skills they need to cope effectively with these life-involving decisions.”

In the Ontario school system, it is in Grades 4 to 6 where the curriculum expands beyond simply teaching students about the characteristics of the natural world (as in previous grades), and encourages students to understand how humans interact with the rest of the world, prior to more senior grades where subjects become more specialized. Also, at this

level, teachers are often responsible for teaching most of, if not all, the subjects in the curriculum and are required to have a general awareness of all the subjects they teach.

This thesis is based on the belief that education is an important commitment to the future and that, through education specifically directed towards environmental concerns, people have the potential of becoming well informed and environmentally aware. I believe that environmental education is necessary to the process of finding a solution for current environmental problems. It should: give people the feeling that their actions can make a difference, rather than creating the impression of an environmental apocalypse; teach people about environmental issues; and motivate them to solve environmental problems. Improved understanding of complex environmental issues will be key to gaining the necessary commitments to resolve the problems, and with an adequate understanding of the natural environment, people will be able to intelligently engage in and evaluate environmental debates.

Environmental education faces several challenges, including (but not limited to):

- Educating children to believe that their actions can make a difference;
- Incorporating a variety of perspectives and taking a balanced view of environmental issues;
- Incorporating environmental education into a crowded curriculum where environment is not a core subject and attention is focused on the established core subjects through mechanisms such as standardized testing; and
- Re-establishing the linkage between the individual and the environment through mechanisms such as outdoor learning.

With environmental education being a relatively new topic within the elementary school curriculum, I have hypothesized that teachers are searching for and are attempting

to evaluate materials that can assist them in teaching this subject. They will still be determining the interest levels and capabilities of the students and the extent to which different teaching and learning methods are successful. It is quite probable that many teachers are unaware of existing materials that could support their lesson plans, and have little time to search for them, but, if made aware, would be interested in using them.

This thesis provides an analysis of the environmental education movement, based on a review of the literature (Chapter 2) with emphasis on teaching models and approaches, and teaching and learning resources. In Chapter 3, the expectations for environmental education, as seen through the curriculum guidelines set by the Ontario Ministry of Education, with a focus on Grades 4 to 6 are assessed, and the availability of teaching resources for environmental education is assessed in two (Ontario) school boards.

The methodology for and results of primary research, undertaken to explore the challenges for environmental education within two Ontario school boards is presented in Chapters 4 and 5. This aspect of the work included structured interviews with teachers and informal discussions with school principals and school board officials. In conducting the research, the Carleton University Ethics Committee Guidelines, and the two School Boards' joint Research Advisory Committee guidelines were followed.

It is my hope that this research will contribute to a better understanding of environmental education as it is delivered in Ontario, and that it will assist some of those teachers who assisted me directly and others who may be seeking additional teaching

materials and enrichment on environmental subject areas. Ultimately, it is hoped that students and the environment will be the main beneficiaries.

Chapter Two

Environmental Education: From Past to Present

2.1 The Contribution of Environmental Thought

The evolution of environmental education can be traced back to significant influences of 18th and 19th Century scholars, even though the words “environment” and “education” were not used in conjunction with each other until the mid-1960s (Palmer, 1998). Formally, environmental education is a relatively young field that is becoming increasingly recognized by educators and the general public. The field has undergone significant changes over the past four decades and has been greatly shaped by landmark conferences, publications, and perspectives on theory and research.

Interest in environmental issues was spurred in the 1960s when the organized environmentalist movement began, largely reflecting the concerns of white, middle-class people from Europe and America. These early environmentalists were concerned about the undesirable effects of industrial and economic development, and about the effects on their own lifestyles and health (Elliott, 1999).

Rachel Carson’s *Silent Spring* (1962) was a landmark publication that drew attention to mankind’s attempts to control nature, and was a major agent in spurring revolutionary changes in the laws affecting air, land, and water. Stevens (1997) summarizes the emphasis of her book as being “...on chemical pesticides and herbicides, their failure to control insects because of adaptation of the latter, and the terrible side

effects on both the health of the environment and mankind.” Her passionate concern for the future and for children’s awareness of the environment, in *A Sense of Wonder* (Carson, 1956) was something that greatly shaped my own way of thinking (several decades after it was published) about both the appreciation people should have for the environment and the importance of teaching people about the environment.

Not surprisingly, developing nations initially gave little support to the environmental movement. They were skeptical of proposals that they perceived would limit their development objectives and remove their control over resources. Nonetheless, by the 1970s, the fears expressed by some developing countries were gradually changing and new ideas concerning the environment led to a greater participation of developing countries in the environmental debate. Interest in environmental issues by international institutions helped raise the profile of environmental education. Two major conferences, hosted by the United Nations Educational, Scientific and Cultural Organization, and United Nations Environment Program (UNESCO-UNEP) helped “...develop some consensus on what environmental education could and should become, and assisted governments in implementing relevant programs as soon as practicable” (Environment Australia, 1999). The purpose of the first conference in Belgrade in 1975 was to draft concepts and a vision for environmental education, while the second conference in Tbilisi in 1977 built on the plans put forward at the conference in Belgrade (Environment Australia, 1999). At the Tbilisi conference (UNESCO, 1977), a general consensus on the nature of environmental education resulted in the adoption of the following “principles”

(Table 2.1), taken from Sterling (1992), which are widely accepted and are the basis of most environmental education definitions.

Table 2.1: Tbilisi Recommendations for Environmental Education

Tbilisi Principle/Recommendation that environmental education...
<ol style="list-style-type: none"> 1. is a lifelong process; 2. is interdisciplinary and holistic in nature and application; 3. is an approach to education as a whole, rather than a subject; 4. concerns the interrelationship and interconnectedness between human and natural systems; 5. views the environment in its entirety including social, political, economic, technological, moral, aesthetic and spiritual aspects; 6. recognizes that energy and material resources both present and limit possibilities; 7. encourages participation in the learning experience; 8. emphasizes active responsibility; 9. uses a broad range of teaching and learning techniques, with stress on practical activities and first-hand experience; 10. is concerned with local to global dimensions, and past/present/future dimensions; 11. should be enhanced and supported by the organization and structure of the learning situation and institution as a whole; 12. encourages the development of sensitivity, awareness, understanding, critical thinking and problem-solving skills; 13. encourages the clarification of values and the development of values sensitive to the environment; and 14. is concerned with building an environmental ethic.

After Sterling (1992).

In 1980, the “World Conservation Strategy” was launched by the International Union for the Conservation of Nature and Natural Resources (IUCN), UNEP, and the World Wildlife Fund (WWF). The “World Conservation Strategy” suggested requirements for human survival and prosperity and introduced the concept of “sustainable development.” In 1987, the report published by the World Commission on Environment and Development, entitled “Our Common Future”, marked another significant milestone as it drew attention to the relationship between the less developed parts of the world and social and environmental problems. The Commission defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987, 43). The term sustainable development has been criticized for being ambiguous and open to a wide range of interpretations that can be quite contradictory (British Columbia Round Table on Environment and Economy, 1992, 34). However, it has been most useful in drawing attention to both present and future environmental issues, and it has served as an important rallying point for research and action.

By the 1990s, environmental issues had become highly politicized and the debates that arose from “Our Common Future” led to the United Nations Conference on Environment and Development (The Earth Summit) that was held in Rio de Janeiro, Brazil in 1992. In 1997, the UNESCO Thessaloniki Declaration, “Educating for a Viable Future”, sought to further clarify the concept of education for sustainable development (Environment Australia, 1999).

Environmental issues have become firmly established in development thinking and are often regularly discussed in both formal and informal settings. One of the major challenges that the young and dynamic field of environmental education faces is that it involves complex issues that often defy human understanding. Palmer notes that environmental education is characterized by a paradox:

“Few would doubt the urgency and importance of learning to live in sustainable ways...of conserving the world’s natural resources...and of taking care of the Earth today so that future generations may not only meet their own needs, but also enjoy life on our planet. Yet environmental education holds nowhere near the priority position in formal education programs around the world that this scenario suggests should be the case. It seems that it constantly has to ‘engage in battle’ with the intricacies and demands of ‘education’ in general rather than be a core element of it.” (Palmer, 1998, ix)

This paradox places constraints on the development of the field and highlights the challenge for environmental education in the 21st Century. Progress in establishing environmental education programs around the world has been uneven and it tends to be more institutionalized in developed countries than in developing countries (Palmer, 1998).

The evolution of research on environmental education has involved a slow yet steady movement away from the scientific paradigm towards a broader base of post-positivist methodologies. The three key approaches that characterize research and understanding in environmental education include: (1) the positivist paradigm; (2) the interpretivist (constructivist) paradigm; and (3) critical theory (Palmer, 1998). The latter two approaches are critical of positivism.

Environmental education research has tended to be dominated by the scientific research paradigm. This quantitative approach has been aligned with the positivist (empiricist) paradigm. Palmer (1998) estimated that 90-92 percent of research studies in environmental education during the 1970s and 1980s involved quantitative research. Palmer noted that research studies published in the *Journal of Environmental Education* during that period reflected quantitative characteristics such as the presentation of results in numerical and statistical forms, and the belief that the “truth” consisted of observable and verifiable facts. She further noted that an understanding of environmental issues was derived from the natural and physical sciences, reflecting the tradition of scientific inquiry, and researchers tended to remain detached from their research in order to avoid bias.

Palmer (1998) states that more recently there has been a reduction in the dominance of the quantitative approach and a shift towards the use of more humanistic and interpretive lines of inquiry by environmental educators. Although there have been criticisms of the quantitative tradition, the quantitative research is still valued as it has been fundamental in the development of the field and it still plays an important role in on-going research. Interestingly, quantitative research studies are still dominant in environmental education, despite the shift to more use of qualitative forms of inquiry. Palmer (1998, 119) has argued that the number of qualitative research studies increased considerably during the 1990s; however, “...many appear to be based on methodologies that are either lacking in rigour or poorly articulated, which raises serious questions relating to reliability and validity.”

2.2 Initial Challenges

Environmental education faces several challenges at the present time, including:

- 1) Creating a positive feeling about environmental accomplishments;
- 2) Incorporating a variety of perspectives in curricula;
- 3) Incorporating environmental education into a variety of courses;
- 4) Re-establishing the linkage between the perceived welfare of the individual and the environment.

2.2.1 Creating a Feeling of Accomplishment

It is often too easy to focus on what is wrong with the environment rather than what is right with it. Too much bad news can be overwhelming, particularly when the perceived complexity of the problems leads many people to feel powerless to do anything about them. Rather than viewing environmental problems as something that only specialists can understand, people should try to develop an ethic of care towards the environment (Kaufman & Franz, 1993). This would allow people to extend values such as respect and responsibility towards the environment, while encouraging concern for the health of the environment. Simple actions by many people can add up to become significant accomplishments.

Environmental education can be used as a tool to address many of the emerging environmental issues. Both adults and children should be educated to believe that their actions can make a difference to the environment. Moore (1999) cautioned that there often seems to be a feeling that all environmental trends are negative and that nothing can

be done about them. However, it is important that people see the world in a more positive light through success stories that educate people on issues such as cleaning up toxic wastes, improving air quality, reforming forest practices, and protecting endangered species. The positive aspects must be balanced against an awareness of ongoing environmental concerns such as poverty, land degradation, energy use, and climate change. “Environmentalism should be at least as much about celebrating life and our ability to maintain it as it is about fear of future loss and change” (Moore, 1999, x). Environmental education needs to teach us to be problem solvers with the ability to critique and to transform our analyses into actions so that we create a positive reinforcement for each individual.

2.2.2 Incorporating a Variety of Perspectives

It is critical that individuals are exposed to a variety of viewpoints before reaching decisions on environmental issues. Educators and the media, in particular, must ensure that the full range of social, economic and environmental viewpoints are explored on major societal issues.

Given the variety of perspectives on environmental issues, there is a need to incorporate the wisdom and efforts of many different members of society (e.g., individuals, governments, businesses, communities, non-governmental organizations, etc.). Educators must strive to design curricula that reflect this variety of perspectives, and expose students to all sides of controversial issues (Smith & Williams, 1999). The scope of education must also encompass all generations of people from different walks of

life. While the future may lie in the hands of our children, it is the older generations that are often in a position of power where they have the opportunity to initiate changes.

2.2.3 Incorporating Environmental Education

Another challenge involves the structuring of courses. In a conversation with Harold Hungerford (2002a), Dr. John Disinger, a distinguished environmental educator, past president of the North American Association for Environmental Education, and emeritus professor in the School of Natural Resources at The Ohio State University, noted that a challenge for environmental education is that it is interdisciplinary in nature, and it has a difficult time fitting into school curricula that have a disciplinary structure. Environmental education concepts can be incorporated into a wide variety of courses. However, “most K-12 educators who deal with the environment in their classes do it as Science, perhaps Social Studies, and rarely anything else” (Disinger, in Hungerford, 2002a, 7). Environmental issues provide a natural bridge among subjects that are often too fractured. If environmental perspectives become integrated into the whole curriculum, students will inevitably be exposed to them.

2.2.4 Re-establishing the Linkage Between the Individual and the Environment

Education has come to be viewed primarily as a means through which individuals are able to gain an edge in the increasingly competitive global market (Ferguson, 2004). However, in earlier (native) societies, people were educated about the linkages between

humans, animals and the land that supported all of them. “Individuals were not educated for themselves alone but for what their education would mean to the welfare of the whole” (Smith & Williams, 1999, 16). People seem to be losing sight of their relationship to nature and their dependence on the natural world; environmental education provides a means of re-establishing this connection.

2.3 Formal and Informal Environmental Education

Environmental education depends upon the totality of an individual’s experiences relating to the world, including both formal and informal education. Formal environmental learning tends to be taught through schools, colleges and universities, but it also includes formal job training, apprenticeship programs and community or continuing education programs. Palmer (1998, 274) defines informal education to include “...communication and information that results from living and interacting in a particular locality and community, newspapers, television, radio, other media forms, ‘events’ in one’s life and in the wider world, and interacting with relatives and close friends.” Public awareness of the environment originates from a wide variety of sources and is derived from a multitude of perspectives. Informal education can occur before, within, and after formal education programs, and interact with them. Palmer (1998) notes that informal influences do not simply ‘feed into’ formal education systems that can then ‘take over the task’ in a linear progression. The most successful environmental education

programs appear to be those that support formal and informal elements of education alongside each other.

2.3.1 Formal Environmental Education

Implementing the goals of environmental education into the classroom still remains a challenge. Two main approaches are proposed: (1) creating specialized courses, and (2) integrating environmental issues into other courses.

The first approach, creating courses called “Environmental Education”, has the apparent advantage that schools can hire teachers who are trained in presenting environmental information to students and that teachers of other subjects would be relatively unaffected by the addition of a new course and new teacher into the curriculum (Kaufman & Franz, 1993). The arguable disadvantage is that students might not fully grasp how the ideas link to what they are learning in their other courses.

The second approach advocates making environmental issues an integral part of all courses where there is a tangible link. For example, Arnott (2000) reported that the Toronto District School Board had, for 12 years, operated a week-long intensive visual arts program in an outdoor setting to allow the art students to take inspiration from the natural settings.

Kaufman and Franz (1993) have argued that a truly comprehensive environmental education program would introduce environmental topics at all grades and in all courses of a school curriculum. They state that this should be done smoothly so that the elements are not recognizable as separate units. This integration would allow for students to automatically become aware of the importance of the environment while

learning about issues in standard courses. Suggestions for this type of integration include reading essays and poems from *Audubon* magazine in English classes, becoming familiar with efforts to reduce automobile pollution when taking drivers' education classes, and applying the laws of thermodynamics to the challenge of producing energy in the future in physics class. Nevertheless, one may justifiably ask: to what extent can environmental education be infused into the curriculum without compromising the original course material.

Thus, education on environmental issues can be integrated into the formal sector either by creating 'environmental education' courses, or by integrating environmental concerns into established courses. Regardless, formal education programs can only form one part of an individual's education relating to the environment and it is important that the informal education sector plays a role in developing the understanding of environmental issues.

2.3.2 Informal Environmental Education

Informal environmental education includes all information and learning opportunities outside of the formal education system (British Columbia Round Table on Environment and Economy, 1993). These informal educational opportunities are becoming increasingly important because they are able to reach people who are not currently in the formal education sector, and they supplement the environmental knowledge that children learn in schools. Informal educational programs help compensate for the extreme difficulty of matching up the complexities of environmental

education with the demands of formal education curricula. While parents may be perceived as having the opportunity to supply their children with the environmental awareness and knowledge that may be missing in their classrooms, it is probable that they may not be qualified or inclined to do so. Information can come from a wide range of sources: native peoples can offer practical lessons that help connect people with the environment through alternative means than the formal education systems; informal education opportunities are often offered by national and international environmental organizations; governments and nonprofit organizations contribute to informal environmental education efforts, particularly through many of the documents that they publish and make available to the public; and the commercial media outlets provide relevant information through newspaper stories, news broadcasts and special programs.

While the British Columbia Round Table (1993) recommended a multi-media communications program to build awareness of the environment and sustainability, Pope (1996) argued that television is the single largest factor influencing the political debate on the future of the Earth and its environment. Regardless of how the information is conveyed, the public needs to recognize that the media does not always include a variety of perspectives on environmental issues and they may focus on the problems rather than the successes. This is particularly likely in news broadcasts, when only a small amount of time can be devoted to each story. Given the significance of all types of media to public communications in the modern world, it is important that media leaders be convinced to report on environmental issues regularly, accurately, fairly and from a broad perspective.

Erika Archibald (1999, 27), in an analysis of newspaper reporting and the environment, argued that “because it has been shown that the public gets much of its information about the environment from the news media, it is important to learn more about the process that brings them this information”. After conducting extensive interviews with 20 environmental reporters, she noted that “Research suggests that environmental reporting is plagued by omission of important information, too much emphasis on crises and conflicts, limited source use, and other shortcomings.” She determined that there is a convergence of numerous problems in environmental reporting, rather than any single, overriding problem. The range of problems included issues such as: pressures of deadlines and limited news space, complexity and subtlety of the issues, uncertainty of the science involved, and trends in journalism (e.g., editors seeking stories involving conflict). Through content analysis of news stories, she determined that “...many reporters were getting the time to write longer, more in-depth stories, but they were still relying heavily on traditional sources, such as government officials and environmental activists, for their information rather than on such alternative sources as academic or independent scientists” (Archibald, 1999, 31).

Archibald’s suggestions for improvements in environmental reporting included: increasing the amount of environmental reporting, making the reporting style less crisis oriented, having an editor who had formerly been an environmental reporter, and adding environmental information to other parts of the newspaper (e.g., an environmental index/Dow Jones of the environment).

Interestingly, none of the reporters whom Archibald interviewed believed that lack of training in science or environmental issues was a cause of any problems in their writing. However, it should be noted that this self-critique is at odds with the assessment of many environmental activists, industry representatives, politicians, scientists, academic researchers and even journalists themselves who have been known to criticize reporters' lack of a fundamental understanding of environmental issues. Murkowski (1995) also suggested that problems with environmental reporting are due to a lack of reporter training and understanding in science and the environment.

Thus, environmental learning can be attributed to both formal and informal education efforts. These media have the potential to direct the environmental consciousness of society. Since environmental education is concerned with producing well-informed and environmentally active people, it is particularly important that those who are responsible for producing environmental information have an understanding of the kind of learning experiences that influence the development of environmental care.

2.4 The Importance of Environmental Education

People have always faced environmental challenges. However, today's challenges seem far more numerous and more serious than in the past. Scientific research has given people a better understanding of the effects of unseen contaminants on both the environment itself and on human health (e.g., mercury, asbestos, cadmium). People are realizing that they can no longer simply base their perceptions of the quality of the environment on their own understanding, experiences, and senses; the unseen, the

unsmelt, and otherwise unsensed contaminants may pose significant risks to the individual. It is with this realization that people are increasingly relying on a variety of sources to provide them with information concerning issues of environmental risks and their avoidance.

Consulting a wider variety of sources for information may initially create some confusion, as there is rarely agreement about the causes of and/or the solutions to environmental challenges. Nevertheless, it is a valuable exercise as people may gain a different perspective on the issue at hand, or a greater understanding of the *collective product* of a large number of unconnected actions which individually may have very little impact upon the environment. By so doing, they will become more aware of the impact that their personal decisions can make upon society as a whole, and more socially responsible when making lifestyle choices. An early sense of social responsibility in children can be developed through environmental education in schools, especially at the elementary level.

Palmer and Neal (1994, 33) have argued that “Pupils in school, perhaps at primary level in particular, are fascinated by their surroundings and have tremendous capacity to build upon natural learning experiences that take place within them. Aside from academic debate and jargon, the ‘real world’ experiences of a wide sample of educators show the vital importance of education *in* the environment as a prerequisite to a concern *for* it”.

William Stapp, Professor Emeritus at the University of Michigan School of Natural Resources, stressed the importance of environmental education, particularly with

youth, and its importance in the formal sector. He was recognized by the Executive Editors of *The Journal of Environmental Education* as “one of a handful of individuals who truly shaped the field of environmental education...he (Stapp) influenced how environmental education is defined, its practice, and the development of its institutions. Perhaps most important, through his leadership, integrity, and enthusiasm, he inspired environmental educators around the world” (Simmons et al., 2001, 4).

His career in education spanned nearly five decades, until his passing in 2001. In the 1960s, he initiated a Kindergarten to Grade 12 environmental education program with the Ann Arbor Public Schools, has served as President of the North American Association for Environmental Education, founded the environmental education program at the School of Natural Resources and Environment at the University of Michigan, was involved in framing the Tbilisi Declaration and the founding the Global Rivers Environmental Education Network (GREEN), was the first director of the International Environmental Education Program at UNESCO, and was nominated for the Nobel Peace Prize in 1993.

He expressed a specific interest in the design and implementation of environmental curricula for primary and secondary schools. Stapp (1974, 50) argued that:

“The foundation for strong citizen action rests to a large degree in what happens in our homes and schools. Today’s youth will be the voters whose decisions will affect not only the immediate environment in which they live, but also that of our nation. They will make decisions and cast votes about housing, recreation, transportation, beautification, and air and water pollution. It is imperative that schools provide youth with the knowledge and

problem-solving skills they need to cope effectively with these life-involving decisions.”

Although his arguments were made 30 years ago, they are much the same as those made by people who have an interest in environmental education today. Stapp noted that environmental education activities for students in Grades K-12, should focus on the affective (feeling), cognitive (knowing), and skill-behaviour domains, with differing emphasis on each of the recommended areas, depending on age level. He suggested that the emphasis in the early years should be in the affective domain, while the emphasis in the later years should be on the cognitive and skill-behavior domains, and that students should be provided with opportunities to explore their immediate environment with all of their senses (sight, hearing, smell, touch, taste).

Stapp recommended that students be exposed to a wide variety of physical and social environments in order to be better able to judge the quality of their immediate environment. He used a classic example to illustrate the difference between an inner-city child's understanding of his/her environment versus a rural child's understanding of his/her environment. He noted that an inner-city child “...who has never experienced clean air, uncrowded housing, safe streets, unpolluted water, healthy trees, and rich soil, may not have a quality ‘measuring stick’ by which to judge his home environment. Likewise, a rural child may accept a pristine environment, not knowing that it can be degraded if people are not active in maintaining a quality environment” (Stapp, 1974, 73). By not being aware or fully understanding the strengths, weaknesses, and meaning of one's own environment, it can be difficult to assess the strengths, weaknesses and

meaning of contrasting environments. Thus, by teaching children to appreciate and respect environmental resources, as well as teaching them about a wide range of environments, and perspectives on environmental issues, they should have better skills for making future decisions regarding the environment.

2.5 Environmental Education in Schools

In today's society, people often rely on the *formal* education system, through public and private schools, as the primary means of educating children, although they may choose to supplement the knowledge that the children learn in schools, through the informal education sector (e.g., media, government publications, non-governmental organizations, museums, Boy Scouts, Girl Guides, etc.).

2.5.1 School Policies for Environmental Education

Schools can create their own policies for Environmental Education. Palmer and Neil (1994, 135) provided an example of a school policy for environmental education in a primary school as follows:

Within the context of environmental education, the school will hope to bring about an understanding of the environment, an appreciation for the environment and a sense of caring for the environment.

From first-hand and real experiences, the pupils will learn:

- in, through and from the environment (as a resource);
- about the environment (knowledge);
- for the environment (values and attitudes); and
- skills to assist in the study of the environment.

The policy could go into further details regarding how the school hopes to implement such a policy, and how teaching will specifically support the policy.

2.5.2 The School as a Role Model

David Suzuki, a well-known scientist and journalist, stated in an interview with Cynthia Andrew (2000, 16) that:

“schools do have a very important role. The critical time for science and environmental education is in the primary years, not the postsecondary or graduate years. The most important thing we can do is to teach children to love nature... In the process of learning how interconnected we are with the rest of the planet, we should come to an appreciation of how important the rest of life on earth is, especially to our own existence. Environmental education at its most fundamental level should be teaching those values – a respect and love for all of creation, and for the sacred elements of earth, air, fire and water.”

He argues that the love of nature is the key to having a generation that is concerned about the environment.

At school, students should be given the opportunity to “...explore their environment, sensorially, physically, and intellectually, in order to obtain both the motivating concern and the factual knowledge necessary to become an environmentally literate citizen” (Stapp, 1974, 51). One method for students to develop a concern for the environment while at school is for the school to act as a role model and exude an environmentally-friendly atmosphere. The school management and staff should ensure that the image of the school that is passed on to students, parents, and any other visitors, indicates that the school is environmentally sensitive. Palmer and Neal (1994, 76) have argued that to encourage environmental sensitivity in students, the school staff should

give them the sense that ‘we who work here care about the environment’. Development of an environmentally-sensitive school can be done through a wide variety of means, including placing emphasis on the environmental components of the formal curriculum, as well as through informal education throughout the school. In this circumstance, informal education ideas can include:

- maintaining litter-free school grounds;
- encouraging reducing, reusing and recycling of materials in the classroom and around the school (e.g., recycling bins in each classroom);
- thanking maintenance staff for being environmental stewards and inviting them to school events;
- creating notice boards in the school hallways with information on:
 - conservation events;
 - awards (e.g., Green Awards for students who do something out-of-the-ordinary to benefit the environment of the school, or local community);
 - the local weather;
 - local, national and international environmental news;
- posting signs next to light switches that encourage people to turn off unnecessary lights;
- maintaining a wide range of up-to-date environmental resources in the school library;
- creating a Students’ Environmental Council, with classroom representatives who could plan events and evaluate the success of past and current events;
- creating hype for an Environmental Day (e.g., inviting guest speakers, inviting guest presenters (of new environmentally-friendly products), organizing activities, etc.);
- including environmental topics in school assemblies (e.g., drama plays); and
- encouraging first-hand experiences outdoors (e.g., fieldtrips), practical investigations and interactions with the natural and built environments.

Informal education initiatives such as those above can have a significant impact on students by encouraging them to behave in environmentally-friendly ways, to be aware of environmental issues, to begin to understand issues of waste and conservation (i.e., of materials, energy, etc.), and to understand that learning can take place in many different physical settings (i.e., both inside and outside the classroom), and that it can be enjoyable.

2.5.3 Field Trips

Most children get excited about going on field trips, and environmental components of the curriculum can provide the basis for such opportunities. Palmer and Neal (1994, 146) have argued that “Resource material for environmental education abounds – the environment itself is the greatest resource of all.” It is often thought that while fieldtrips are valuable, they are too expensive and time consuming to organize because of consent forms being required. Field trips do not necessarily have to require parent/guardian consent forms nor the organization of school buses for the transportation of students, and they do not necessarily have to be expensive. A fieldtrip can be as simple and inexpensive as leaving the classroom and exploring the school ground. It gives teachers the “opportunity to answer individual questions, and it gives the students an occasion to ask questions which, in the classroom, might hold up the teaching process too long” (Kuenen, 1986, 26) This can be beneficial as it can open up important new lines of thought.

Students generally get excited about opportunities to leave the classroom and learn in a different setting, and this enthusiasm, paired with the environmental learning, can be effective. Students can take part in outdoor lessons such as looking at the physical characteristics of the school ground (e.g., soil, percent of asphalt versus greenspace, etc.), listening to natural versus man-made sounds, distinguishing between structures and devices made by humans (e.g., play structures) and structures found in nature (e.g., bird nests, animal burrowing holes in the ground), mapping the school ground, and/or conducting an environmental waste audit of the school grounds.

2.5.4 Environmental Waste Audits

In an environmental waste audit, information on litter (i.e., location, quantity, type, etc.) can be recorded and the information can be analyzed afterwards in the classroom (i.e., create a report, make graphs, do simple mathematical calculations, etc.) to learn more about litter. This type of activity can be advantageous as it can be a bridge for many subjects (i.e., Science, Math, Reading/Language, Arts/Drama). Students could learn about the collection of data, do a mathematical analysis of the data collected, go to the library and pick a book to read and write a report on a subject such as littering or recycling, and could even act-out a play for a school assembly on the lesson learned. However, the analysis should also include a deeper discussion including topics such as waste, conservation, and population size (i.e., number of students in a school, amount of resources available), to ensure that students are understanding the links between their activity and the world outside the school. The depth of such a discussion is clearly

dependent on the age of the students, and a teacher should have a general awareness of the students' cognitive level, with the support of school curriculum guidelines.

It is not only students who can conduct environmental audits. School boards can encourage or make it mandatory for schools to take part in an environmental audit program. "The 'environmental audit' is a concept that is well established in the world of commerce and industry...and is becoming as important a practice as financial auditing" (Palmer and Neal, 1994, 130). In an environmental audit, investigations are made into the use of energy, materials, disposal of waste, atmosphere of the school (e.g., Is the entrance to the school welcoming and attractive? Does the school exhibit an interest in environmental care?), as well as environmental initiatives (e.g., existence of an Environment Club, global issues relevant to the school community through assembly material, charity involvement and extra-curricular activities). Although environmental audits require extra time, planning, and organization, they are often appealing to school boards because they "...not only appease the environmental conscience of the organization involved but it can lead to both financial and environmental advantages" (Palmer and Neal, 1994, 131).

2.6 The Role of the Teacher

Teachers are in an interesting position because in order to deliver a 'new' non-traditional curriculum demand (environmental education), they must keep both their students' and their own motivation high, yet they may not necessarily have any formal training in this part of the curriculum. They are a particularly important element of the

formal component of environmental education because they are in direct contact with students through much of the day, and because the success of the formal component is strongly dependent on teacher subject knowledge, awareness, and enthusiasm (Palmer & Neal, 1994).

Palmer and Neal (1994) have suggested that teachers need to first understand the aims and objectives of environmental education at their school, and should establish links with other subjects across the curriculum to encourage students to recognize the extension of their school subjects into the outside world. Some teachers may have taken environment-related courses, or have a general awareness of environmental issues, or even a passion for the environment. Others may know very little about the environment and lack the confidence to teach environmental subjects or have little personal interest in environmental issues. Teachers who feel under-prepared may seek in-service training (e.g., a day-long program or course on a particular subject such as climate change or ozone depletion) when such is available, but in-service training can be restricted by the lack of suitable organized courses and by lack of funding.

In-service training may be particularly important to teachers responsible for environmental education. May and Flack (2001) noted that environmental educators must make ongoing adjustments because the Earth is currently experiencing dramatic changes in both social and physical environments. They argued that: “effective environmental educators understand student and other environmental dynamics and consistently alter their teaching efforts in response to those changing dynamics” (May & Flack, 2001, 6).

However, there are significant challenges for environmental education associated with the role of teachers, and they are part of the cause that teaching can be considered a strenuous activity. For instance, teachers are in a position in which they must cope with conflicting demands. Peter Posch (1991, 97) noted that one such conflicting demand is that “On the one hand, society wants teachers to transmit a certain body of knowledge that conforms to social values. On the other hand they are expected to help young people to become independent and able to decide for themselves and become ‘critical’ (i.e., to discriminate, reflect and be able to evaluate).” David Lambert (1996) has noted that teachers also face the challenge of accommodating the curriculum, while deciding how to ‘deliver’ the mandatory content. It is important to note that environmental education is not the only topic that is demanding of integration across disciplines; teachers are increasingly learning to incorporate topics such as information technology.

In a conversation with Harold Hungerford (2002b), Dr. Richard Wilke, who has been recognized for his contributions to the field of environmental education, noted that the potential exists to provide a quality environmental education program using the infusion of subjects. However, there are major barriers in teacher training with regard to environmental education (specifically, a lack of pre-service teacher education in environmental education), inadequate time for planning instruction across subject areas and grade levels, as well as the fact that environmental education is typically excluded in assessment processes. Lambert (1996, 232) noted that teachers are increasingly taking on the role of being a ‘researcher’, and “it is perhaps not surprising that teachers around the country have tended to rely on rapidly published ‘formula’ textbooks which claim to do

the delivery job.” Thus, a teacher’s role is extremely complex and greater assistance (via the provision of environmental resources, in-service training, and teacher appreciation) should be provided to teachers by either their local school board, or provincial Ministry of Education.

2.7 Teaching Methods

Among the many people who have researched formal environmental education, Joy Palmer has gained significant recognition. Palmer has been a Senior Lecturer in Education at the University of Durham and a past Chairman of the National Association for Environmental Education. She notes that there are extensive possibilities for classroom interpretation of environmental topics and that many of them have links with other curriculum areas. Under her ideological framework, environmental education should take into account three inter-linked components: education about the environment (basic knowledge and understanding of the environment), education for the environment (values, attitudes and positive action for the environment) and education in or through the environment (using the environment as a resource with emphasis on enquiry, investigation and pupils’ firsthand experiences). The model “...forms a basis for topic development and, most importantly, for linking a specific topic or environmental starting point into a coherent and progressive overall curriculum plan for the key stage as a whole” (Palmer and Neal, 1994, 38).

Palmer and Neal (1994, 152) recommend that teachers ask themselves the following questions when going about planning and assessment tasks:

First Step:

- Have I planned tasks which help pupils to learn *about* the environment?
- Have I planned tasks which involve learning in or *through* the environment?
- Have I planned tasks which involve learning *for* the environment?

Second Step:

- What specific elements and levels of knowledge and understanding are covered by learning tasks?
- What attainment targets/programs of study do these relate to in core and foundation subjects?
- What skills are covered by learning tasks (both specific and cross-curricular)?
- What attitudes do I aim to promote through planned learning tasks?

Third Step:

- What personal experiences will each learner actually engage in while performing planned tasks?
- How will my planned experiences and tasks help to develop a sense of concern for particular environmental aspects and issues?
- What action (personal or class-based) may result from experiences and tasks which have been planned?

Fourth Step:

- How do I ensure that tasks and experiences build upon each other in a progressive way in each of these components of the overall model?

Palmer and Neal specifically state that they do not believe that there is a single ‘right or wrong’ way to approach the teaching of environmental learning in the primary phase, although teachers should consciously think about how they teach about the environment, and that first-hand experiences with the environment should be at the forefront of teaching and learning. When considering the resource material that is available for environmental education, Palmer and Neal (1994, 146) argue that “...the environment itself is the greatest resource of all.”

Figure 2.1 provides an interesting model for teaching and learning in environmental education. It is able to integrate the three dimensions of the learning process (knowledge and understanding, skills and attitudes) that have been outlined in a variety of documents over the years, as components that are critical to the aim and content of environmental education (see Appendix A).

Figure 2.1: Model for teaching and learning environmental education

2.8 Environmental Education: Promise Versus Performance

Michael Sanera (1998), of the United States' Environmental Education Research Institute, introduced an important debate on promise and performance into the field of environmental education. Sanera referred to the "promise" of environmental education as being the professional environmental educators who have the aim of providing students with knowledge of environmental issues from a variety of scientific perspectives so that students can make up their own minds on the issues. Sanera noted that although the educators have good intentions, he is concerned about the *performance* of environmental education. By referring to "performance", he is questioning whether the information that students receive actually lives up to the promise or intent. For example, "...when children receive environmental education in the classroom based on curriculum materials or textbooks, or when they go to the school library to check out books about the environment, do they receive information that lives up to this promise?" Sanera argues that there is a large gap between the promise and performance of environmental education.

Sanera (1998, 14) questioned the ability of teachers to interpret environmental education goals and teach issues which cover many different disciplines, by using an example of a hypothetical teacher named Mrs. Jones.

"For Jones to successfully accomplish her environmental educational mission, she will have to be a scientist, a psychologist, a political scientist and an economist. For her to successfully teach her students, she must keep up with the rapidly changing research by reading peer reviewed scientific journals in all of these academic fields. The intent is good, but the task seems too broad and too diverse. It is little wonder that the practice of environmental education often falls short of the promise.

What often happens in situations like this is similar to what happens in goal displacement. Individuals confronted with this complex and diverse goal are likely to select only part of it. For example, some will concentrate on teaching knowledge, others will work on student attitudes and behaviors, while still other teachers will emphasize the student action part of the definition.”

Sanera noted that many teachers seek information in textbooks to educate themselves on issues, yet, after reviewing some textbooks, he showed concern and deemed that they were not satisfactory due to bias and misinformation. He was also concerned with the exclusion of scientific information, which resulted in the presentation of only the most catastrophic version of an environmental issue to teachers and students.

He recommended that educators seek information from a variety of sources, and he argues that educators should not be expected to do content research on numerous environmental issues without help. He argued that the solution to the widening of the gap between the promise and performance of environmental education is to start at the base of education and focus on developing a knowledge base on environmental issues for teachers and students. Unfortunately, he did not go into much detail regarding how one should determine what information is accurate, or who is responsible for reviewing and/or providing such information. However, he noted that the funding of grants and research projects is beneficial as they help provide models of quality environmental education based on current science that can be taught in a balanced manner.

In response to Sanera, Deborah Simmons (1998a), the director of the National Project for Excellence in Environmental Education, argued that he did not give enough credit to teachers and made them seem simple-minded.

“The ‘typical’ primary school teacher provides instruction in science, mathematics, health, art, music, social studies, reading, language arts, and, depending on the school district, physical education. This teacher is also expected to understand a variety of educational theories such as emergent literacy and multiple intelligences, teach to varying learning styles, address the needs of students from culturally diverse backgrounds (including those whose native language is not English), work with students who have physical and educational disabilities, and the list goes on. The task of the classroom teacher is immense and more often than not underappreciated. However, to suggest that “typical” classroom teachers are not up to the task of teaching environmental education because of the complexities involved does not give these professionals due credit.” (Simmons, 1998a, 42-43)

Simmons clearly understands the difficult tasks involved with teaching and is able to provide a detailed explanation of it, but she may be misinterpreting Sanera’s argument. In general, it seemed that Sanera (1998) was not claiming that teachers are incapable of researching wide ranges of information, but that people should recognize that teachers should not be expected to do all sorts of research by themselves, and that it would be beneficial if such information could be given to them.

Simmons provided elaboration on the process of analysis of textbooks as recommended in the *Environmental Education Materials: Guidelines for Excellence* which was published by the North American Association for Environmental Education (1996). Simmons (1998a, 43) noted that the *Guidelines* “...attempt to provide a holistic view of environmental education as a process ...and were developed using a process of critique and consensus and were circulated to over 1000 individuals and organizations...” in an attempt to reflect a widely shared understanding of environmental education. The *Guidelines* include six key characteristics, 28 guidelines, and over 100 indicators that are to be used together when evaluating or developing environmental education materials.

Unfortunately, Sanera only used one of the key characteristics and only focused on two of its guidelines.

Simmons (1998a) also argued that there is more *right* with environmental education than Sanera would lead people to believe. She noted that much of the promise of environmental education is being accomplished, and that one of the most cost-effective efforts that can be undertaken to further improve environmental education is to support pre-service and in-service educator preparation. Many proven national and international programs exist, such as Global Rivers Environmental Education Network (GREEN), Project Learning Tree, Project WILD, and Project WET, which together provide service to more than 100,000 educators each year.

Simmons concluded by arguing that Sanera's idea of simply focusing on the knowledge dimension perpetuates a type of education that is "thin" and does not develop in the learner the ability to ask questions and resolve problems. Environmental education is more than simply learning 'facts' and must include thinking skills that promote civic responsibility.

"We are faced, and will continue to be faced, with conflicts related to environmental issues. We will continue to need to make informed decisions as individuals, as consumers, as workers, and as a society. Our students need to be prepared to face future challenges – challenges that we cannot even imagine – and they need to be able to make well-informed decisions. To make these well-informed decisions, they will need a whole host of knowledge, skills and dispositions, not just a laundry list of facts." (Simmons, 1998a, 46)

Simmons argued that credit needs to be given to teachers' ability to learn new information and ask questions, although, I think the same needs to be said for students. It would be too simplistic to teach students facts, and not add depth beyond the facts.

Children ask questions and naturally want to know why they are learning about something and how it relates to them. To create a citizenry that is capable of dealing with future problems with the world, it is important that they are able to relate what they have learned as facts, with the real world, and understand the importance of the decisions they make.

2.9 Factors Influencing Children's Environmental Attitudes

Paul Eagles and Robert Demare (1999) investigated factors that influence children's environmental attitudes. In a study of 6th-grade students, Eagles and Demare noted that taking students on a week-long Sunship Earth program at a residential camp did not produce any measurable differences in ecologicistic or moralistic attitudes. They found that the key factors that influence children included talking at home and watching films and reading, which occur both at school and at home. These factors influence children over a long period of time and are continuous. Eagles and Demare (1999) noted that the majority of nature television and virtually all children's magazines present an ecosystem view, with an associated strong conservation ethic, and many of the young viewers adopt these concepts. Thus, it is no surprise that a one-week camp program did not increase existing ecologicistic and moralistic attitudes; the week long camp program simply served as a reinforcement of previously adopted views that had been derived from several influences, including family, media, and previous school-based environmental education programs. However, other studies, such as work done by Dresner and Gill (1994), noted that there *were* changes in the enthusiasm and awareness of children, about

nature, after a camp experience (Dresner & Gill, 1994). The different results may be due to low levels of environmental experience and lower levels of attitude scores prior to going to camp among the children who showed changes in environmental attitude and awareness after the camp experience.

Eagles and Demare (1999, 37) noted that major change in the attitudes of children occurs during their younger years, and that their attitude structures are well-formed by the end of high school. "Attitude flux occurs throughout youth, up to the early teen years. At this time the attitudes solidify and become much less amenable to change. Therefore, developers of programs dealing with older high school students face a large challenge in attempting to change attitudes." Their study highlights the need for both formal and informal environmental education programs to be well developed, to start targeting children at an early age, and to be continuous if they are to be effective in influencing attitudes over the long-term.

It is important to realize that although Eagles and Demare found that there was an age ceiling effect with regard to *environmental attitudes*, other studies have found that camping expeditions can lead to changes in *self-concept* and *environmental knowledge*. Gillett et al. (1991) found that such changes occurred in teenagers during an intensive 6-week wilderness hiking experience. Lisowski and Disinger (1991) found significant increases in ecological learning by students during a one-week field course to two Caribbean islands. They found that the learning was correlated with several variables: expressed interest in science, positive perception about learning, and low pre-test scores.

It would be interesting to see the results of a study that would focus on the length of the fieldtrip/field course/camping experience to see if duration of experience has an influence on the youth. It seems logical that longer duration could alter environmental knowledge considerably, although it might require a quite lengthy period to alter attitudes that have been shaped on a long-term basis throughout the child's youth. If the attitude is changed only slightly on the trip, slippage back into its old mode once the child is back in their home environment and lifestyle seems highly probable.

2.10 The Teacher's Perspective on Environmental Education Programs

Most research on environmental education programs focuses on student knowledge and attitude changes. However, Deborah Simmons (1988) focused on "The Teacher's Perspective of the Resident Environmental Education Experience." Simmons noted that classroom teachers play an integral role in any environmental education program and that without the classroom teacher's enthusiastic participation, an on-going environmental education program is severely handicapped.

Simmons asked teachers, who were participating in a residential environmental education program at the New Jersey School of Conservation, to express their views on a number of subjects regarding their experience with environmental education. The teachers involved had taken their students on a 3-4 day fieldtrip to the New Jersey School of Conservation and were asked to conduct their classes in non-classroom settings (most classes took place outdoors). The subjects taught included social studies, natural

sciences, humanities, and outdoor pursuits themes. Professional staff of the New Jersey School of Conservation participated in about 30% of the teaching.

The study found that the teachers felt that environmental education is an important part of the school curriculum. This was expected because teachers who take part in this type of program are expected to feel that it will benefit their students. The teachers expressed a general enjoyment of the opportunity to spend time in a natural setting, they saw the experience as giving them a chance for personal growth, and they enjoyed the challenge of the experience.

Importantly, the teachers expressed many training and support needs, including:

- lesson plan support (requested more fully developed teaching materials, and to have preparatory and follow-up lessons provided for them);
- how to teach in an outdoor setting;
- classroom-related environmental education;
- learning more about how to integrate environmental education into regular class activities;
- learning how to use the school site more effectively;
- learning how to use the community to teach environmental education; and
- learning more about weekend workshops to receive further training.

However, perhaps most interestingly, the teachers felt that incorporating environmental education into the curriculum was *not their responsibility*. This was seen as a disturbing trend as it reflects a slightly less enthusiastic and significantly lower endorsement of their own role in contrast to their feelings about the relevance of environmental education.

This study by Simmons provides an interesting view of the perspectives of teachers, and gives an interesting example of a resident environmental education school

that provides many unique opportunities for both teachers and students. Despite the interest of teachers in the environmental aspects of learning, they themselves were not environmental experts and, as such, can be seen to reflect the perspectives of the average teacher. They felt that the out-of-classroom experience was beneficial for both their students and themselves, yet they seek more in-service training, and lesson plan support. If the teachers who *have an interest* in the environment are not only seeking training and support, but do not feel that teaching environmental education is their responsibility, then whose do they think it is? Whose responsibility do the teachers who do *not* have an interest in the environment think it is? In summary, Simmons' study documents that teachers are seeking environmental training, lesson plan support, and would appreciate direction in integrating environmental education into their regular classroom activities.

Yvonne Meichtry and Lorna Harrell (2002) conducted an environmental education needs assessment of K-12 teachers as a result of a legislative mandate requiring the establishment of an environmental education centre in each of the eight state universities in Kentucky.

This assessment aimed to determine teachers' priority environmental education program and training needs, and it used two different methods: a survey, and follow-up focus groups with a small portion of the survey respondents. The survey indicated that teachers ranked their program needs as: (1) funding, (2) field trip opportunities, (3) curriculum resources, and (4) lesson plan and curriculum ideas. The survey indicated the following main areas of need for environmental training (not ranked):

- availability and use of curriculum;
- technology use related to environmental education;
- development and use of outdoor sites and alignment of environmental education with the Kentucky Program of Studies Standards;
- environmental education teaching strategies;
- funding sources and grant writing;
- use of local non-formal environmental education sites; and
- integrating environmental education with other subjects.

The focus groups provided further in-depth information about the environmental education needs of the teachers. In particular, the teachers indicated that no school funding had been given to environmental education because it is not a core content area on which K-12 students are tested as a part of the state standards assessment program. The teachers indicated that rather than having to seek funding from various small grants and businesses, it would be helpful if they were assisted in this process by being provided with a clearinghouse of information on potential funding sources.

The teachers also noted that low-cost, nearby field trips were particularly desirable, and it would be helpful if there was a website or newsletter that summarized information on field trips. They indicated that the main obstacles to taking field trips were: transportation issues (e.g., school bus schedules, funding), time constraints, scheduling within schools, and coordination with other classes.

They noted that having an outdoor site at their school, dedicated for environmental education, would be useful and that the site should provide hands-on learning opportunities that could be integrated across all disciplines. However, the

obstacles to such a site would include hesitancy by some teachers to use the site, issues of site maintenance, and organization of volunteers to help maintain outdoor classrooms.

When asked what the best ways to recruit teachers to participate in environmental education opportunities, the participants responded by saying that teachers most often respond to personal invitations from other teachers, or from an institution or organization that they respect. The participants also noted that incentives (e.g., stipends and credits) are deemed as desirable, as are free curriculum materials and readily available lesson plan ideas.

The participants in the study ranked a regional environmental education center as a very high need, and hoped that such a center would house nature guides, curricular materials, videos, and other materials that could be borrowed (e.g., hip waders, nets). They also recommended having a regularly updated website containing fieldtrip information, an environmental calendar, and a forum for teachers to share ideas.

It is important to note that the teachers who participated in the study had an inherent interest in environmental education as they had expressed an interest in it and had agreed to distribute information about it to other teachers in their schools. Thus, it was noted that a more generalized sample of teachers would most probably express an even higher level of need.

2.11 The Limitations of Teaching Indoors and the Challenge of Teaching Outdoors

In order for teachers to teach *with the environment*, it involves occasionally getting outside. Unfortunately, little environmental education is being done outside, and thus it remains within the realm of abstraction (Russell, 1997).

“Orr believes that building ecological literacy is thus difficult ‘because we have come to believe that education is solely an indoor activity’ (1992, 87). Getting outside does not negate the importance of schools, however, especially in their fundamental role of human socialization. Rather, it means that we reconsider the possibility of schooling to include the greater community, both human and nonhuman” (Russell, 1997, 39).

Palmberg and Kuru (2000) have argued that the purpose of outdoor activities is to give pupils out-of-classroom experiences involving direct contact with various environments. Their experiences have the potential to provide them with in-depth knowledge of environmental issues, and to develop their self-confidence, environmental sensitivity, action skills, and social relationships. In a study that Palmberg and Kuru (2000) conducted, they found that “nature experiences developed the pupils’ self-confidence and feelings of safety, in particular, which in turn increased their willingness to participate in future outdoor activities.” They concluded that knowledge that helps students understand the dependence and interactive relations between humans and nature can, together with personal values, form a basis for a willingness to act. Thus, outdoor activities can form a basis for environmental responsibility.

As mentioned in Section 2.5.3, outdoor activities/fieldtrips can be as simple and inexpensive as leaving the classroom and exploring the school ground. “School grounds provide a valuable educational resource where many aspects of the environment may be

studied. They also play a significant part in the informal curriculum outside lesson time” (Hale, 1992). Traditionally, school grounds have been used as a space for breaks between lessons, playing, and for sports activities, but they do not need to be restricted to these activities.

Hale (1992) argued that school grounds should be viewed as a continuation of the classroom. Out of classroom lessons can stimulate cross-curricular work and can compliment lessons carried out inside the classroom. Outdoor activities can provide students with direct experience in observation, investigation and participation in the design and development of the school grounds, while helping them become informed, responsible and enterprising. In addition to this, Hale (1992, 57) argued, “the use of school grounds promotes a sense of place as the field work undertaken has a direct relevance to the environment in which children live and are familiar.”

However, teaching outdoors is different from that in the classroom and it presents many different challenges for teachers. Deborah Simmons (1998b) argued that taking students to natural areas for environmental education experiences requires significant teacher commitment and preparation. Their duties often include: scheduling the trip, making arrangements for transportation, parent/guardian permission, and additional supervision, taking responsibility for the education and safety of students, as well as finding time to integrate environmental education lessons into the curriculum. “Each of these responsibilities, if perceived to be bothersome or otherwise problematic, could form a barrier that blocks teachers’ inclination to provide nature experiences” (Simmons, 1998b, 23-24).

In a study that Simmons conducted, it was found that teachers believed that it was important to include nature experiences as part of the curriculum, that their students would enjoy the experiences, and that participation in programs at natural areas would be educationally worthwhile. However, the teachers exhibited concerns over their own preparation for such teaching. For example, some teachers were not confident about teaching outdoors and were concerned with their own ability or readiness to teach in a particular setting. They also noted that “taking students outside the classroom involves more than just traditional education considerations of lesson plans, teaching abilities, and student behaviour” (Simmons, 1998b, 26), because outside the confines of the school, teachers must also worry about the students’ safety, the presence of poisonous plants, the threat of animals, the risk of students getting lost, and whether other people might cause trouble. Some teachers in the study also expressed a desire for more training before taking their students to particular outdoor settings.

Thus, while teaching outdoors (*in the environment*) can be extremely beneficial, it presents some unique challenges for teachers. Hale (1992) has argued that in-service and initial teacher training should include an environmental component to equip teachers to use the outside environment. In-service courses could help build teacher self-confidence in teaching outdoors, provide ideas and opportunities for teaching lessons, and promote the exchange of experiences with other teachers. If such in-service courses are not available, efforts should be made to ensure such courses and resources are available to teachers. Efforts by the Ministry of Education, local school boards, and school staff to minimize the challenges associated with teaching outdoors could significantly improve

the environmental education component of the school curriculum while furthering efforts to develop students' appreciation and wonder for the natural world.

2.12 Resources

Disinger (2001) noted that since the environment is rarely a core subject in the school curriculum, it often does not have its own textbook. However, a wide variety of environmental education resources is available to assist teachers with lesson planning and preparation, including the Internet, newspapers, magazines, television, radio, journals, informational materials from non-profit organizations and government. Some organizations such as the Canadian Nature Federation have recognized the importance of environmental education and have produced environmental education kits as a free resource for teachers and students. In the case of the Canadian Nature Federation, the kits have been designed to match the curriculum in each of Canada's provinces and territories.

Appendix B lists seven examples of environmental education kits for Grades 1-6 available in Ontario, and to illustrate the variety of resources available, Appendix C provides information on 17 organizations that have environmental information available on the Internet. Reviews of large amounts of environmental education materials have been conducted by the North American Association for Environmental Education (NAAEE, 1997, 1998) and by the Independent Commission on Environmental Education (ICEE, 1997).

In using these materials, teachers must be cognizant that the materials may have been prepared from the perspective of the organization that sponsored them. For example, Disinger (2001) warned that materials from environmental groups, business and industry groups, and government agencies might support the particular positions of their sponsors. Teachers should be aware that the materials may (or may not) be well-grounded scientifically, well balanced, and more entertaining than rigorous. Disinger also noted that while commercial publishers are attempting to meet content requirements, they also have the goal of being profitable in the lucrative textbook market.

2.13 Standardized Testing

Standardized testing is a challenge for environmental education because it encourages a focus on core subjects such as Reading, Writing and Mathematics, and reduces the emphasis placed on Science and Social Studies, where environmental topics are typically raised. Teachers are being driven by the curriculum, and channeled by the standardized testing.

In the province of Ontario, the Educational Quality and Accountability Office (EQAO), an arms-length agency of the Ministry of Education, was established to develop and coordinate performance assessments in Reading and Writing (Grades 3, 6 and 10) and Mathematics (Grades 3, 6, and 9). Standardized testing is intended to encourage excellence according to the belief that by raising standards and ranking student performance against these standards, the bar will be raised, and children and teachers will rise to the challenge. Sears (in Ferguson, 2004, 34) has argued that "...the perception

that schools should prepare kids to tough it out in a competitive, career-driven world helps explain the appeal of more rigorous standards.”

One of the school boards that was involved in research for this thesis provides the following definition of a standardized test: “...a test whose format, administration and scoring have been standardized; for which reliability and validity data are available; and for which data exist which permit interpretation and comparison with a defined student population.”

Critics of standardized testing, such as Sue Ferguson (2004), a writer for Maclean’s Magazine, are concerned that by putting an emphasis on testing and ranking students, it detracts from ‘deeper’ learning in which students can absorb information, into their long-term memory, and then access it and use it creatively. Such deeper learning is specifically required in the “Relation of Science and Technology to the World Outside the School” portion of the Grades 1-8 Science (1998) curriculum, where environmental topics are typically raised.

Ferguson (2004) argues that there is also a concern that less attention is being paid to marginalized students, due to the focus on academic performance and increasing standardized test scores. Mel Levine, a pediatrician with thirty years of experience, is concerned with today’s testing methods as he argues that “...many children with exceptional minds are denied success because those same minds are not designed to conform to conventional measurement criteria” (Landscapes, 2004, 8). He also noted that some students who excel on tests might develop a false sense of security and confidence, and fail to realize that many adult careers use skills that no test can elicit.

This is true in the case of many careers that take place outdoors. An important concern that Levine raised is that it is important that teachers beware of "...teaching to the tests because your work or school is being judged solely on the basis of examination scores" (Landscapes, 2004, 8).

"In the past two decades, teachers have become increasingly beholden to a battery of provincial and national standardized tests that are all about raising and ranking the performance of kids, schools and provinces. And parents have been clamouring for clear, concise information about where their kids stand." (Ferguson, 2004, 30)

Sue Ferguson researched the issue of report cards and standardized testing. As part of her work, she interviewed Stephen Powell, a Grade 3 Ontario teacher, who expressed serious concerns with the way that students are being ranked, and the impact it is having on teaching. He believes that "Ontario's current policy shifts the focus from the child to the curriculum expectations. Because the curriculum is so "dense", kids who need more time to grasp a concept often don't get it. Instead of helping them meet the expectations, you end up assessing them" (Ferguson, 2004, 32).

In summary, standardized testing as it has been introduced in Ontario, may detract from environmental education. Standardized tests cover core subjects in which the environment is not a focus, and they may draw a student's time and attention away from different learning skills that are needed to develop an understanding of the environment. This may be a particular problem for students who need more time to grasp complex concepts and for those who have difficulty dealing well with written tests. These weaknesses create particular problems for teaching environmental education because the teacher's tendency will be to channel attention and time to the core subjects. As the next

chapter indicates, this problem is exacerbated by the structure of the curriculum (requiring non-standard materials for environmental education) and the lack of support for teaching resources.

2.14 Approaching The Current Curriculum

Environmental education has changed dramatically since its initial beginnings in the 1960s and 1970s. Environmental philosophy now incorporates the concept of sustainability, a complex concept that requires individuals to make decisions that are based on a balance of perspectives and information. The World Commission on Environment and Development (1987) considered that education is key to this approach, and it has been argued that educating young people with appropriate knowledge and problem-solving skills is critical to today's environment and its future. Today's challenges for environmental education can be addressed through both formal and informal educational systems. Within the formal system, there is debate whether it is more effective to teach environmental education as a separate course or as concepts imbedded in existing courses. Teachers are in a critical position because success of the formal component is strongly dependent on teacher knowledge, awareness and enthusiasm. Within the informal system, it is apparent that schools offer opportunities for non-curriculum related activities. Outdoor experiences and activities link classroom-based learning to the real world, but research has shown that environmental awareness needs to be developed over a long period of time to maximize the benefits of outdoor learning. Standardized testing can present particular challenges for the formal sector

because it causes teachers to concentrate on core subjects to the potential detriment of environmental education.

Given this background, the questions that arise are: what is the approach to environmental education in Ontario? and, what resource support is provided by school boards and the Ministry of Education to assist the teachers?

Chapter Three

The Ontario Elementary Curriculum and Environmental Teaching Resources

3.1 The Curriculum Challenge

Environmental education is a relatively new topic within the Ontario school curriculum. Disinger (2001, 4-5) stated that “teaching about the environment, other than as a set of obstacles to be overcome and used, has not historically received high priority because concern about the environment was not until recently a societal priority.” He noted that environment-related studies were generally limited to straightforward observations of the natural world, and natural phenomena were used to illustrate scientific principles. Today, there is a greater societal concern about the extensiveness of human impacts on the environment, which has led to a greater emphasis on environmental education in K-12 classrooms.

In April 1997, the Independent Commission on Environmental Education (ICEE) of the George C. Marshall Institute released a report (ICEE, 1997) discussing their review of some 100 Kindergarten to Grade 12 environmental education teaching resources. The review covered some of the most widely used and highly recommended environmental education teaching resources used in K-12 classrooms in the United States of America. The ICEE believed it (the Commission) could help teachers understand the strengths and weaknesses in contemporary environmental education resources, while advocating for a greater focus on teachers and their needs.

One of their many findings was that study of the environment is an important subject for grades K-12. Disinger (2001) explained that elementary and secondary schools usually have a disciplinary structure; thus when and if the environment is considered, its multidisciplinary nature means that it is usually considered as an add-on to existing subjects. In practice, environment-related themes and topics appear most frequently in science courses, occasionally in social studies courses, and less frequently elsewhere (ICEE, 1997).

Of particular concern to the Commission was the difficulty teachers might have dealing with environmental education. The ICEE argued that it is an impossible task for teachers with a full class load to evaluate a vast array of environmental education materials. Members of the Commission were aware that the introduction of environmental education into the curriculum can reduce the time available for teaching basic subjects, although they believed that if teaching about the environment is based on rigorous standards, it can be an enhancement to, rather than a diversion from the basics.

Russell and Burton (2000, 287) reported that “in *secondary* schools in Canada, environmental education is rarely infused throughout the highly discipline-based curriculum. The various integrated environmental studies programs operating in a number of Ontario secondary schools, however, offer an alternative approach which bears some promise.” (italics added) The integrated programs take a holistic approach which includes cognitive learning, as well as kinesthetic, affective, and sensory learning. In these programs, four or five subjects are grouped together to make a “package” (e.g.,

Physical Education, Leadership, Environmental Science, Geography, English, or Co-operative education), and students spend the majority of the semester outside.

Russell and Burton noted that at the time of their study, there were only 30 such programs in Ontario and they faced challenges such as: funding cutbacks, a mandate to change from a 5-year to a 4-year secondary system (which has since been implemented), and a “back to basics” curriculum, which they argued leaves less room for environmental concerns to be addressed. They noted that the programs show promise; however, they are limited because most of the programs are not team-taught, so they are limited by the individual teacher’s expertise and comfort level with various subjects. Russell and Burton also indicated that the non-traditional nature of the programs can be a challenge due to the fact that the environmental studies programs can be referred to as “bird courses” (indicating that they are easy/simple), and that some resistance to the programs remains among some teachers and administrators that “scoff at students’ ability to learn content while outside, apparently only having fun” (Russell & Burton, 2000, 300).

Despite its focus on secondary schools, versus the focus in this thesis on elementary schools, the study by Russell and Burton is interesting, particularly because it is a relatively recent study, and it highlights the challenges of environmental education in Ontario. It also sets the understanding of the need to educate *elementary* school students on environmental issues, as a foundation for *secondary* school learning, which can take place in a variety of different settings.

This chapter will examine the challenge of incorporating environmental education within the context of the Ontario *Elementary* Curriculum Guidelines and some of the resources available to support teachers.

3.1.1 A Review of the Ontario Ministry of Education's Curriculum Guidelines: Environmental Education

The elementary curriculum assists students in acquiring basic literacy, a thorough knowledge of basic concepts, broad-based skills, and a firm conceptual base before entering secondary school. At this level, teachers are not required to have specialized teaching subjects and are often responsible for teaching the majority of subjects for a particular grade.

The Ontario Ministry of Education and Training is responsible for the creation of curriculum guidelines that all schools in the province must follow. The Curriculum Guidelines, and the Exemplars (samples of student work) are documents published by the Ontario Ministry of Education and Training, that outline the key expectations that are required for particular subjects, according to each grade. They assist teachers in outlining the key topics that they will teach for each subject area, including detailed expectations of the knowledge and skills that students in each grade are expected to achieve. The Curriculum Guidelines are free, and are accessible both on the Internet, and in hardcopy at Government Resource Centres (i.e., Access Ontario). They are useful to those working in the educational field, and also to parents because they outline the role of parents, the role of teachers, and the role of students.

The Exemplars are available at Government Resource Centres and are most useful to those specifically within the educational field. However, parents can use them to help monitor their children's progress and as a basis for communication with teachers. They are designed to demonstrate examples of students' work, and show samples of students' work for each of the four levels of achievement. They also include a teacher's package (to assist in lesson preparation) and teacher notes. They are free for teachers but cost \$5.50 per exemplar for non-teachers.

The Exemplars are an excellent resource, but the cost may be a deterrent to people outside of the teaching profession. As well, they do not provide examples of students' work for each strand of each grade; however, they provide useful examples of lesson plans and assistance with assessment that could be particularly beneficial to new teachers. Teachers with more experience may wish to use the Exemplars to introduce a new pre-prepared lesson plan.

In this review of the elementary Curriculum Guidelines, with a focus on Grades 4-6 Environmental Education, it was noted that topics related to the environment lie primarily within the subject of Science and Technology, and to a lesser extent, within the subject of Social Studies.

3.1.2 Environmental Education in Grades 1-8 Science and Technology

The document, "Ontario Curriculum: Grades 1-8, Science and Technology, 1998" was created to replace the sections of "The Common Curriculum: Policies and Outcomes, Grades 1-9, 1995" that related to science and technology. One of the features of the new curriculum for Science and Technology is that greater emphasis is placed on the

expectations on relating science and technology to each other and to the world outside the school, and on the need for sustainable development. Attempts are made to stress students' understanding of the concept of sustainability in a variety of contexts. The Curriculum Guidelines (OMET, 1998a, 9) state that:

“Students need to develop the attitudes or ‘habits of mind’ that are considered essential for meaningful work in science and technology. These include: commitment to accuracy, precision, and integrity in observation, experimentation, and reporting; respect for evidence; concern for the observance of safety procedures; and *respect for living things and the environment.*” (italics added)

The Science and Technology curriculum is divided into five strands that represent the major areas of knowledge and skills, including: (1) Life Systems, (2) Matter and Materials, (3) Energy and Control, (4) Structures and Mechanisms, and (5) Earth and Space Systems. The strands which lend themselves well to discussions about the environment include: Life Systems, Energy and Control, and Earth and Space Systems. As shown in Table 3.1, each of the five strands contains one topic for each of Grades 1-8.

The Guidelines provide both “Overall Expectations” and “Specific Expectations” for each of the topics. Within the “Specific Expectations,” achievement is assessed according to four knowledge and skill sets (Table 3.2). With regard to the environment, the first three skill sets assist with students' basic understanding of how the environment functions, methods of inquiry, and how to communicate observations, findings, etc. The fourth skill set which best exhibits links with environmental education is the one which encourages students to relate science and technology to each other and the world outside the school. This requires students to see the links between the human and non-human

Table 3.1: Strands and Topics: Science and Technology, Grades 1-8

Strand	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Life Systems	Characteristics and Needs of Living Things	Growth and Changes in Animals	Growth and Changes in Plants	Habitats and Communities *	Human Organ Systems	Diversity of Living Things *	Interactions Within Ecosystems	Cells, Tissues, Organs and Systems
Matter and Materials	Characteristics of Objects and Properties of Materials	Properties of Liquids and Solids	Magnetic and Charged Materials	Materials that Transmit, Reflect, or Absorb Light or Sound	Properties of and Changes in Matter	Properties of Air and Characteristics of Flight	Pure Substances and Mixtures	Fluids
Energy and Control	Energy in Our Lives	Energy from Wind and Moving Water	Forces and Movement	Light and Sound Energy	Conservation of Energy *	Electricity *	Heat	Optics
Structures and Mechanisms	Everyday Structures	Movement	Stability	Pulleys and Gears	Forces Acting on Structures and Mechanisms	Motion	Structural Strength and Stability	Mechanical Efficiency
Earth and Space Systems	Daily and Seasonal Cycles	Air and Water in the Environment	Soils in the Environment	Rocks, Minerals, and Erosion *	Weather *	Space *	The Earth's Crust	Water Systems
After Ontario Ministry of Education and Training, 1998a, p.8 * Topics that exhibit links with environmental education.								

Table 3.2: OMET's Specific Knowledge/Skill Set Expectations for Science and Technology, Grades 1-8

Knowledge/Skill Set Expectations
<ol style="list-style-type: none"> 1. Understanding of basic concepts 2. Inquiry and design skills (including skills in the safe use of tools, equipment and materials) 3. Communication of required knowledge 4. Relating of science and technology to each other and to the world outside the school (*)

* The Knowledge/Skill set that exhibits the best links with environmental education.

worlds and to think at a deeper, more holistic level about human-environment interactions. This broader understanding is the key to going beyond simply learning a list of facts, and applying knowledge to other situations.

For example, in Grade 5, under the Energy and Control strand, students learn about the conservation of energy. In the section in which students learn to “relate Science and Technology to the World Outside the School” (OMET, 1998a, 63), students are expected to:

- List various sources of energy and identify them as renewable (e.g., sun, wind, tides, wood) or non-renewable (e.g., coal, natural gas, oil);
- Describe the advantages and disadvantages of using renewable energy sources as opposed to non-renewable sources;

- Identify the forms of energy (e.g., mechanical, electrical) used in the home, school, and community and identify the energy source for each (e.g., wood, coal, moving water);
- Describe how we use different natural resources as sources of energy and evaluate the effect of their use on natural and human-made environments (e.g., in using fossil fuels such as natural gas for heating our homes we deplete natural resources but improve our quality of life);
- Explain ways in which technological innovations affect our use of natural resources and increase or decrease our ability to conserve energy (e.g., home insulation allows us to conserve heat and reduce consumption of energy from non-renewable sources);
- Identify factors that determine how effectively and economically a device can transform one form of energy into another (e.g., discuss the advantages and disadvantages of using solar panels for heating);
- Explain how humans rely on energy transfers from a variety of products and systems to survive (e.g., chemical energy from food becomes muscular energy in humans);
- Identify ways humans use energy, evaluate the economic and environmental costs of each, and describe ways to avoid wasting energy (e.g., lowering the thermostat during the night);
- Identify design features that improve the energy efficiency of buildings, devices, and systems (e.g., double glazing).

These expectations make a strong link between humans and the environment, and assist in the development of students' understanding of sustainable development (which had been identified as a key feature of the 1998 version of the curriculum). However, the curriculum is greatly anthropocentric (human-centred), and it is concerning that students at such a young age of development are not being exposed to alternative views (e.g.,

ecocentric, holistic, etc.). An example of the anthropocentric nature of the curriculum is evident in the “Overall Expectations” of the Grade 5 unit on the Conservation of Energy:

“Modern society places large demands on non-renewable sources of energy. It is essential that the energy from these sources be used wisely. In addition, alternative and renewable sources must be developed if we wish to sustain our present standard of living and ensure adequate energy supplies for future generations. Students need to understand the importance of this problem and learn how to conserve energy” (OMET, 1998a, 62).

The first statement concerning society’s demand on energy sources is true, but the Ministry of Education and Training does not clearly state in the second sentence for whom the energy sources should be used wisely. Is it only “future generations” (of humans) that students should be encouraged to conserve energy for? What about the intrinsic value of the environment itself? Should not the value of non-humans be taken into consideration?

The curriculum for the more senior grades becomes increasingly specialized. The Science and Technology components of the curriculum are separated and Science is broken down into four subdisciplines: Biology, Chemistry, Earth and Space Science, and Physics. This study does not focus on environmental education in the senior grades; however, upon reviewing the document titled “The Ontario Curriculum: Grades 9 and 10, Science” (OMET, 1999a) discussions about the human-environment connection are typically raised in Biology, and Earth and Space Science. In “The Ontario Curriculum: Grades 11 and 12, Science” (OMET, 1999b) the Ministry of Education and Training introduces more complicated topics including: Waste Management, Human Impacts on the Environment, and Gardening, Horticulture, Landscaping and Forestry.

In “The Ontario Curriculum: Grade 9 and 10, Technological Education” (OMET, 1999c), there is a variety of courses that touch on aspects of environmental education. For instance, in Grade 10 Health and Personal Services Technology, students are asked to explain the environmental effects of different products. In Grade 10 Hospitality and Tourism Technology, students are asked to explain the challenges of environmental sustainability in ecotourism. In Manufacturing Technology, also a Grade 10 course, students demonstrate understanding of the ecological ramifications of manufacturing.

In Technological Education, environmental education is linked to the curriculum sections which discuss “Impact and Consequences”, more so than the sections on “Theory and Foundation” or “Skills and Process.” This is suitable, so long as the title “Impact and Consequences” does not cause teachers and students to develop pessimistic views and simply consider environmental issues as obstacles that limit development.

Carty (1996, 41, 119) argued that “A major concern for environmental education is, if environmental messages are repeatedly imbedding notices of risk to health, society and nature as a whole, we may learn to become uninterested. People tire quickly of repeated predictions of doom and tend to ignore information. Learning negative facts about the environment also leads to panic and threat.” Kelly (1977) argued that repeated negative imagery in environmental discussions can lead to uninterested attitudes, and re-occurring environmental discussions may be dismissed as “just another environmental crisis.”

Thus, it is important that courses which include discussions on the environment present a balanced view with both optimistic and pessimistic perspectives. Optimistic points of view can include the benefits of a healthy environment, hope, and cooperation.

By learning to appreciate the environment, value it, and make decisions that include it, we may be better able to reduce discussions on the *impacts* and *consequences* of society on the environment.

3.1.3 Environmental Education in Grades 1-6 Social Studies

The document, “Ontario Curriculum: Social Studies: Grades 1 to 6, History and Geography: Grades 7 and 8, 1998” (OMET, 1998b) was created to replace the sections of “The Common Curriculum: Policies and Outcomes, Grades 1-9, 1995” (OME, 1995) that related to Social Studies, History and Geography. The 1998 curriculum features some significant differences, including greater emphasis on relating Social Studies, History, and Geography to the world outside the classroom, and a focus on the need for responsible citizenship. These are important new features as they match key characteristics of environmental education including its interdisciplinary nature and its encouragement of students to become knowledgeable.

As was the case in the Science curriculum, the Social Studies Curriculum Guidelines (OMET, 1998b, 7) make a statement regarding attitudes in Social Studies, History and Geography:

“Students need to develop the attitudes or ‘habits of mind’ that are considered essential for the development of responsible citizenship in a complex society characterized by rapid technological, economic, political and social change. These include positive attitudes about learning; respect, tolerance, and understanding with regard to individuals, groups, and cultures in the global community; *respect and responsibility for the environment*; and an understanding and appreciation of the rights, privileges, and responsibilities of citizenship.” (italics added)

The Social Studies curriculum is divided into two strands: (1) Heritage and Citizenship, and (2) Canada and the World Connections. As with the Science and Technology curriculum discussed in Section 3.1.2, one topic within each of the strands is taught in Grades 1-6 (Table 3.3).

Table 3.3: Strands and Topics: Social Studies, Grades 1-6

Strand	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Heritage and Citizenship	Relationships, Rules, and Responsibilities	Traditions and Celebrations	Pioneer Life	Medieval Times	Early Civilizations	Aboriginal Peoples and European Explorers
Canada and World Connections	The Local Community	Features of Communities Around the World	Urban and Rural Communities	The Provinces and Territories of Canada	Aspects of Government in Canada	Canada and its Trading Partners
After Ontario Ministry of Education and Training, 1998b, p.6						

There are both “Overall Expectations” and “Specific Expectations” listed in the curriculum for each of the topics. Within the “Specific Expectations,” achievement is assessed according to four knowledge and skill sets (Table 3.4), that differ slightly from those in the Science curriculum (Table 3.2). The skill set which best exhibits links with environmental education is the “Application of Concepts and Skills in Various Concepts.”

Table 3.4: OMET's Specific Knowledge/Skill Set Expectations for Social Studies, Grades 1-8

Knowledge/Skill Set Expectations
<ol style="list-style-type: none"> 1. Understanding of concepts 2. Inquiry/research skills, and map and globe skills 3. Communication of required knowledge 4. Application of concepts and skills (*)

* The Knowledge/Skill set that exhibits the best links with environmental education.

In the Social Studies curriculum, some of the aspects of environmental education include:

- the use of maps, globes, and models;
- learning about different landscapes and how they have changed over time;
- understanding different uses of the environment;
- developing skills of inquiry and communication through field studies and other research projects; and
- understanding communities from the local to the global.

Some examples of expectations relating to environmental education in the Grades 4-6 portion of the Social Studies Curriculum Guidelines include:

- compare environmental causes of pollution in medieval times and today;
- describe the relationship between Aboriginal peoples and their environment (e.g., with respect to food, shelter, cultural practices);

- locate relevant information (e.g., on how environmental factors affected the ways basic needs were met in early civilizations) from a variety of sources;
- locate and label provinces, territories, and capital cities within each region on a map of Canada;
- identify Ontario's major natural resources and their uses;
- investigate a cause-and-effect relationship between the environment and the economy in a province or territory (e.g., over-fishing on the Grand Banks).

Social Studies in Grades 1-6 seeks to “examine and understand communities, from the local to the global, their various heritages, and the nature of citizenship within them” (OMET, 1998b, 2) The Social Studies component of the curriculum is completed at the end of Grade 6, and students must apply this knowledge of basic concepts in subsequent more specialized courses.

In Grades 7 and 8, students take History and Geography. The topics covered in each of these courses are provided in Table 3.5. “History involves the examination of individuals and unique events, as well as of groups, movements, institutions, nations, and eras” (OMET, 1998b, 2). It includes discussions about the environment to a certain degree, but in its social sense, environmental education is concentrated in Grades 7 and 8 Geography.

“Geography is the study of place. It examines the earth's physical systems and the people in them. It also investigates how people and environments affect each other. Geography students learn to gather, organize, analyse, and present information obtained from fieldwork, models, simulations, aerial photographs, satellite imaging, maps, and computers. They learn to apply a conceptual framework of location/place, environment, region, interaction, and movement. By integrating various aspects of place, the

study of geography provides students with a unique opportunity to learn about the world around them” (OMET, 1998b, 3).

In the more senior grades, environmental education continues to be evident in courses such as Geography and History, and becomes increasingly specialized into topics such as: “Environment and Resource Management”, “World Geography: Urban Patterns and Interactions”, and “Environment and Resource Management”.

Table 3.5: Topics in History and Geography, Grades 7 and 8

Subject	Grade 7	Grade 8
History	New France British North America Conflict and Change	Confederation The Development of Western Canada Canada: A Changing Society
Geography	The Themes of Geographic Inquiry Patterns in Physical Geography Natural Resources	Patterns in Human Geography Economic Systems Migration
After Ontario Ministry of Education and Training, 1998b, p.6		

3.1.4 Discussion of the Ontario Curriculum with Reference to Environmental Education

The Curriculum Guidelines are extensive and this can be seen as both an advantage in that the details help explain exactly what is expected, and as a disadvantage as the curriculum may be so full that it could overwhelm teachers and put pressure on them to rush their teaching in order to complete the curriculum by the end of the school year. In such a case, it may reduce the amount of time for “deep thinking” and

innovative teaching strategies (e.g., teaching outdoors) that are important in the development of young minds.

As well, the wording in the Curriculum is ambiguous at times. For instance, in the Social Studies curriculum, one of the expectations is to “compare maps of early civilizations with modern maps of the same area” (OMET, 1998b, 24). One may ask: For what purpose? Is the intention to use a map of early civilizations produced then, or now? Do teachers have access to such map resources? This is unfortunate as it can lend itself to varying interpretations, which decreases the consistency in the teaching of portions of the curriculum.

The words “environmental education” are not mentioned anywhere in the Ontario Ministry of Education’s elementary curriculum guidelines; rather, reference to the environment is subtle and inferred. Due to the fact that the curriculum is quite full, it would be unrealistic to suggest adding a course dedicated to environmental education. The existing strategy of structuring environmental education in a more holistic manner is beneficial because by including environmental education within a variety of subjects, it can act as a natural bridge for many discussions.

However, further attempts should be made, within the formal sector, to link environmental education to subjects other than Science and Technology, and Social Studies. A way in which this could be done is by introducing more environmental topics/reading material into the language portion of the curriculum. Literature studies that lead to discussions on human-environment relations could serve as a practical means of integrating subjects. As well, the environment can be a subject of art classes, and

environmental data can be included in math lessons (e.g., graphing data from waste audits).

It is not expected that environmental education be infused into the curriculum to such an extent that it detracts from other aspects of teaching and learning. However, this infusion should include other subjects of the curriculum than just Science and Technology, and Social Studies, and this is something that the Ontario Ministry of Education and Training should address before making their next curriculum publication.

“If one concurs with Madeline Grumet’s definition of curriculum as ‘the collective story we tell our children about our past, our present and our future’ (Grumet, 1981, 115), then it is high time we begin to critically reflect on the stories we have told ourselves about our relationships with nature and the relative importance of these stories to our educational theory and practice. We must bring environmental education to the forefront, out of the depths of the hidden curriculum.” (Russell, 1997, 39)

Unfortunately, the Curriculum Guidelines and the Exemplars do not provide teachers with enough information for lesson planning, preparation and presentation, and teachers need to consult additional resources. Unfortunately, the Curriculum Guidelines do not include a list of reviewed, recommended resources that teachers could consult. Such a list could prove to be extremely useful for teachers as it could reduce the time they spend researching topics, help reduce the teaching of inaccurate and/or inappropriate information, and provide some consistency in the teaching materials used across the province. The use of such resources need not be mandatory, but could provide assistance to teachers beyond what the Curriculum Guidelines and Exemplars can provide. The operation of teacher resource centres that house such materials would help ensure that teachers have access to reviewed resources.

3.2 Reviewed, Recommended Resources: British Columbia and Manitoba

It is helpful if School Boards and/or a Province's Ministry of Education provides teachers with a list of reviewed resources (e.g., text books, videos, etc.) that can assist teachers in their lesson planning, preparation, and presentation. The purpose of this thesis is not to focus on educational standards in every province in Canada, but the approaches of British Columbia's and Manitoba's Ministries of Education have been reviewed here to note useful teaching support strategies. Such approaches, based on reviewed, recommended resources could be useful for teachers in Ontario (further discussed in the analysis of teacher interviews).

The Ministry of Education in British Columbia provides curriculum guidelines ("Integrated Resource Packages"/IRPs) to teachers, and in this document, teachers can consult the: (1) prescribed learning outcomes, (2) recommended learning *resources*, and (3) suggested *instructional strategies*. The list of learning resources includes: books, CD ROMs, videos, and software. They are organized according to grade level, the year the resource was recommended, and the publisher, along with a brief description of the resource. The Ministry also includes appendices that give suggestions to teachers on how they should select learning resources for the classroom, and on how to make cross-curricular links.

A telephone interview with an elementary school Principal in British Columbia (October 2003) confirmed that teachers there have access to such documents, and often use the *suggested* resources when initially developing lesson plans, for general reference, and as a base resource which they can augment with additional resources. He noted that

“...it encourages consistency in the teaching of subjects, outlines specific criteria for teaching resources, and develops a process for the evaluation of resources, which helps reduce the teaching of inaccurate and/or inappropriate information.”

Manitoba’s Ministry of Education also has a process for reviewing learning resources. Manitoba’s Education and Youth (Program and Policy Services Unit) evaluates and selects learning resources that are listed in the Manitoba Text Book Bureau Catalogue using “...curriculum fit, instructional design, technical design and social considerations evaluation instruments under the review process outlined in the Evaluation Guide for Learning Resources, March 2002” (Government of Manitoba, 2002). Teachers from Manitoba schools examine publishers’ submissions, evaluate learning resources and make recommendations regarding the suitability of resources.

This brief review provides evidence that both British Columbia and Manitoba are providing more teacher resources for environmental education than is evident in the Ontario school boards that cooperated with this study.

3.3 The Advantage of Teacher Resource Centres and the Challenge of Closures

Some school boards maintain teacher resource centres which can assist in the delivery of the school curriculum. A resource centre is essentially a board-wide library which may contain print, audio/visual and other resources for professional and/or classroom utilization. By maintaining a shared board-wide resource collection, it ensures an effective and efficient use of time, space, and finances (avoids duplicated resource purchases).

Learning resource centres, with their wide range of learning resources, exist to enable teachers to expand learning opportunities beyond the classroom, and to provide the teachers with professional support in developing their lesson plans. The resource centre staff acquire the resources that meet the needs of students, staff, and the curriculum, and maintain a collection that can be shared by teachers throughout the school board. They are often trained in resource-based teaching and learning and can assist in supplying teachers with innovative teaching material that can reduce the time teachers spend researching teaching material, and in turn, it assists them in directing that time and energy towards other aspects of their teaching. Through cooperative planning with the resource centre staff, the teacher can meet the need of a wide range of diverse abilities, interests, and needs among students, while ensuring that there is a uniform integration of resource-based learning throughout the school board.

Some teacher resource centres encourage teachers to visit the centre, review what material is available, select the material which suits their need(s), and arrange for the material to be couriered to the appropriate school for a suitable date. Other resource centres may prefer that teachers order appropriate material by: telephone, fax, and/or email and then have the material couriered. In many cases, the resource centre staff encourage the teachers to supply them with the teaching topic (e.g., energy conservation), and the staff will do the research for them. The staff will collect all of the material that they have that is suitable, evaluate it according to its usefulness, appropriateness, reading level, etc. and courier the resources to the teacher.

3.3.1 Example of a Resource Centre in British Columbia

During the telephone conversation (October 2003) with the British Columbia elementary school principal, it was discovered that access to the materials recommended in the IRPs has been restricted by the recent closure of their Resource Centre. The closure, due to British Columbia government budgetary cutbacks, has led to the situation whereby individual schools must incur the responsibility of developing their own set of resources at their own cost. The closing of the Resource Centre might be considered to be a short-sighted decision, in both the educational and the budgetary contexts as each school must now purchase its own resources.

The closing of the Resource Centre has increased the costs of photocopying, has forced school staff to become more aware of copyright issues, and not all classrooms have full-sets of textbooks, due to financial restrictions. The development of a wide-ranging set of school resources, including a well-equipped school library is viewed as a priority given that out-of-school resources (i.e., fieldtrips) are becoming increasingly expensive (e.g., school bus costs) and are introducing new challenges (i.e., relying on parent drivers, issues of liability, parents not wanting to sign waiver forms, etc.). As well, unfortunately, some resources are not needed for long periods of time (e.g., videos), and the sharing of resources had been beneficial in such cases.

3.3.2 Resource Centre Access: for the School Boards Cooperating in this Study

3.3.2.1 Catholic School Board

The Catholic School Board operates its own Teacher Resource Centre to service over 50 schools (specific number not stated to ensure anonymity). Prior to the closure of a Regional Media Centre (used by both the Public and Catholic School Boards), the Catholic Board teachers had access to both resource centres. The Catholic Board's Resource Centre is the centralized resource and teachers may visit the Centre and/or order material by telephone, fax and email. The Resource Centre staff will research topics for teachers and will courier the resources to teachers every other day.

During my visit to the Teacher Resource Centre (February 2004), the Manager/Library Services Advisor provided a background on the resource centre, and guidance on how teachers can access the resources. She noted that she had worked at the Centre for 16 years and estimated that it had been open for approximately 25 years.

The Centre offers meeting rooms, a computer lab, tutorial training sessions, laminating services, and a central curriculum support library for the staff of the Board. The curriculum support library is automated (computer database) and consists of approximately 15,000 resources including: multi-media materials (videos, DVDs, cassettes), literature studies (which help integrate subjects (e.g. Literature with Science)), and books. Resources can be borrowed for one month, with a maximum of 25 books/month, and 10 videos/month. The Resource Centre no longer uses films, and has been purchasing DVDs increasingly rather than VHS video tapes. Until the closure of the Regional Media Centre, the Teacher Resource Centre collection primarily consisted of

Kindergarten-Grade 6 programs in English and French. The Teacher Resource Centre is now trying to build up their inventory of resources for the more senior grades (Grade 7-12), as well as to increase French resources, which are currently minimal.

The meeting rooms are equipped with pull-down screens, overhead projectors, flip charts, televisions and VCRs, and are often used for workshops on Professional Development days. The computer lab in which training of teaching and non-teaching staff members occurs is supported by the Administrative Division of the Information Technology Department. Book binding and laminating services are available to all staff members and can be booked by calling the Centre (with a cost recovery fee).

When various environmental key word searches were entered into the resource database it became evident that the Centre houses a considerable number of resources related to Environmental Education (Table 3.6). The key word searches that were chosen were topics that are raised in the Grade 4-6 curriculum. Teachers who are seeking resources should definitely take advantage of the resources at the Centre as they can augment existing lesson plans and school library resources, as well as provide teachers with access to reviewed resources. The environmental resources may be particularly useful to teachers with little environmental background and to teachers who need assistance in teaching the environmental components of the curriculum (particularly in Science).

Table 3.6: Database Search at the Catholic School Board's Teacher Resource Centre

Key Word Search	Number of Resources
"environment"	111
"energy"	155
"energy conservation"	11
"pollution"	74
"endangered species"	74

A concern is that teachers may not be aware of the Resource Centre and the vast amount of resources and services offered by the Resource Centre staff. However, the Manager/Library Services Advisor noted that "...of the 15,000 resources in their collection, approximately 6,000-9,000 are borrowed monthly; a good borrowing rate. A reason why it might not be higher is that those teachers who borrow resource material frequently may not spread the word of the usefulness of the Resource Centre because they do not want to risk not having access to the resources that they typically use, when they need them!" The staff at the Centre rely greatly on communication with school administrators, and with school librarians to encourage teachers to make use of the Centre. A suggestion to increase teacher awareness of the Catholic School Board's Teacher Resource Centre is to post notices that advertise the Resource Centre on school bulletin boards (e.g., in school libraries), explaining its vast collection of resources and the service of providing research assistance to teachers.

To ensure that the Teacher Resource Centre stays in operation, the staff aim to keep operating costs low, and make themselves available to teachers before and after school hours (including one evening until 7pm). The Centre staff recommend that school principals encourage new teachers to visit the Teacher Resource Centre and become familiar with the resources and services. The Centre is also open during the summer, at which time the staff often assist teachers in planning which resources they will use for the coming school year, and reserve them to ensure they will be available when needed.

During the summer, the Resource Centre staff check all books, cassette tapes, and videos for damage, conduct an inventory, and order new and/or replacement resources. As a means of reducing costs, the Centre has volunteers who read books onto cassette tapes. The Centre keeps a master copy, and sends the copied versions to teachers who request auditory support for resources. By producing the cassettes themselves, the Centre is able to have the copyright of the cassette and can reproduce it themselves (with the master copy). The Centre operates with a small staff (3) in an additional effort to keep costs low. The Manager/Library Services Advisor noted (February 2004) that she has "...found that the Board is very supportive of the Centre and provides them with a good budget. Thankfully, there has been no discussion of closure."

The Teacher Resource Centre provides a valuable source of information to teachers, as well as a service (assistance with research) that greatly assists teachers with time management and lesson plan development. They currently have a considerable amount of resources related to the environment in the elementary grades; however, they should continue developing their collection of resources for the more senior grades where students require resources with more in-depth literature and varying viewpoints.

The meeting rooms also play an important role as they provide a location for board-wide meetings and in-service training for teachers on professional development days. This space should be used to its full advantage at other times as well, to ensure that the space is not deemed unnecessary. As well, it is highly recommended that a sign be posted on the outside of the building (e.g., “Teacher Resource Centre”), as there is currently no such signage, and it limits people’s/teachers’ awareness of the Centre. If the public is made more aware of it, through signage, they are likely to feel optimistic about the strength of the education system, and may be willing to rally support in the time of cut-backs. Support for resource centres such as this should be encouraged to avoid the challenges associated with a lack of a resources, and help teachers direct time and energy to other issues that raise educational challenges.

3.3.2.2 Public School Board

In my review of an Ontario Public School Board and a Catholic School Board, teachers had access to a Regional Media Centre until the Summer of 2003, when it was closed due to budgetary cuts. It had housed resources such as videos and literature studies, and primarily provided teaching material to teachers in Kindergarten to Grade 6. Originally, teachers could visit the Media Centre; however, during the final stages of its operation, the services were limited to borrowing resources via phone, email, or fax.

During its operation, both school boards provided the funding for the Media Centre. Thus, upon its closure, the Catholic Board retrieved some of the resources that it had directed funding towards, and now houses those resources in its own Teacher Resource Centre. The remaining resources from the Regional Media Centre are still

being stored. During a discussion (February 2004) with the Manager/Library Services Advisor of the Catholic Board's Teacher Resource Centre it was noted that "there has been word of the Public Board opening a resource centre, but nothing has been confirmed as of yet." The Manager also recommended that "if the Public Board is thinking of re-opening a resource centre, they had better do it quickly, before the resources become out-of-date, and are no longer of use."

3.4 Board Strategies for the Inclusion of Environmental Education

Although the Ontario elementary curriculum does not specifically make reference to Environmental Education, the two school boards in the study have made attempts to include environmental education, through two different strategies.

3.4.1 Catholic School Board

The Catholic School Board has included environmental education in its schools by (1) making an official Board policy on environmental education, and (2) creating an Environmental Action Committee that is to assist all School Board employees in implementing the Board's environmental philosophy and policies.

3.4.1.1 Policy on Environmental Education

In August of 2001, the Catholic School Board approved a policy on environmental education, which stated that:

1. Environmental issues, concerns and solutions shall be integrated into the curriculum of a variety of subjects in all grade levels.
2. Instruction in environmental education shall be realistic, age appropriate, respect the principles of student development and be oriented to positive and attainable action.
3. The Board shall encourage a program of education for teachers and pupils that reflects attitudes and practices that are respectful of all life and the environment.
4. The Board shall consider environmental issues and concerns in developing its purchasing, building, educational and maintenance programs.

The Administrative procedures of the Board's environmental education policy state that:

1. Superintendents responsible for educational programs will reflect this policy in their annual plans/budget.
 - a) Organize an Environmental Action Committee which will consist of superintendents, principals, coordinators, teachers, and a representative from the Facilities Department.
 - b) The role of the Committee will be to coordinate the Board's environmental activities, share information/resources and provide in-service sessions for school representatives.
2. Managers responsible for purchasing, building and maintenance programs will reflect this policy in their programs/budget.
3. Principals will support staff in their endeavours to implement environmental action at the school level.

The policy includes many key aspects that are fundamental to an effective environmental education program, such as: *integration* of environmental issues into the curriculum of a *variety of subjects*, the development of an environmental *knowledge* base, and an *attitude* of respect, that are oriented to *action*. The creation of the Environmental Action Committee was a wise decision; however, they may wish to include other people (e.g., students, parents) on the Committee to ensure that the policy truly has an integrative approach and includes the thoughts of all stakeholders, particularly those that the policy is directed towards. The policy states that the Environmental Committee will be responsible for coordinating activities, sharing information/resources, and providing in-service sessions; however, it does not state how this will be supported or implemented.

Will funding be provided for such initiatives (i.e., workshops, purchasing or creation of resources)? Will they assist in the development of lesson plans to make integration of environmental education into the curriculum possible? Unless support is provided to teachers, by way of environmental resources (i.e., texts, videos) and pre-prepared lesson plans (i.e., ways of integrating environmental topics into the existing curriculum), the success of the Environmental Education policy goals will be hindered.

The introduction and implementation of an environmental education program must not be seen as a hassle for teachers or as something that disrupts their lesson preparation and teaching schedule, otherwise environmental education initiatives may not be adopted by all teachers, and it may only be integrated into informal activities around the school, rather than being included in the formal curriculum, as promised in the Environmental Education Policy. To create an atmosphere of environmental care, it is important that both formal and informal aspects of the school demonstrate respect for the environment, otherwise, environmental initiatives will simply be seen as something “extra”, and/or “out-of-the-ordinary” that are done occasionally, rather than being included as a fundamental aspect of the school culture.

Palmer and Neal (1994) have argued that the inclusion of environmental education should not be episodic, and it should not be seen by teachers or students as something unusual (i.e., similar to an annual sports day, school recital, etc.). If environmental topics are grouped together into a unit and set aside for a particular part of the year, there is the risk that it may be interpreted as a ‘treat’ and not given full academic rigour. There is no need for environmental education to be seen simply as something that is extra-curricular, a game, or a competition, and those responsible for the environmental component (both

formal and informal) need to accommodate the interdisciplinary, on-going teachings of environmental education.

3.4.1.2 Environmental Action Committee

The role of the Environmental Action Committee is to assist all Board employees in implementing the Board's environmental philosophy and policies. The Committee accomplishes this through information sharing, topic-specific workshops and making resources available to schools. It also holds meetings throughout the year, plans workshops that focus on environmental issues that are determined to be suitable to the needs of schools, and posts information on current events on the Environmental Action forum portion of the First Class online bulletin board that can be accessed by all employees.

The Committee maintains a website and provides information on: the Committee, what it offers, what is new in the schools, a list of environmental resources (guest speakers and sources of environmental information), as well as information on waste management and their awards program. Although portions of the site are in need of updating (e.g., "by the year 2000..."), the website provides a means for teachers to easily gain access to information on the Committee. However, the website does not provide teachers with much other than a list of resources and important dates (Earth Day, Earth Week, Education Week), and waste audit summary sheets. The list of resources (guest speakers and sources of environmental information) could prove to be useful if teachers are in fact aware of it.

Perhaps the most interesting initiative put forth by the Catholic Board's Environmental Action Committee is the "Environmental Awards Program" which inspires students to take part in informal environmental education activities around their school, and be recognized for their work if they are able to meet certain criteria. It is particularly advantageous because it encourages students to take action, can be extremely rewarding, builds school pride, and helps students see the differences their efforts can make on different scales (e.g., within their own school and school grounds, local community, etc.), while developing concern for the environment. In order to be a recipient of the Environmental Award, a school must prove (with photographs, press clippings, and a letter from the school principal) that it has completed a minimum of ten of the following criteria:

1. Organized a school environmental fair/environmental awareness program.
2. Obtained external funding for one or more environmental projects.
3. Developed and implemented an on-going litterless lunch program.
4. Went beyond mandated 3 R's legislation to explore opportunities for recycling (e.g., composting, recycling clothing, recycling plastics, etc.).
5. Undertook a school ground naturalization project.
6. Operated a school environment club for at least six months.
7. Increased environmental appreciation through an outdoor activity in each class.
8. Developed and revised a school code of environmental ethics.
9. Supported a developing nation or community-in-need project.
10. Sponsored a professional development activity to develop environmental literacy of staff.
11. Completed another school activity to foster environmental education.
12. Conducted a solid waste audit.
13. Developed and implemented an on-going energy conservation program.
14. Adopted a conservation area or parkland as a site for outdoor education and environmental activities involving the Board's curriculum objectives.
15. Developed a significant environmental activity with one other school or community group.

The Environmental Award is an excellent way of promoting a positive environmental ethic among staff, students and families within the Catholic School Board. However, the criteria are quite demanding and require a lot of work to be done within one school year. There is no mention of the support that will be given to students regarding teacher guidance and support in undertaking each of the tasks. If success of the initiative depends on teachers who are interested, and who will volunteer their time to supervise, and/or organize an extra-curricular Environment Club, support for environmental education could vary significantly among schools. It is important that the teachers feel that they are appreciated because “experience has shown, almost invariably, that staff members will take on extra tasks if they are seen to be realistic and valuable. Rejection will come only if the demand for change is too fast and too unrealistic” (Palmer & Neal, 1994).

On its website, the Committee states that “by law in Ontario, all schools with an enrolment of 350 students or more must complete yearly waste audits and waste reduction plans.” They recommend waste audits as an educational opportunity for staff and students to meet the Ontario Ministry of Education’s learning expectations for Mathematics in Grade 5 (Data Management and Probability). Although part of their motivation for doing the audits may be to comply with Ontario laws, it is interesting to note that they have recognized the opportunity to integrate the environmental audits with Math lessons, rather than the typical inclusion of environmental issues in Science lessons.

Although the Environmental Education Policy states that “environmental issues, concerns and solutions shall be integrated into the curriculum of a variety of subjects in all grade levels,” it appears that little has been done to assist teachers in implementing

environmental education with formal education at schools, and the focus of efforts to include the environment have been through informal activities around the schools. The risk of not developing the formal aspects of environmental education and stressing the informal aspects is that students may take part in activities without being fully knowledgeable about an issue, and may not have learned the necessary information to make a decision on an issue/activity.

It is feared that such a situation could be what Sanera (1998) referred to as having good intentions (promise), but limited follow-through towards Environmental Education Policy goals (performance). Fortunately, the Catholic Board has supported other ventures, such as the Teacher Resource Centre, that can assist teachers in lesson planning, preparation, and presentation, given that the assistance of pre-prepared lessons that incorporate environmental issues and/or a partnership with an environmental education program are not services provided by the Board. The Board, its employees and students should be commended for their efforts to include environmental education through informal means; however, more support should be given to assist in the incorporation of environmental education in the formal sector.

3.4.2 Public School Board

The Public School Board has made efforts to include environmental education in its schools through two different approaches: (1) the recent launch of an environmental education partnership with a program that is the academic renewal component of the “Better Schools Partnership” and (2) support for two outdoor education schools.

3.4.2.1 Launch of Environmental Education Partnership

The Public Board has made attempts to include environmental education in the formal sector by aligning itself with environmental education programs. One of its attempts was the launch of an “enviro-science curriculum” on May 11, 2001. In October 2003, the Board launched a new environmental education program through the “Better Schools Partnership” (BSP) with Ameresco Canada. The BSP was founded by Ameresco Canada, a private energy-solutions company established thirty years ago. The Public School Board states that the BSP is “an innovative initiative that has allowed this district and others across Canada to fund essential school renewal programs through energy savings. Through the BSP, schools and its strategic partnership with energy company Ameresco Canada, the school board has been successful in reducing waste and operating costs.” The resulting lower utility bills have allowed the school district to invest the cost savings into school upgrades such as energy efficient heating and lighting, as well as new environmental education programs.

To maintain confidentiality of the school board, in this instance, it is necessary to identify their environmental education program by a fictitious name, which is here designated as “Project X”. Project X has been adopted by the Public School Board, and other boards in Ontario are in the process of acquiring the program. The Project Coordinator for Project X stated that (March 2004) it is currently not mandatory for schools to take part in Project X. However even without an “expectation” or “mandate”, approximately 90% of elementary schools and 80% of high schools are participating. She provided an example of the energy savings created through the Project: there are 26,000 computers in the schools and, if turned off when not needed, they would save \$60 per

computer per year (totaling roughly \$1.5 million). The Project Co-ordinator believes that the Program will create savings of \$1 million for the Public Board this year.

In the development of Project X, teachers, students, custodians, senior management, and principals identified three key requirements of a potential environmental education program: (1) the program must be tied to the Ontario curriculum, (2) the program should not be an add-on to the already busy day and workload, and (3) there should be no additional cost. The requirements were taken seriously and were included in the creation of the program.

Project X is an activity-based, curriculum-aligned program that focuses on energy conservation, waste reduction, and water conservation. "The purpose of the program is to empower students to become environmental stewards at their school, and to put their conservation practices to work in their community including furniture recycling, CD and other re-usable goods trading posts, yard clean-up and many other environmental initiatives." Project X requires schools to create their own "team" comprising students, teachers, parents, custodians and administrative staff. Each team receives training and is supported by a "catalyst" who is a secondary school student who receives training through Project X and is eligible for cooperative education credits or credit towards their required 40 hours of volunteer service. The "catalyst" is paired with their "feeder" elementary school. The teams are organized into groups of 20-25 schools and an "executive team" is created to monitor and assist in the organization and implementation of the program. As well, the chief building operators receive training, and the school board receives support in terms of materials and training.

Project X includes both informal and *formal* environmental initiatives. Project X has created approximately 54 lessons for teachers to incorporate into their teaching. Each lesson identifies a theme (e.g., energy, water, waste), the curriculum expectations, necessary background information, the accountability for students, teacher notes, and a comment section for teachers to provide feedback on how the lesson could be altered or improved. The lessons:

- are aligned with the Ontario Curriculum expectations;
- focus on the Project X themes of water, waste and electricity;
- are cross-curricular;
- are grade-specific (Table 3.7);
- are linked to lesson-specific expectations;
- involve stakeholders;
- have a home, school, or community-based extension; and
- provide continuity across grade levels, and potentially into future generations, to help develop environmental stewardship by embedding lessons in the curriculum delivery of a particular subject.

The Project X website is useful to teachers and students and provides information on: the Project X pledge, school audits, energy tips, the ozone layer, Kyoto initiatives, climate facts, as well as games and trivia.

Table 3.7: Project X Index of Lessons for Grades 4-6

Theme	Grade 4	Grade 5	Grade 6
Energy	Light Detective	Conservation of Energy	Battery Power
Energy	Sound Busters	Solar Power	Simple Circuits
Waste	Environmental Checklists	New Food Products	Once More with Feeling
Waste	School Garden	Trash Attacks	Recycled Paper
Water	Wild Waters Downtown	Wat-er We Good For?	Appearances are Deceiving

Project X is still in its initial stages and training workshops are currently taking place; thus, it is not appropriate to evaluate the success of the program at this time. However, it exhibits key characteristics of environmental education programs (integrated approach, activity-based, and knowledge-attitudes-skills development) and shows signs for significant potential. The fact that it includes both formal and informal educational aspects is promising as it allows students to learn about topics through their classroom lessons, and then apply their knowledge/decision-making skills by taking part in a related informal environmental activity. As well, the potential of the program is spurred by its practical, well-organized structure that links it with the curriculum, and its cost-saving nature.

Areas of concern lie on the level of support given to the “Project X catalysts” who are partnered with younger students. Given the structure of the Project, the success of the

environmental education program in the elementary schools is highly dependent on the commitment of the “catalysts”, who may find it increasingly difficult to find spare time in their senior years of high school. As well, it is essential that teachers are aware of the existence of the pre-prepared environmental lessons if the program is to be incorporated effectively into the formal sector of the schools (continued use of the Board’s Project X website would be useful).

It is hoped that when Project X is in full operation, it will follow through with its initial promise that stated that it should not be an add-on to the already busy day and workload, as this could prove to be a significant challenge to its success. As well, continued motivation, support, inspiration, and enthusiasm for the project are necessary to keep Project X in operation, particularly given the short life of its predecessor. Project X shows promise of a longer life because it has incorporated lesson plan support for teachers. This is a key aspect because teachers may be seeking resources that can strengthen environmental education in the classroom.

Project X is a particularly innovative strategy that the Public Board has initiated. The Board appears to have taken a leadership role by separating itself from other Boards that have put sole emphasis on informal initiatives. Support for the formal aspects of environmental learning is critical, as a successful environmental program must include both formal and informal initiatives in order to fully develop students’ environmental knowledge, skills, attitudes and behaviour.

3.4.2.2 Creation of Two Outdoor Education Schools

Inclusion of environmental education throughout *all* schools in the Public Board has been gradual and sporadic; however, the Board (and its predecessor Boards before provincially mandated amalgamation in 1998) has supported two schools that have been devoted to outdoor education, for many years. To ensure confidentiality, the two schools will be referred to as Outdoor Education Centre A and Outdoor Education Centre B. The programs offered at the Centres are designed to:

- complement and extend the Ontario curriculum;
- immerse participants in nature's outdoor classroom through direct experience;
- promote an appreciation and understanding of basic ecological processes;
- nurture understanding, respect and appreciation for self and others; and
- stress the basic attitudes necessary for safe, progressive outdoor experiences throughout all seasons.

Both sites host three examples of ecosystems that are useful for environmental education purposes: wetlands, forests, and open agricultural fields/meadows. The two Centres also offer interested Public School Board staff in-house training and resources through workshops and training sessions. Instructors from the Centres have made on-site visits to schools and staff development programs. As well, the Centres have hosted international students and teachers, and student teachers from colleges and universities. These people have assisted in the development and delivery of programs. Community involvement has included co-operative education students from local high schools who have worked as visiting staff at the Centres and learned about the field of environmental education.

Outdoor Education Centre A:

Outdoor Education Centre A, opened in 1966, provides agricultural, natural science, and environmental education programs. The programs at Centre A have evolved to include curriculum-based, experiential learning in Science, Geography, History, and outdoor skills, and it has made itself open to other boards, schools, community groups, and members of the public.

The Centre has a pioneer village on site with an inn, a schoolhouse from the 1870s, a log house, sleeping cabins, a sugar shanty, stables, a field centre, and an outdoor classroom, which lend themselves well to curriculum based lessons (e.g., Canadian History on life in early Canada). Ecology-based programs include examples such as: “Into the Woods”, “Predator/Prey”, “Wetland Studies”, and “Soil Studies.”

User fees were introduced in 1996, and the Centre has increased the use of the facilities during its off-hours to assist in cost-recovery efforts. Community adult and family programs include: birding, cross-country skiing, canoeing, survival skills, astronomy, orienteering, furniture making, and snowshoeing.

Outdoor Education Centre B:

Outdoor Education Centre B, opened in 1988, hosts: two shelters, an outdoor classroom, a large sports field, two indoor classrooms, and an adventure gym (with a climbing wall and both high and low-rope components). Direct support of classroom studies has been a focus at Centre B. Ecology-based programs include examples such as: “Wonder of Wetlands”, “Soil and Forest”, “Leaves and Seeds”, “Animal Studies”, and “Winter Ecology” (which includes snowshoeing and cross country skiing).

User fees were introduced at Centre B after the amalgamation of the two school boards in 1998. The introduction of fees had a short-term negative effect on the number of classes attending; a change from past years when the programs were free to students and there was a wait list (e.g., in 1993-1994, 11,000 students participated in programs and there was a wait list of 4,300 students).

Discussion

Centre A and Centre B provide unique outdoor experiences for students, School Board employees, community groups and members of the public, and it is critical that these experiences are not lost. The fun and the inspiring lessons learned at the Centres can assist in the development of knowledge, skills, and attitudes that are fundamental to environmental education. The Centres encourage life-long learning by offering programs for people of all ages, and integrate discussions about the environment into a variety of lessons.

The change in financial support for the Centres after amalgamation in 1998, and the decrease in the number of classes attending is concerning. Prior to the introduction of fees, more than 25,000 students visited the Centres annually, whereas attendance in the last four years has been in the range of 14,000-17,000. Figure 3.1 exhibits the gradual decline and recent increase at Centre A, while Figure 3.2 exhibits the declining use of Centre B since 1998. Both Centres exhibited a decline in student participation between 1998-1999 and 1999-2000. That may have been due to the modification of the fee structure. While attendance by students at both Centres stabilized in 2000-2001, in 2001-2002 Centre A exhibited a growth in student participation whereas Centre B exhibited a

Figure 3.1: Use of Outdoor Education Centre A (1998-2002) **Figure 3.2: Use of Outdoor Education Centre B (1998-2002)**

decline. The staff at Centre B suggested that the number of instructors available to run programs might have been a factor in the decline of participation at their Centre. The School Board should be pleased that the introduction of an attendance fee for the public does not seem to have dampened the steady increase in public participation at both Centres since 1998-1999.

The Centres' programs are extremely valuable in the development of attitudes of respect and understanding of both humans and nature. The Centres are also valuable because they: promote hands-on learning, offer programs that have complementing links to the Ontario curriculum, and provide opportunities to be immersed in outdoor settings where knowledge gained in indoor settings can be applied. If Centre A and/or Centre B were closed, it would be a great loss for the local communities and for environmental education in the area.

This chapter has provided a background on environmental education in Ontario, as seen through a review of the Ontario Elementary Curriculum Guidelines, and some of the resources available to support teachers, particularly those within the two school boards participating in this study. Given this understanding, the following chapters will provide an increasingly finer investigation into challenges associated with environmental education, through primary research that included interviews with nine elementary school teachers in two Ontario school boards. Chapter 4 outlines the methodology for the research and Chapter 5 reports on the results of the primary research.

Chapter Four

Methodology for Primary Research

4.1 Research Objectives

The goal of this thesis is to explore some of the challenges associated with environmental education in elementary schools, particularly in Grades 4-6. It is hoped that my research will improve the ability of elementary school environmental education programs to inspire the students' sense of wonder about the world.

The purpose of the primary research is to determine teachers' perspectives on environmental education, environmental education teaching strategies, and the availability and accessibility of environmental education resources in one school district in Ontario, Canada.

It is my hope that this research project will not only further my own knowledge and understanding of the topic, but that it will assist teachers who may be seeking additional teaching materials and enrichment on environmental subject areas.

4.2 Approach to Research

As a human geographer, I recognize that *people* are among the most important sources of information when conducting research on a multidimensional topic like environmental education. I value both qualitative and quantitative research; however I focused my research mainly on qualitative interviews (in a relaxed and conversational atmosphere) to provide insight into the teachers' perspectives on environmental education

and associated teaching strategies and learning resources. I was particularly interested in the resource materials available to elementary school teachers to assist them in lesson planning, preparation and presentation.

4.3 Research Design and Restrictions

The original research design contained three elements: (1) teacher interviews, (2) classroom observations, and (3) student focus groups. It was hoped that 15-20 teachers could be interviewed initially, prior to making observations of students in the classroom setting and receiving their reaction to the teaching methods and materials.

The research proposal, with detailed explanation of the three phases, was submitted to the Carleton University Research Ethics Committee and then to the local School Boards' Research Advisory Committee. Approval was received from Carleton University on May 13, 2003 (Appendix D) and from the School Boards on May 27, 2003 (Appendix E). This approval process created a significant delay, which was compounded by the final approval coinciding with the end of the elementary school year. The research was further restricted because the school boards initially undertook the responsibility of seeking interested participants. It became necessary to find school principals who were willing to have research conducted in their schools, and then to find teachers who were willing to volunteer time for the study. These restrictions had the effect of reducing the time and the number of participants available for this research. Ultimately, the scope of the study had to be altered to include only the first phase (a limited number of teacher interviews). It became necessary to eliminate the second and third phases with the

students, hence it was not necessary to use the parent/guardian consent form which had been prepared (Appendix F). Nevertheless, the conclusions of the study are considered valid because the eventual participants exhibited a wide range of teaching experience and provided enough repetitive responses for the researcher to recognize that the study had identified a common window into the teachers' perspectives on environmental education.

The study focused on *elementary* education because it is the level at which teachers are *not* expected to have a specialized teaching subject and thus, they do not have a professional academic interest in the environment. At this level, teachers are often responsible for teaching most of, if not all, the subjects in the curriculum to their students, and are required to have a general awareness of all the subjects they teach.

More specifically, the study focused on *Grades 4-6* because these are the grades where the curriculum expands beyond simply teaching students about the characteristics of the natural world (as in previous grades), and encourages students to understand how humans interact with the rest of the world. Grades 4-6 are an important transition into Grades 7 and 8 where the subjects become more specialized (e.g., Social Studies is separated into History and Geography), prior to the more senior grades at which point Science becomes increasingly specialized (e.g., Chemistry, Physics, Biology).

4.4 Recruitment Process

The constraints of the recruitment process were understood at the outset of the research study thus, to increase the possible number of participants in the study, teachers were recruited from both the Public and Catholic School Boards. The two school boards

had different methods of assisting in the research process, while maintaining their own level of control of non-Board-initiated research. The Catholic School Board selected a few schools that were not involved in research studies at the time, and called the school principals directly to ask for their participation in the study. One school principal responded through this method.

The Public Board emailed my summary of the research study (Appendix G) to all elementary school principals early October 2003, and asked them to contact me by telephone or email if they were interested in participating in the study. No school principals contacted me through this method. The Public School Board also granted me permission to contact the school principals by telephone if there was no response during the month of October. Personal contact (telephone or email) with the school principals after October 2003 proved to be most successful, and this became the primary avenue for recruiting teachers for the interviews.

It is important to note that the study was not random, as it was not possible to recruit teachers directly. The study relied on the interests of principals who self-selected the teachers who were notified of the study. The nine teachers who responded and then participated in the study had responsibilities for environmental education in Grades 4-6 and had some interest in environmental education (i.e., concern for the environment, concern for serving their students, were seeking resources, etc.). Their environmental teaching was primarily linked with the Science and Technology, and Social Studies components of the curriculum.

4.5 Teacher Interviews

Qualitative interviews with nine teachers comprised a large amount of my primary research. The interviews were conducted voluntarily outside of class time, at the teachers' convenience, during November and December of 2003, and January of 2004.

Prior to conducting each interview, the respondents were required to sign a letter of consent (see Section 4.6.1 below and Appendix H). To ensure that participants were comfortable with the process, I provided them with a clear briefing on the purpose of my research, the purpose of the interview and indicated that I was willing to answer any questions that they might have. The interviews were expected to last a minimum of one hour, but the duration depended on teacher awareness and experience with environmental education and environmental education teaching kits.

The interview questions (Appendix I) were open-ended and were intended to lead to a discussion of:

- their background involving environmental education;
- their opinions concerning the best approaches to teaching environmental issues;
- the source materials they use in developing the lessons that they present to their students;
- the capability and potential for teachers to meet the Ministry of Education's curriculum requirements; and
- an indication of opportunities to improve upon existing teaching and learning resource material.

The questions for the teacher interviews were clearly worded and straightforward.

The interview questions were based on a survey prepared by the Survey Research Center of the University of Maryland College Park for the North American Association for Environmental Education and the Environmental Literacy Council (2000). The respondents were asked to answer the questions to the best of their ability, they were encouraged to make additional suggestions and comments, and they were told that they could decline to answer any questions. If the participant seemed upset or expressed anger or frustration, the topic was not probed and similar questions were rejected from the interview. As well, a topic was not probed if the participant attempted to avoid it.

The interviews were not recorded; however, I took notes during the interviews and all information that was identifiable with specific respondents was kept secure. The only people who had access to the results of specific interviews were my supervisor, advisory committee members and myself. The information (experiential and attitudinal) gained through the interviews of teachers is for use in this Master's thesis. To comply with the School Board's requirements for researchers, a written summary of my research will be made available to participants and school staff, and a final report will be provided to the School Board.

4.6 Data Collection Principles

4.6.1 Informed Consent

A consent form was required for my interviews in order to ensure that all information was voluntarily given and that I would uphold the Municipal Freedom of

Information and Protection of Privacy Act, 1989, on the ethical treatment of human subjects. The consent form (Appendix H) followed the guidelines provided by the School Boards' Research Advisory Committee. A copy of the form was provided to all teacher participants at the beginning of the interview; they were asked to read and sign the form (if they chose to) before I introduced the interview questions. No person refused to sign the consent form.

4.6.2 Anonymity and Confidentiality

All participants remained anonymous in this study (as stated in the informed consent form that participants signed). To do so, no names or other identifying information were included in the interview transcripts, this thesis or any written publication. Instead, each participant was ascribed a number (correlating to their interview order) for identification. This number was used in all transcripts. Also, any identifiable information (such as names of teachers, students, schools, school boards, or school board programs) was not included.

The only people who had access to data that was derived from interviews and classroom observations were myself, my supervisor, Dr. J. K. Torrance, and other advisory committee members (as necessary). The data will be stored securely until the completion of my thesis, at which point any information that is identifiable with specific respondents will be destroyed.

4.6.3 No Foreseen Risks to Participants

It should be noted that there were no foreseen risks to the participants in the study as it was simply a study of teaching and learning methods which involved the opinions of

teachers. Privacy risks were minimized in accordance with the Municipal Freedom of Information and Protection of Privacy Act, 1989, which ensures that information collected for my research is confidential and protected.

Teachers participated voluntarily and, as explained in Section 4.6.1 above, they were asked to sign a consent form prior to their interview that outlined the basis for the study and their participation. In order to eliminate risks to participants they were informed that they did not have to consent to the interview, that they could terminate the interview at any time, and that they could choose to withdraw from my thesis study, without giving a reason and with no adverse consequences, even after completing the interview.

No information was collected from individual teacher files or records, and there was no use of video or audio equipment. The results of the study will not appear in any school records and will be reported in ways that ensure complete confidentiality. As mentioned above, teacher participation took place outside of class time at the teacher's convenience to minimize interference with daily routines. No monetary compensation was used in conducting the interviews.

All participants were provided with my name and contact information and encouraged to make contact at any time if he or she had any concerns about the research or interview process. No teacher expressed any concerns. I informed the participants that anonymity and confidentiality would be assured through the use of a number assigned to each participant; this would ensure that they would not be identified by name or description in any way.

Chapter 5

Primary Research

5.1 The Teachers Interviewed

During November and December of 2003, and January of 2004, interviews were conducted with 9 teachers of Grades 4-6 classes from 5 different schools in a Public and a Catholic School Board in Ontario, Canada. As stated in section 4.1, the purpose of the interviews was to determine:

- (1) teachers' perspectives on environmental education;
- (2) environmental education teaching strategies; and,
- (3) the availability and accessibility of environmental education resources.

Table 5.1 summarizes the characteristics of the teachers interviewed. They included 7 females and 2 males responsible for teaching within Grades 4-6. Their teaching experience was an average of about eight years, ranging from less than one to seventeen years. Six of the teachers taught in English and three in French. Their involvement in environmental education ranged widely: four of them had no specific focus on environmental education and the others claimed up to 17 years of involvement.

Table 5.1: Respondent Data

Respondent Number	Male/Female (M/F)	Teaching Experience (Years)	Conscious involvement in EE component of the curriculum (Years)	Grade Taught	Teaching Language
1	F	17	5	4/5	English (ESL)
2	F	2	No extra focus (covers the basic curriculum)	5	English
3	F	8	No extra focus (covers the basic curriculum)	4/5/6	English
4	F	4	No extra focus (covers the basic curriculum)	4	French
5	M	6	No extra focus (covers the basic curriculum)	6	English
6	F	17	17	4	English
7	F	<1	<1	4	English
8	M	14	6	4/5	French
9	F	<1	<1	5	French
	Female: 7 Male: 2	Average: 7.8			English: 6 French: 3

* EE: Environmental Education

5.2 Teachers' Perspectives on Environmental Education

The success of a lesson is often dependent upon teacher subject knowledge, awareness, and enthusiasm for the task. Not every teacher has an interest in environmental issues, and not every teacher is expected to have a professional academic interest in the environment. In fact, although seven of these teachers had Bachelor of Arts or Bachelor of Science degrees, only two of them had degrees that related to the

environment. One teacher had a Bachelor of Arts degree in Geography, and the other had a Bachelor of Science degree in Biology. Other teachers' educational backgrounds included Bachelor of Arts degrees in: Psychology, Law, Kinesiology, Physical Education, and Leisure Studies. However, four of the teachers indicated that although their educational background did not concentrate on the environment, they had taken at least one course related to the environment (e.g., Environmental Science, Outdoor Education, Geography).

After receiving their Bachelor degrees, the participants had received their Bachelor of Arts degrees in Education. As the curriculum analysis indicated, elementary school teachers do not need to be specialized in one or two teaching subjects, because their responsibility is to introduce students to a wide-range of subjects that are outlined in the curriculum, including those topics related to the environment (most often found in Science and Social Studies).

Since becoming a teacher, only two teachers have obtained financial support or time off for training (one met with other Environmental Club representatives, another had general training upon the launch of the Ontario Curriculum Unit Planner Website), and no teachers have taken any courses related to the environment.

5.2.1 Conscious Interest in the Environment

Of the teachers that were interviewed, five of them expressed a conscious interest in the environmental education component of the curriculum. Interest in environmental education stemmed from indirect and direct experiences with the environment including:

- outdoor activities (e.g., canoeing, sailing, camping);
- rural living;
- working in the outdoors (e.g., tree nursery, canoe trip leader);
- a general ethic of care for the environment (e.g., through recycling, composting); and,
- university Geography and Outdoor Education courses.

5.2.2 Is Enough Information Provided to Students?

Teachers were asked whether, in their opinion, enough information on the environment was being provided to students, or whether it needed to be supplemented (e.g., by parents). Interestingly, all of the participants noted that their students do not lack concern for the environment, rather they need help enhancing their knowledge of environmental issues. Seven of the nine teachers thought that schools were doing well at teaching students about the environment on their own, but two teachers stated that parents' help would be useful. However, respondent #6 noted that "there is a range of have and have not families", and therefore relying on parent teaching support may not be practical because the parents themselves may not be educated on environmental issues, and it may increase confusion among students if they learn inaccurate information.

Of the seven teachers who thought schools were providing students with enough information on the environment, one teacher noted that "kids are very environmentally aware", and another teacher stated that "students today have a better environmental attitude than most adults! When it comes to recycling, the students in my class do it

without a second thought.” One teacher drew particular attention to the lessons learned through informal learning at the school (e.g., Environment Club activities), and the fun that students can associate with outdoor activities, fieldtrips, school assemblies dedicated to environmental issues, and the sense of pride students have when they receive an environmental award.

5.2.3 Environmental Education: A Separate Course?

All participants of the study believed that the most effective way to teach environmental education is to incorporate environmental information into existing courses. One teacher noted that, ideally, a separate course dedicated to environmental education could teach students a great deal more about the environment; however, given the realities of the curriculum and the vast amount of information to cover, there is simply not room for another course.

Other teachers also commented on the lack of available time and space in the curriculum to add a new course, and respondent #5 argued that “the integration of environmental issues is the best approach anyway because it helps students understand the links between issues, and it doesn’t isolate environmental issues into their own separate category.” Respondent #6 echoed such comments and said:

“it is much more appropriate to integrate environmental material into a variety of subject based discussions for two reasons. The first reason is that if an additional course was added to students’ workload, it would give them one more thing to groan about, and we don’t want them to associate negative attitudes with the environment. And secondly, by integrating environmental education among subjects, students can take what they’ve learned out of the classroom and onto the playground, and that is when you feel that you’ve made a difference because you know that they are learning how the issues relate to their lives.”

5.2.4 Suggestions for Changes to Improve the Quality of Environmental Education

At the completion of each interview, the participants were asked if they had any suggestions for changes in the curriculum or within the school that would improve upon the quality of environmental education that students receive. The teachers appeared to enjoy the opportunity to provide their input, and appreciated that someone was taking the time to pay attention to their needs. Some of them spent considerable amounts of time restating issues that were particularly concerning for them, while others introduced new ideas. Some of their comments and suggestions included:

- It would be useful to have a recommended list of environmental education resources (i.e., a book or website). Teachers would be more likely to use a resource that they have easy access to (e.g., environmental education kits, published documents), and a recommended list of resources would be much better than constantly researching. As well, by using resources from a recommended, *reviewed* resource list, it would help prevent any possible controversies over material used/issues discussed in the classroom, and/or situations where parents may contest the teaching of a particular subject.
- What has been done with the resources that were at the Public Board's Resource Centre that closed? Is there any way that teachers can have those resources (i.e., distribute them amongst schools in the Board)?
- The Catholic School Board has a Teacher Resource Centre; however, not all teachers are aware of it, or choose to make use of it.

- “More requirements related to the environment are needed in the curriculum to give it more of a focus. The curriculum is vague and it should address it in a more specific way. Too much is left up to a teacher’s personal interpretation of the curriculum” (Respondent #2)
- There are too few French language resources in general, and it is particularly hard to find environmental education resources in French.
- Environment Clubs can be used to help spread environmental messages/lessons.
- “It would be beneficial if there were more workshops, conferences, and/or a medium (i.e., web chat room) for teachers to have opportunities to brainstorm environmental teaching strategies with other teachers” (Respondent #6).

5.3 Environmental Education Teaching Strategies

Some of the questions that were addressed to the teachers asked them to identify strategies that they use when they teach about the environment. Their responses indicated that a variety of strategies are chosen.

An important finding of the interviews was that very little environmental teaching is done outdoors, as it is typical for instruction to be done indoors (except for classes such as Physical Education). Three teachers responded that they have not taught any environmental lessons outside, while the others mentioned that they have taken their students outside on rare occasions for brief lessons. They cited examples such as: observing the birth of a calf, examining a sundial, recording weather data (e.g.,

temperature), making a 'class shadow', collecting worms (to learn about food chains and decomposers) and collecting soil samples.

This is a cause for concern as the literature research indicated the importance of teaching *about* and *for* the environment, as well as teaching *in* the environment. If direct experiences are not a part of the learning process, students may not develop the ability to interpret the environmental components of the curriculum as a whole. However, as discussed in Section 2.11, there are many reasons why teachers may not teach outdoors. The reasons that teachers mentioned during the interviews for not conducting more lessons outdoors, included: it would take too much time away from other lessons, there are limited numbers of fieldtrips allowed each year, and that it requires a lot of organization because students are not allowed to leave the school property without permission. Although it would be beneficial to students if more outdoor experiences were incorporated into teaching strategies, it was interesting to note that teachers have made attempts (though limited) to make use of the school grounds in environmental lessons.

With regard to teaching indoors, all nine teachers stated that they use both oral and written instructions with their students, when teaching environmental lessons; however, the emphasis was on oral instruction. When teachers were asked: "Which method of teaching/approach do you feel that the students respond to the best?," teachers made various comments including:

- the teacher speaking, then providing an opportunity for students to ask questions;
- hands-on, activity based work;

- demonstrations by the teacher;
- group work; and
- opportunities to go outdoors.

It was interesting to note that although one teacher recognized that his students responded best to his teaching when they went outside, he had not incorporated many opportunities to go outside to teach his lessons.

When teachers were asked if there were any reasons why they did not teach about the environment, the most common response was that there was too much other material to cover, and the second most common response was that there was a need for more teaching materials. Interestingly, those teachers who claimed that they were “somewhat aware” that environmental education was a part of the curriculum requirements, responded to this question by saying that a reason why they do not teach about the environment is because it is not relevant to their curriculum. One teacher responded that she wished that she had more environmental knowledge/training, while others appeared to feel that they had an adequate understanding of environmental issues, but that their needs would be satisfied if more environmental education resources were available.

It was interesting to note that *no* teachers responded by saying that reasons for not teaching about the environment were due to: resistance by parents, the school board, or school district, that the children weren’t interested, or that the issues were too controversial.

In the following sections of Chapter 5, the thesis explores factors that influence the strategies that teachers choose when they are teaching about the environment.

5.3.1 Awareness of Environmental Education in the Curriculum

The teachers who were interviewed exhibited varying awareness of environmental education being in the curriculum (Table 5.2). Seven of the nine teachers were aware that there were environmental components in the curriculum and they taught them because they were *requirements* of the curriculum. Five of the seven expressed a conscious *interest* in the environmental component of the curriculum. Two of them were only slightly aware that environmental topics were in fact in the curriculum. It was only after talking with them and drawing their attention to sections of the curriculum that they realized that they mention issues about the environment; however they are typically raised as offshoots of other discussions. This is a cause for concern because these teachers might not actually be teaching about environmental topics, and the relationship between humans and nature, as outlined in the curriculum. Both of these teachers noted that they would appreciate assistance in learning how to incorporate information on environmental education into their lessons, so long as it did not detract from their time spent on other aspects of the curriculum.

This aspect of the interviews reveals some of the dangers when environmental materials need to be incorporated into other subjects (as discussed in Section 2.2.3), in that two of the teachers appeared only somewhat aware of this requirement. However it also illustrates that the teachers were looking for resource assistance.

Table 5.2: Teacher Awareness and Teaching Subjects for Environmental Education

Respondent Number	Teacher awareness of environmental education in curriculum	Subject(s) in which environmental discussions arise
1	Aware	Science, Social Studies, Language Arts
2	Somewhat Aware	Science
3	Somewhat Aware	Social Studies
4	Aware	Science
5	Aware	Science
6	Aware	Science and Social Studies
7	Aware	Science, Social Studies, Art
8	Aware	Science, Social Studies, Art
9	Aware	Science

5.3.2 Subject(s) Within Which Environmental Topics are Included

Teachers noted that environmental topics are typically focused in their Science lessons, and are also discussed in their Social Studies lessons. This finding is noteworthy as it supports the curriculum review research done in Chapter 3. The integration of environmental education into subjects other than Science and Social Studies relies on teacher motivation, research skills, and ability to blend subject areas, as there is no assistance provided to them in the curriculum guidelines. However, three teachers have made attempts to discuss the environment in other subject areas including Language Arts (e.g., literature studies), and in Art lessons. Two teachers noted that they could see potential for more discussions about the environment in their Language Arts lessons; however, they had not found any novels for students to read that introduced environmental issues. They indicated that assistance with regard to researching such resources would be beneficial.

5.3.3 Opportunities to Integrate Lessons

5.3.3.1 Integration Within a Variety of Subjects

Interestingly, four of the nine respondents noted that they make attempts to integrate discussions about the environment *within a variety* of subjects including Science, Social Studies, Language Art, and Art. Integration of environmental topics within Science basically followed the curriculum; however, teachers found that the guidelines for integration within Social Studies curriculum were not as specific, and this limited their potential to integrate topics.

Three of the four respondents who integrate environmental education into a variety of subjects also integrated it as part of a combination of subjects. For instance, respondents #6 and #7 noted that they try to combine student work involving art and nature. An example of this included combining a Science lesson on light (energy), with an Art lesson building kaleidoscopes, and the opportunity to look through the kaleidoscopes outdoors.

Respondent #1 noted that she has also integrated discussions about the environment *among* subjects. In particular, she has used a book by Bill Peet titled “Wump World” in her Language Arts unit, to raise discussions that fall within the Science curriculum on habitats, population size, pollution, overcrowding, and learning to take responsibility for one’s environment. Her students turned the lessons that they had learned into a PowerPoint Presentation, to integrate a technological lesson. Then, she encouraged those students who were also in her Environment Club to turn the story into a dramatic play for a school assembly.

The fact that most of the integration occurs in Science is consistent with the findings of the Independent Commission on Environmental Education (1997) as reported in Section 3.1. The reports of integration within other subjects is very encouraging and illustrates the type of achievement needed for a comprehensive environmental education program as envisioned by Kaufman and Franz (1993) as discussed in Section 2.3.1.

5.3.3.2 Integration of Topics Among Grades

Discussion of related environmental topics can assist in the teaching of two grades at the same time and may lead to a particularly innovative means of managing teacher time and resources. Of the three teachers who taught more than one grade at a time (split grades), one teacher (respondent #1) noted that her teaching strategy is dependent on what she is teaching in each of the two grades that she teaches. She takes every advantage of situations in which she can integrate teaching topics among grades, as it can ease her lesson planning and quantity of resources (e.g., projector acetates, videos, posters) that need to be easily accessible within the classroom. For instance, she has a concurrent, while independent, strategy of teaching her Grade 4 unit on Habitats and Communities with her Grade 5 unit on Weather because they require the same visuals, etc. She uses both wall space and floor space in her classroom wisely and places a great importance on the number of resources (textbooks, posters, games, magazines, newspapers) available to both students and herself. She actively seeks resources including guest speakers, and environmental education kits, and has a corner of the classroom designated for student resources, including newspapers, magazines, and two, half-class sets of Science texts.

5.3.4 Responsibility for the Environment Club

Respondent #1 noted that her teaching strategy is influenced by her role as the teacher responsible for the Environment Club. She provides all of her students with the environmental information required in the curriculum; however, she makes herself available to keen students who seek a more in-depth level of knowledge on the environment, via the Environment Club. This teaching strategy is suited to her students in particular as the majority of them are learning English as a second language (ESL) and need to concentrate on the basic material in the curriculum.

Respondent #1 also noted that she is particularly aware of the environment within her school and its classrooms because she assists the Environment Club with environmental audits around the school. During the audits, the Club monitors classrooms throughout the school and marks them according to their use of energy (e.g., computers, lights), appearance (e.g., neat and tidy learning environments), as well as the quantity of waste versus recycled material. The audit results are then posted, and monthly rewards (which she purchases herself) are distributed to winning classes as an incentive to demonstrate environmentally friendly behaviour.

As well, it is her understanding that most environmental information that the school receives via mail, fax, etc. is directed to her. It allows her to benefit by seeing advertisements and finding out about resources, such as the availability of environmental education kits, which she can incorporate into her lessons. Unfortunately, other teachers who are not responsible for Environment Clubs may be at a disadvantage as environmental information may not be forwarded to them. This is a potential hazard that

school staff should be aware of as it can cause uneven distribution of resources, and potentially a difference in the quality of teaching within a school.

For instance, in one school, a case arose where the Environment Club Representative was a member of the staff at the school, but not a member of the regular teaching staff, and was thus not involved with the presentation of the curriculum. Teachers in the school, who were interviewed, praised the work done by their school's Environment Club and noted that a great deal of the lessons learned about the environment were distributed by the Clubs. However, when the Environment Club Representative was made aware of this, she had no idea that teachers were relying so much on the Environment Club. She then noted that she puts any environmentally-related mail, informal environmental lessons, etc. in a binder; however, she had not had an opportunity to look at the material in her binder because she volunteers her time to be the Environment Club Representative, and she had not had the time available to do so. This situation is a cause for concern, due in part to the voluntary nature of the Environment Club representative's position, the reliance and responsibility for environmental education being placed on informal school activities (outside of curriculum lessons), and the risk of filtering environmental information away from those involved in planning curriculum-based lessons, with no guarantee that the information will be shared appropriately among school staff.

Environment Clubs are examples of informal educational mechanisms used within schools (Section 2.3.2), and help to illustrate applications of the knowledge gained in the classroom. They help develop an ethic of environmental care and are an excellent

example of a mechanism to help the school be seen as a role model (Section 2.5.2), and can be used to help students develop a sense of accomplishment (Section 2.2.1).

5.3.5 Financial Support

Interestingly, money was not raised as a *major* limitation on teaching environmental education in comparison to the need for lesson preparation time and resources. However, this is not to say that it was not a concern. Teachers noted that different schools have varying amounts of money available for education initiatives. For instance, when school boards provide funding, they often state what the money should be spent on (e.g., Early Literacy). Some schools have Parents' Committees that raise money and suggest that it be directed toward particular aspects of the school (e.g., sports equipment). Field trips are typically an important part of environmental education, and unfortunately, they are often limited by a lack of available funding. Teachers noted that it is usual for a class to be able to go on at least one field trip per year; however, it may not necessarily be related to environmental issues, and beyond that, they may require financial assistance from parents if more field trips are desired.

These teacher interviews revealed very low numbers of field trips and use of the outdoors for teaching purposes, and they served to underline the fact that a shortage of funding is one of the difficulties typically associated with teaching out doors (Sections 2.5.3, 2.10 and 2.11). The fact that few field trips are being taken indicates that one-third of the "in-about-for" model of environmental education (Section 2.7) is not being fully utilized. It may be beneficial to these teachers if they were to explore low-cost alternatives (Meichtry & Harrell, 2002), as discussed in Section 2.10.

5.3.6 Lack of Time Available

Teachers stated that time is a major constraint on the ability for teachers to prepare their lessons. They are interested in the idea of incorporating new information, and information from a wider-variety of sources than they currently use; however, they are focused on covering the major topics outlined in the curriculum guidelines, of which the environment is not seen as a “major” issue. Teachers tend to concentrate on the major subject areas and introduce discussions on the environment as off-shoots of other discussions. It is generally felt that if too many new lessons (i.e., on environmental topics) are introduced, there will not be enough time left for students to do any reviews before tests.

Interestingly, two teachers noted that the Exemplars set such high expectations for students that it creates a challenge for teaching. For example, respondent #6 stated: “If I taught until students could produce the level of work that is considered excellent in the Exemplars, I wouldn’t be able to cover the whole school year’s curriculum.”

The fact that these teachers reported time limitations is consistent with the type of pressures anticipated when considering teacher perspectives on lesson planning and preparation (Section 2.10).

5.3.7 Standardized Testing

Standardized testing and its associated difficulties (Section 2.13) did not appear to be a major issue to these teachers; however, the introduction of standardized testing was seen by two of the teachers as an issue because it created a lack of time to teach about the environment. Teachers’ concern was that it causes some teachers to concentrate on

teaching the language and mathematics components of the curriculum, leaving less time to be spent on other subjects, such as environmental education. One of the reasons for this pressure is that the results of the standardized tests are published, and therefore there is pressure from within the school system and from parents to ensure each child and class performs well in comparison to others, because the comparative result is perceived to be due to the quality of the teaching that they have received. The school principal whom I interviewed, noted that although he does not want to put too much pressure on the teachers within his school 'to teach for the tests', he encourages them to help their students do well on the tests, as the results become public, and there is an implication that schools with low scores are inferior to those that have high scores.

One teacher participant responded by saying that "...at the core of things (his teaching), I feel that I am responsible for the basic literacy and numeracy of students, and as a result, other subjects may be allotted less time. The curriculum expectations are very rich and it is challenging because there has been no change in the length of the school day, or our work day."

5.3.8 Years of Teaching Experience

Teachers with fewer years of teaching experience have the challenge of continually reviewing the curriculum guidelines, and developing lessons that are both useful, and stimulating. They must find appropriate resources and are faced with the challenges of time management and behaviour management in the classroom. Additional challenges that teachers noted included: teaching English as a Second Language (ESL) classes, teaching split-grade classes (e.g., Grade 4/5 class), working part-time, and

teaching a subject to different students throughout the day (e.g., language specialist teachers).

This is not to say that teachers with more experience are exempt from these issues; however, some of them have recognized that they are now at a stage where they are more settled, and can re-use lessons that they prepared in the past, and expand on previous lessons. Revising lessons tends to take less time, which allows the teachers more time for integrating material across subject areas, and for seeking new resources (i.e., contacting organizations for information, seeking public speakers, etc.).

In Sections 5.1 and 5.2, it was noted that there was a broad range of training and experience amongst the teachers interviewed, and few had a significant amount of experience with environmental education. These findings regarding teacher experience are consistent with the discussion of the teacher's role in Section 2.6, indicating there is a need for more preparation time.

5.3.9 Availability of French Language Resources and of 'Home Classrooms'

Some teachers, most notably language specialists in bilingual programs, present a subject(s) in a second language and may not always have a 'home classroom'. They may be required to move their teaching and learning resources between classrooms, and this can inhibit their ability to have all the appropriate resources in the classroom with them, when they need them.

As well, each of the three French teachers highlighted the need for more French resources. A considerable amount of their time is spent seeking French language

resources, and translating English language resources, if appropriate French language resources are not found. Interestingly, the Manager/Library Services Advisor at the Catholic Board's Teacher Resource Centre had also identified that it is difficult to obtain French language resources, and that the Resource Centre's collection of French language resources was considerably smaller than their English language resources. This is a factor that can have a significant impact on teaching strategies, as the teachers may require more lesson preparation time, and they may need to rely on oral instruction methods more than other methods which may include giving written worksheets, etc. to students to work on. As well, the lack of French language teaching resources is a cause for concern because teachers may not have access to the most current information, and they risk teaching students information that is out-dated.

5.3.10 Availability of Resources

Strategies for teaching are also highly dependent on the availability, quality and quantity of teaching and learning resources. When asked: "How do you prepare to teach environmental subjects?" teachers responded that they consult either a pre-prepared lesson (from previous years), or they may need to develop a lesson, in which case they conduct research and consult resources to develop a lesson plan.

Not all teachers have access to full class sets of textbooks and/or student workbooks, particularly those discussing environmental issues; thus, teachers often research information on a topic (with the use of newspapers, magazines, television, published teacher's guides, the Internet, the Ontario Curriculum Unit Planner website, and books from libraries) in order to become knowledgeable on a topic and have

appropriate information to teach their students. In some cases, teachers purchase teaching and learning resources, with their own money, at local teaching supply stores.

Significantly, all nine teachers noted that when preparing their lessons and reviewing resources, they must rely on their own judgment in the selection of quality resources. Teachers made comments such as: “I use my own knowledge of what environmental information will fit into a lesson”, and “I focus on choosing resources that will match the curriculum and engage students”, “I look for information that matches the curriculum”. One teacher, in her first year of teaching, noted that in addition to using her own judgment, she consults with other teachers with more experience to receive their opinions on resources. The availability and accessibility of resources is further discussed in Section 5.4.

5.4 The Availability and Accessibility of Environmental Education Resources

In general, if teachers are not familiar with issues that they are required to teach, they need to seek the resources that will help them provide the necessary information to students, in an informed and accurate manner. When teachers were asked how they find out about environmental education materials, other than through their own research, there were a range of responses including: word of mouth, workshops/conferences, mail (direct and email), and the Internet. The two most common ways in which teachers discovered new environmental education teaching materials were through word of mouth and mail (direct and email). Funding for such resources was from the school/school board, Parents’ Councils, and teachers’ own money.

The quality of the resources can be an issue of contention, as the information obtained can be from various sources including textbooks, television or radio, newspapers, news magazines, journals, the Internet, the library, or from government and non-governmental organizations. Factors which influenced teachers' judgment of teaching and learning resources included:

- the ease of locating the materials
(i.e., whether it already exists in the school or is easily accessible);
- the cost (to purchase or photocopy);
- the quality of the sources;
- the organization of the resource itself (i.e., whether it is 'teacher-friendly', the ease of use, well laid-out, has an abundance of lesson plans and activities for students);
- how well it links with the curriculum (i.e., does it require additional lesson plan development or is it self-sufficient);
- the quantity available (full or half class set);
- whether it is age-appropriate; and
- the availability of the resource in different languages (particularly a challenge for teachers seeking French resources).

5.4.1 Resources to Which Teachers Had Access

When teachers were asked which resources they consult when obtaining their environmental teaching materials, each of them responded with a variety of answers (Table 5.3). All teachers responded that they use the Ontario Ministry of Education and Training's Curriculum Guidelines. The other resources that were consulted the most included: textbooks, newspapers, the Internet, and commercially published documents). The fact that they consult a variety of resources is particularly important as there is a

greater possibility that a range of perspectives on environmental issues will be presented to students.

Interestingly, six of the nine teachers claimed that they predominantly use “Teacher’s Guides” from Commercial Publishers, and that they are the most *satisfied* with this resource. Three teachers specifically mentioned that they use Teacher’s Guides published by Addison-Wesley. Those who have access to Teacher’s Guides often use them as a base resource and then consult other resources to develop their complete lesson plan.

When asked how they find out about such resources from commercial publishers, the general response was that publishing company representatives visit schools and do presentations that advertise their resources and then encourage teachers to buy their product. The teachers for whom the publication(s) are suitable (e.g., primary teachers) get together, compare the proposed new teaching resources, and decide on which resources they should spend any available funding.

As discussed in Section 2.12, it is important that teachers use caution when selecting resources as the publishing organizations may be supporting the position of their sponsor and/or concentrate on making a profit, rather than on providing a balanced treatment of the subject that addresses curriculum content demands.

Table 5.3: Resources that Teachers Consult

Type of Resource	Number of Teachers that Use the Resource (Out of a Total of 9 teacher participants)
Textbooks	6
Television or radio	4
Newspapers	6
Journals	0
Internet	6
Library	4
Government (in addition to Curriculum Guidelines and the Exemplars)	1 (Ontario Ministry of Energy)
Business and Industry	1 (Prospectors and Developers Association of Canada)
Environmental Groups	1 (Sierra Club, Project Wild, Ducks Unlimited)
Commercial Publishers (e.g., Teaching Guides)	6
Other	2 (Guest speakers) 3 (Ontario Curriculum Unit Planner) 1 ("I Love Science" interactive CD-ROM) School Environment Club

Interestingly, some teachers use current events as a resource to incorporate into their lessons, when they determine it to be appropriate. Three of the teachers noted that they try to specifically include “teachable moments” in their lessons. Respondent #6 noted that she tries to include local environmental news in her lessons, and she advises new teachers to “try not to get too caught up in the curriculum. Try to take advantage of situations in the news as they come along.” She claims that they can serve as resources that perk students’ interest and helps them to relate to subjects being taught in class. She used the example of incorporating news on a local flood into class discussions. Respondent #7 noted that she took advantage of her school’s rural surroundings and in one unique experience, she took her students outside to witness a calf being born on a farm that was on a neighboring property to the school. The students did not need to leave the school grounds, and they were excited to go outside and see nature at work. Respondent #1 noted that during a recent election campaign, she had students make a map for the classroom wall outlining different political boundaries (for Social Studies) which led to a discussion on different political parties’ support for environmental issues.

Environment Clubs are deemed to be a useful resource, by teachers, and they often rely on the Clubs to further develop students’ environmental awareness. Students put a tremendous amount of effort into work for “Environmental Awards” including implementing litterless lunch programs, school ground naturalization projects (e.g., planting tulips), composting, schoolyard cleanups, assemblies, as well as various international efforts (e.g., clothing and book drives). Environmental audits are a common activity and schools have different ways of acknowledging classes that are

environmentally-friendly (e.g., one school's environmental audit award is a dust pan that has been spray-painted gold). One school had made particularly unique efforts to earn an environmental award by creating a process within the school for making notepads from recycled paper. They also started a school based publishing company and took stories written by the students and bound them using cardboard from cereal boxes, covered them with wallpaper and then included them in their school library.

At the completion of each interview, I thanked each participant and gave him/her a list of some organizations that post environmental information on the Internet (Appendix C). I indicated that the resource list was by no means exhaustive; however, it might help them when they are seeking information on environmental topics. The teachers were very appreciative of the resource list and indicated that it would be of use to them.

Given that the preliminary research indicated that some organizations have curriculum-linked environmental education kits available free for teachers, it was surprising to note that only two of the teachers reported that they had used such a resource. When I provided all teachers with a list of free environmental education kits that I was aware of in Ontario (Appendix B), several of them indicated that they would inquire about such resources, and looked forward to having access to prepared lesson plans (which they could augment if necessary).

These findings concerning the resources that teachers had access to is consistent with the discussion of resources discussed in Section 2.12, indicating the variety of environmental education resources that can assist teachers with lesson planning and

preparation. Interestingly, teachers have taken initiatives to incorporate information on current events, and Environment Clubs; however, few opportunities have been taken to incorporate environmental education kits.

5.4.2 A Proposed List of Reviewed Resources

When teachers in the study were asked if they would be interested in having access to a list of *reviewed* environmental education resources, if one was available to assist them in their lesson preparation, there was a unanimous positive response. If it was a provincially based review as in British Columbia and Manitoba (Section 3.2), such an initiative might require the Ontario Ministry of Education, or local school boards to review the curriculum guidelines, seek a variety of resources that discuss issues matching the curriculum guidelines, review such information and resources, and accumulate a list of *suggested* resources, organized by grade level, to which teachers, and perhaps students and parents could have access. This would not only ensure that resources were reviewed, it could increase the consistency of material taught at the classroom, school, school board, and provincial levels, and it would allow teachers to allocate less time to resource development, and more time to other areas of need. The list need not be a mandatory list of resources, rather it could be a *suggested* list of resources which teachers could consult if they were requiring some assistance in teaching a particular subject area, or wanted to add variety, or up-to-date information to existing lesson plans.

5.4.3 The Ontario Curriculum Unit Planner (OCUP)

Interestingly, it was discovered through the interviews (not during the preliminary research), that the Ontario Ministry of Education has a website that has been designed to assist teachers in their lesson plan development.

“The Ontario Curriculum Unit Planner (OCUP) website provides curriculum information to all members of the educational community – teachers, administrators, parents, and students – with additional support for those using the Ontario Curriculum Unit Planner. The Ontario Curriculum Unit Planner is a software application and resource library on CD-ROM that supports Ontario teachers in designing, sharing, adapting, and managing instructional units, profiles, and resources.” (OCUP, 2002a)

The units and an Implementation Support document were released on a CD-ROM and in limited print copy in November 2001 to every district school board in Ontario. The Elementary Curriculum Units Project has gone through two phases in which units were originally developed for teachers of Grades 1 to 8 in the areas of Mathematics, Science and Technology and Social Studies, History, and Geography. The second phase featured units in the subject areas of Health and Physical Education, Language, and the Arts.

The curriculum units are considered to be resources written by teachers for teachers, and the development of the units went through an interesting province-wide development and review process.

“The Council of Ontario Directors of Education (CODE) and the Institute for Catholic Education (ICE) coordinated writing teams from public and Catholic school boards. The units were reviewed by a team of professional colleagues, including school librarians, teachers with ESL and Special Education qualifications, and teachers with assessment expertise. In addition, the Ontario Curriculum Centre (OCC) developed and managed a professional peer review process as well as the editing and publishing process. Catholic units had an additional theological review as part of the process.”

By providing teachers with access to the units in an electronic format, they have the opportunity to adapt the units to meet their particular needs (e.g., teaching to a combined and/or multi-grade class) (OCUP, 2002b). There are currently two versions of OCUP available (versions 2.5 and 3.0) which post units that are downloadable in a print-ready PDF format (for the educational community) and in Planner-editable format (for teachers using the Planner). The CD-ROM of the Ontario Curriculum Unit Planner is distributed free of charge to Ontario publicly-funded school boards and faculties of education (for staff and student labs). The Ministry of Education provides a complimentary copy to pre-service teachers (students in Bachelor of Education programs) through their Ontario faculty of education upon initial publication (April 2003). Other interested parties can have access to the CD-ROM by ordering it from TVOntario, at a cost of \$25.00 plus tax.

Only three of the nine respondents in this study mentioned the OCUP website; however, those who mentioned it were not only aware of it but had tried to use it. Of the three respondents, two were beginner teachers who had received copies of the CD-ROM through the universities where they received their teaching degrees, and the third teacher had been teaching for approximately six years within the school board and had become aware of the Ontario Curriculum Unit Planner through a workshop that she had attended when the Planner was first published and was being promoted.

It is not a resource that they use extensively, partly because they noted that it is not fully developed and does not assist in all of the subject areas in which they are looking for lesson plan support (i.e., very little on environmental education). Upon

review of the website, it was noted that there are approximately 1-4 units prepared for each subject area. In the Grades 4-6 Science and Technology portion of the curriculum, there are approximately 2-3 units prepared for each grade, and within the Social Studies portion of the curriculum, there are approximately 1-2 units prepared for each grade.

One of the teachers, who is currently in her first year of teaching, said that she is planning to use a unit titled “Conservation Clubhouse” that has been designed for the Science and Technology portion of the curriculum, for Grade 5 students.

“In this unit, students will investigate forms and sources of energy, exploring the advantages and disadvantages of different sources. They will examine past and present transfers of energy and will construct and evaluate devices. They will learn about the impact of energy use on the environment, the meaning and importance of conservation, and the effects of energy shortages on their lifestyles” (OCUP, 2002c).

She noted that she is looking forward to using the unit; however, she will need to alter the lessons to fit her timetable, class, and language (she teaches in French and the unit is in English).

Thus, the website could be quite useful for those who know about it; however, it is definitely limited in scope. It appears to be a useful resource that can be used for teaching short units throughout the school year. Further development of the OCUP units could be extremely helpful to teachers, particularly the Science and Technology units with regard to Environmental Education. Clearly the website should be promoted more widely, including possible workshops to demonstrate its usefulness (rather than relying on word-of-mouth and hoping that teachers will learn about it on their own time).

5.5 Major Findings

The major findings from the teacher interviews are summarized in Table 5.4. Many of them are consistent with the literature research reported in Chapter Two and the Curriculum investigations reported in Chapter Three. Table 5.5 has been created to assist in demonstrating the linkages between the teacher interviews and the major challenges identified in Chapters Two and Three.

The analysis provided in Table 5.5 indicates that many of the challenges identified through the literature research are in fact being satisfied in the delivery of environmental education in Grades 4-6 in the two school boards. For example, there are several positive indicators concerning students:

- Students' attitudes about the environment are being affected positively while they are still young.
- Environment clubs, waste audits, and other informal educational activities are establishing the school as an environmental role model, developing concern for the environment, and serve as a means of creating a feeling of accomplishment for the students.
- Students are exposed to a broad spectrum of materials which serve to incorporate a variety of perspectives.

Table 5.4: Major Findings of the Teacher Interviews

- The teachers deemed environmental education to be important.
- The majority of teachers did not have any formal training relating to the environment.
- Students are exposed to a broad spectrum of environmental topics and materials through both formal and informal educational mechanisms.
- It is more effective and practical to teach environmental education as concepts imbedded in existing courses, rather than teaching it as a separate course.
- Environmental education is typically addressed in the subjects of Science and Social Studies.
- Very little environmental teaching is done outdoors.
- Teachers use a variety of resources for environmental teaching.
- Some teachers are seeking assistance in obtaining environmental resources, and help with learning how to incorporate the lessons into the curriculum.
- Teachers experience pressures on their time which limits their ability to seek out and make use of resources for environmental education.
- There is a need for more French language environmental resources.
- Teachers believe that students show concern for the environment, and that lessons learned in school can help build their environmental knowledge base.
- Environment Clubs are a common informal environmental education initiative in schools, and are an important part of the educational strategy used by teachers.
- Environmental audits are a common activity within schools and are often undertaken by Environment Clubs.
- There is a lack of awareness amongst teachers of major environmental initiatives by both the Public and Catholic School Boards.

Table 5.5: Linkages between the “Challenges” and the Teacher Interviews

“Challenges” from Chapters Two and Three	Related Findings from Interviews
Creating a feeling of accomplishment	Environment Clubs and awards are widespread.
Incorporating a variety of perspectives	Students are exposed to a broad spectrum of topics and materials.
Incorporating environmental education	Teachers agreed that it is more effective and practical to imbed environmental education in other courses. Environment is typically taught as part of Science, and partly in Social Studies.
Re-establishing the linkage between the individual and the environment	There is a distinct lack of teaching activities outdoors but teachers reported that students show concern for the environment.
Formal and informal environmental education	Schools use a mix of formal and informal teaching mechanisms.
The importance of environmental education	Not unexpectedly, these teachers felt environmental education is important.
Policies for environmental education	None of the teachers mentioned environmental education policies, despite the existence of one in the Catholic School Board.
The school as a role model	Teachers reported many activities such as recycling, composting, school ground naturalization projects in which the school is encouraging an ethic of environmental care.
Field trips	These teachers conducted very little teaching outdoors and reported that they did not go on many field trips.
Environmental waste audits	Environmental waste audits are a common activity in schools and are often undertaken by Environment Clubs.
The role of the teacher	Most teachers did not have formal environmental training. Some indicated that they were only somewhat aware of environmental issues in the curriculum, while others incorporated environment beyond the curriculum requirements.

Teaching methods	Teachers reported time pressures and limited assistance with environmental resources and lesson planning.
Promise versus performance	Teachers reported little assistance in helping them teach the environmental requirements of the curriculum and indicated that, while students show concern for the environment, the students need help enhancing their knowledge of environmental issues.
Factors influencing children's environmental attitudes	Teachers reported that their elementary students show concern for the environment, which the literature research indicates is key because attitude structures are well formed by the end of high school.
The teacher's perspectives on environmental education	Teachers felt environmental education is important, and seemed willing to incorporate environmental education into the curriculum but are asking for assistance to incorporate resource materials.
The limitations of teaching indoors and the challenge of teaching outdoors	Teachers mentioned that time is limited and difficulties exist in organizing outdoor teaching activities.
Resources	Teachers use a variety of resources and need more, but seemed unaware of some of the significant efforts by school boards to provide such assistance as resource centres. Teachers are seeking more French language resources.
Standardized testing	These teachers expressed concern about standardized testing but it was not raised as a major issue during the interviews.
Teacher resource centres	Those teachers from the Catholic Board, which has teacher resource centre, did not raise it as a major source of teaching support. The teachers from the Public School Board, which recently closed its teacher resource centre, expressed concern about its closure.

Positive features with regard to teachers include:

- The teachers believe that environmental education is important and have found a variety of formal and informal educational strategies to implement environmental education in Grades 4-6. For example, teachers support the Environment Clubs, environmental awards and other informal environmental education efforts done by the Environmental Club.
- The teachers believe that imbedding environmental education in other courses is an effective teaching strategy, which is consistent with the approach that is being used in the curriculum.

There are a few areas where it appears that positive steps, for environmental education, are being taken; however, there is a need for better communication and promotion. Promotion of the environmental initiatives by both the Public and Catholic School Boards may be necessary, particularly with regard to incorporating environmental education into the formal sector. It is possible that teachers may simply not have mentioned certain points during the interviews; however, if teachers are in fact not aware of the efforts to incorporate environmental education into the curriculum, and the assistance for teachers in preparing their lesson plans, the efforts may be wasted.

Major areas where there is a need for better communication and promotion include: policies for environmental education, teacher resource centres and other resource availabilities. For instance,

- No teachers mentioned the Catholic Board's commitment to environmental education in its Environmental Education Policy, and no teachers mentioned the Board's Environmental Action Committee, or any assistance it may provide with the teaching of environmental education.

- Only one teacher made any mention of the Catholic Board's Teacher Resource Centre.
- Only one teacher was aware of the Public School Board's recent launch of its environmental partnership program (Project X), and only one teacher made reference to the Board's two Outdoor Education Centres.
- Another interesting fact was that 3 of the 5 Public Board teachers interviewed, noted that they had once had access to a Teacher Resource Centre, but it had been closed. Their concern over its closure, and hope for a new Resource Centre was significant.

Finally, Table 5.5 indicates that there are a few areas requiring special attention:

- The lack of outdoor teaching, particularly fieldtrips, will make it difficult to establish linkage between the individual and the environment unless there is extensive informal student contact with the environment, away from the school environment.
- Teachers reported time pressures which limited their ability to find resources and incorporate them into other courses as the curriculum requires. Some of that time pressure may be caused by standardized testing or other factors; however, from the teachers' perspective, they feel a need for some assistance in identifying environmental resources that can be adapted for their lessons.
- Amongst the teachers interviewed, there was limited in-service training that was directly applicable to environmental education. Perhaps universities and school boards could coordinate their efforts to provide teachers with opportunities to take part in brief courses, that match teachers' availability (e.g., summer time), to assist elementary school teachers with incorporating environmental education into elementary classrooms.

Chapter Six

Conclusion

The purpose of this thesis was to explore some of the challenges associated with environmental education. In particular, it addressed challenges associated with environmental education in the *formal* sector, specifically in the elementary school setting, with a focus on Grades 4-6. The thesis provided a background on environmental education research, and then demonstrated the challenges of incorporating environmental education at three increasingly finer levels: the province of Ontario's elementary curriculum guidelines, two school board's environmental education strategies, and teachers responsible for the teaching of environmental education.

Given the importance of environmental issues and their links to other aspects of society (health, law, business, geography, science, etc.), it is important that teachers and students have access to a wide-range of environmental information that exposes them to multiple perspectives. Environmental education is important because it provides people with the opportunity to become literate on environmental issues, and it enables people to integrate ecological thinking into social and economic planning. As well, it can help enhance critical thinking, problem solving and decision making skills, and it teaches people to weigh various sides of issues in order to make informed, responsible decisions.

Given the growing concern about both local and global environmental issues, improved understanding of these complex issues will be key to gaining the necessary commitments to resolve the problems, and with an adequate understanding of the natural

environment, people will be able to intelligently engage in and evaluate environmental debates. By teaching *children* to appreciate and respect environmental resources, as well as teaching them about a wide range of environments, and perspectives on environmental issues, they should have better skills for making future decisions regarding the environment. As Eagles and Demare (1994) noted, it is important that both formal and informal environmental education programs are directed at children at an early age because they experience a major development of their attitudes during their younger years, and their attitude structures are well-formed by the end of high school.

A review of literature on environmental education (Chapter 2) helped provide a background on the field, its evolution over the past four decades, and some of the challenges that environmental education has faced. Environmental education was spurred in the 1960s when the organized environmentalist movement began. In the following four decades, it has undergone significant change and has been greatly shaped by landmark conferences, publications, and perspectives on theory and research. The principles of environmental education that grew out of the Tbilisi conference in 1977 have become widely accepted, and form the basis of most environmental education definitions.

Given that environmental education is still a relatively new field, it is still maturing, and continued research and dialogs on the subject can help shape its development. There is still debate in the field as to how it should be incorporated into the formal sector (i.e., as a separate course or imbedded in existing courses), how it should be taught, and what it should accomplish.

Today, societal concern about the extensiveness of human impacts on the environment has led to a greater emphasis on environmental education in K-12 classrooms. Environmental education is a relatively new topic within the school curriculum, and due to its interdisciplinary nature, it faces many challenges in being incorporated into schools that are typically based on a disciplinary structure.

The Independent Commission on Environmental Education (ICEE, 1997) noted that in practice, environment-related themes and topics appear most frequently in science courses, occasionally in social studies courses, and less frequently elsewhere. Well-designed curriculum guidelines can incorporate environmental topics; however, they compete for time and space in already crowded curricula. Palmer and Neal (1994) suggested that by adopting an environmental teaching and learning model that incorporates learning “in”, “about”, and “for” the environment, students will be better prepared to acquire the knowledge, skills, and attitudes that are critical to the aim and content of environmental education.

Environmental education in schools can, and should, include both formal initiatives (based on curriculum taught by teachers) and informal initiatives (learning opportunities outside of curriculum-based lessons). Both schools and teachers play an important role in educating students; however, they face challenges such as those associated with resources, teaching outdoors, and standardized testing.

The Ontario Ministry of Education and Training’s elementary curriculum (Chapter 3) does not specifically make reference to Environmental Education. Its method of incorporating environmental education is to imbed it with existing courses, typically, Science and Social Studies. This method is beneficial as it helps students understand that

the environment penetrates a variety of issues; however, the integrated structure is creating time and resource pressures for the teachers.

Ontario should consider approaches used in other provinces, such as British Columbia and Manitoba that provide teachers with lists of reviewed, recommended resources to assist them with their lesson planning, preparation, and presentation. Teacher resource centres can also assist teachers with their lesson planning, as well as ensure effective and efficient use of time, space, and finances (avoids duplicated resource purchases). Unfortunately, teacher resource centres are often subject to closure during periods of government budgetary cutbacks.

The Public and Catholic school boards in this study have each developed their own strategies for the inclusion of environmental education in their schools. The Public Board launched a new environmental education program (referred to in the thesis as “Project X”), in October 2003 which is activity-based, curriculum aligned, and focuses on energy conservation, waste reduction, and water conservation. It shows promise in that it assists teachers with lesson plans, includes both formal and informal learning strategies, and exhibits key characteristics (integrated, activity-based, and supportive of knowledge, attitude and skill development). As well, it avoids the challenge of generating funding for an environmental education program, by lowering utility bills and investing the resulting cost savings in the program. If Project X proves to be successful, other school boards could also adopt the environmental education program, and adapt it to their own needs. In fact, other provinces could make use of Project X as well, as long as changes are made to suitably match it to their curriculum. The Public Board also supports two outdoor education centres; however, more support is required to ensure that

the number of visitors to the Centres might recover to previous levels and that teachers are aware of the Centres as a teaching resource and fieldtrip opportunity.

The Catholic Board strategies for supporting and incorporating environmental education include a teacher resource centre, a policy on environmental education and an environmental action committee. The teacher resource centre appears to be a useful source of information on environmental issues; however, teachers may not be using the centre to its fullest potential, due to lack of awareness. The Board's policy on environmental education appears promising; however, teachers do not seem aware of it. The Environmental Action Committee focuses on informal environmental education initiatives (primarily related to environmental awards and waste audits) and although they have assisted in creating a sense of accomplishment for the students, and in developing an ethic of environmental care, this should be complimented by more initiatives to incorporate environmental education into their formal lessons.

The goal of the primary research was to determine: (1) teachers' perspectives on environmental education, (2) environmental education teaching strategies, and (3) availability and accessibility of environmental education resources within two school boards in Ontario, Canada. The methodology for the primary research (Chapter 4) indicated that the original design of the research project was to involve three phases: teacher interviews, classroom observations, and student focus groups. Unfortunately, challenges associated with conflicting school schedules and recruitment procedures limited the scope of the primary research to the first phase of the research project. However, a considerable amount of information was collected and the data collected during the teacher interviews was deemed valid due to the consistency of responses on

the major topics. For example, when responding to several parts of the interview questions, each of the nine teachers interviewed referred to a lack of available time, and how useful a list of reviewed, recommended resources would be to them.

The primary research (Chapter 5) indicated that while challenges associated with environmental education remain, some of them are being satisfied by initiatives within the Public and Catholic school boards participating in this study. Teachers reported that they perceive environmental education to be important, and seemed willing to incorporate it into their lessons, but asked for assistance to incorporate resource materials. As well, they noted that the most effective way to teach environmental education is to imbed it within the existing curriculum, which is consistent with the way that it is currently structured. They noted that their students do not lack concern of the environment, rather they need help enhancing their knowledge of environmental issues. Unfortunately, the teachers indicated that their ability to enhance the students' knowledge is constrained by a lack of available time and lack of assistance with resources.

The teachers indicated that strategies for incorporating environmental education vary, and are influenced by a number of factors; however, they typically include a wide-variety of perspectives. With regard to the availability and accessibility of environmental education resources, teachers indicated that they use a range of teaching resources, however, there is a need in environmental education for: French language resources, prepared lesson plans, and a list of reviewed, recommended resources.

The primary research helped highlight the fact that although the School Boards have some good initiatives to support environmental education (e.g., Teacher Resource Centre, two Outdoor Education Centres, adoption of Project X), there is a need for more

communication and promotion of such initiatives as many of the teachers interviewed were not aware of them. The Ministry and the Boards, should consider strategies to assist teachers with integrating environmental education into their formal lessons. Suggestions include: creating a comprehensive list of resources on the World-Wide-Web (similar to the one I supplied to the teachers during the interviews), creating a list of reviewed, recommended resources, and providing teachers with in-service training, or opportunities for brief summer courses related to environmental education.

Overall, the primary research with the teachers, addressing the challenges associated with environmental education, was extremely valuable and it complemented some of the information gained in the literature review. Perhaps most interestingly, it indicated that although challenges remain, some of the challenges identified in the literature review, appear not to be problems, as they have been dealt with through innovative informal and formal initiatives. As well, the study was valuable due to the fact that a lot of research on environmental education focuses on students; however, this study brings attention to the needs of teachers.

The results of the primary research differed from Paula Carty's research in 1996 which noted that:

“environmental education risks moving backward. Environmental learning within the formal education structure is being locked into the position of only “teaching about” the environment, instead of offering an integrated approach. Teachers will be, by necessity, reliant on external sources of environmental information such as media environmental coverage. Students' environmental experience will only be gained primarily outside the school system” (Carty, 1996, 125).

In the eight years since Carty's research was published, environmental education has made significant advances, and innovative strategies to incorporate environmental education are in fact gradually moving environmental education forward. Environmental learning experiences have been incorporated into different aspects of the formal and informal sectors of schools (to different extents), and students have not been limited to experiences outside of the school system. Teachers reported many environmental learning experiences, particularly those gained through Environment Clubs which have undertaken projects such as: recycling, composting, and school ground naturalization projects which encourage an ethic of environmental care. Although there is still a tendency to teach "about" the environment, considerable efforts have been made to teach "for" the environment as well.

Unfortunately, there are still limited opportunities for students to learn "in" the environment and this remains a significant challenge. All three dimensions of the "in", "about", "for" teaching and learning model need to be given support for students to fully realize the interactions between humans and the environment.

Interestingly, the results of the primary research for this thesis were similar to the results obtained by the North American Association for Environmental Education and the Environmental Literacy Council (2000). In their study, 1505 Kindergarten to Grade 12 teachers in the United States of America responded to a random survey that gathered information on how education about the environment is conducted in the classroom. They concluded that:

"there is relatively wide student exposure to at least some level of education about environmental topics. Most of this exposure takes place within the context of courses which are not devoted specifically to the

environment. This preference for inclusion of environmental topics in other course versus teaching courses about the environment may not necessarily be a weakness if it results in demonstrating the relevance of environmental issues to a number of fields” (North American Association for Environmental Education and the Environmental Literacy Council, 2000, 32)

They also indicated that the majority of teachers of environmental topics did not report having environmental training, and that they use a variety of sources for teaching materials (including the Internet, and more traditional sources such as commercial publishers).

Thus, although the scope of the primary research for this thesis was limited, the findings are similar to a study which was conducted on a much larger scale. Feagin, Orum & Sjoberg (1991) noted that while an individual case study may not necessarily provide results that can be generalized, small studies can offer detailed descriptions which may be useful for theory testing and generation, particularly when combined with insights from other related case studies.

Looking forward...

It is important to remember that environmental education encourages life-long learning. It is not expected that students, teachers, educators, the public, or the field itself will instantly accommodate environmental education. It is an on-going process that develops through time and space at varying speeds. Due to the fact that the field of environmental education is still relatively young, and that there are many challenges associated with it, it is not expected that changes will be rapid.

For instance, it is possible that teachers could better enhance students' knowledge of environmental issues if the teachers were provided with more opportunities for in-service training, or access to reviewed, recommended resources. As well, as previously stated, worthwhile efforts by the two school boards in the study could be furthered through better communication and promotion of environmental education initiatives.

Another way to strengthen environmental education would be if the Ontario Ministry of Education and Training made a firm commitment to environmental education in the curriculum guidelines, as it would set an example for others to follow. It would also help if the curriculum guidelines, other than Science and Social Studies, made suggestions on how environmental issues could be integrated (e.g., in Language Arts). Likewise, if school boards made bolder commitments to environmental education, made strong recommendations, or mandates to support environmental initiatives (e.g., Project X), the full potential of such initiatives could be better realized.

The Ministry, the school boards, the schools themselves as well as the teachers all serve as role models to students. Children should be given balanced opportunities to learn "about", "for, and "in" the environment, and have a sense that their actions can make a difference. The primary research indicated that a priority for the future must be to enhance learning "in" the environment. The students of today, will be making decisions that will shape the future of the environment. By educating them about the environment now, they will develop an early sense of social responsibility, and they will be better prepared to engage intelligently in more complex debates about the environment by the end of high school.

Environmental learning experiences both inside and outside the classroom play a critical role in inspiring students' sense of wonder about the world. I hope that I have been able to contribute to the inspiration of students in the future and I especially hope that the insights in this thesis provide feedback on environmental education that will improve existing resources and/or result in the creation of new teaching and learning resource material.

“If children love nature, they will find ways to be concerned and to take action. But the first thing is to show them the wonder, the magic, the diversity and the complexity of nature. And there is nothing more positive than that” (Suzuki, in Andrews, 2000, 17).

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The Three Dimensions of Learning: Knowledge, Skills and Attitudes

Knowledge and Skills:

- i) To develop a coherent body of knowledge about the environment, both built and rural, sufficient to recognize actual and potential problems,
- ii) To be able to gather information from or about the environment independently or as part of co-operative activity,
- iii) To be able to consider different opinions related to environmental issues and to arrive at a balanced judgment,
- iv) To appreciate the ways in which environmental issues are interrelated so that one factor affects others,
- v) To be able to evaluate information about the environment from different sources and to try to resolve environmental problems,
- vi) To understand and to know how to use the mechanisms available in society for bringing about environmental change.

Attitudes and Behaviour

- i) To develop an appreciation of the environment and critical awareness of the natural and built environment,
- ii) To develop an attitude of concern for environmental matters and wish to improve environmental understanding,
- iii) To be critical of one's own environmental attitudes and to take steps to change one's own behaviour and actions,
- iv) To have a desire to participate in initiatives to care for or improve the environment,
- v) To wish to participate in environmental decision-making and to make opinions known publicly.

(Council for Environmental Education/CEE 1987, in Palmer & Neal, 1994, 20-21)

Environmental Education Kits (Grades 1-6) Available in Ontario
Through Green Street

1. CPAWS Endangered Species Program
(Delivered by Canadian Parks and Wilderness Society)
2. Quagmire: A simulation Game for Wetland Decision Making
(Delivered by Clean Nova Scotia)
3. Wetlands I
(Delivered by Ducks Unlimited Canada)
4. Wetlands Field Trip I
(Delivered by Ducks Unlimited Canada)
5. EcoKids Club
(Delivered by Earth Day Canada)
6. School Ground Greening
(Delivered by Evergreen)
7. Eco-Pals
(Delivered by The Green Group)

For more information on the above Environmental Education Kits, please go to the following website:

(http://www.green-street.ca/programs/element_program_e.asp?provinceid=5)

Environmental Education Resources

Thank you for participating in my research on Environmental Education (EE). To assist you in your lesson preparation, and to help you learn more about EE, I have compiled a list of resources available on the web. Please note that this is only a sample of the information that is available on the web, and it is listed in no particular order. The descriptions of the organizations and their websites include phrases that have been taken from the websites themselves and were written by those within the organizations. Many of the websites provide: information on EE, teaching and learning resources (some of which include prepared lessons which have been linked with curriculum guidelines), links to other valuable websites, and some offer free Environmental Education Kits.

The North American Association for Environmental Education (NAAEE)

A Network of professionals and students working throughout North America and in over 55 countries around the world. The North American Association for Environmental Education promotes a healthy, sustainable environment through education. NAAEE provides support for environmental education and educators through a variety of programs and activities. Obtain EE support materials on their Publications page. Check out ongoing Projects and their annual Conferences. They also offer numerous Resources for Educators, Job Opportunities, a National Events Calendar and much more.

<http://www.naaee.org>

Green Teacher Magazine

A magazine by and for educators to enhance environmental and global education across curricula at all grade levels (K-12). Selected articles and activities, as well as subscriptions can be accessed online. Developed in Canada by Tim Grant and Gail Littlejohn.

<http://www.greenteacher.com/>

Learning for a Sustainable Future (LSF)

Learning for a Sustainable Future is a Canadian nonprofit organization whose mandate is to work with educators from across Canada to integrate the concepts and principles of sustainable development into the curricula at all grade levels.

<http://www.schoolnet.ca/future/>

Evergreen

Learn how this organization is working to create healthy cities through innovative community naturalization projects across Canada - on school grounds, on public lands, and on the home landscape.

<http://www.evergreen.ca>

*** http://www.evergreen.ca/en/lg/plans_listing.html

(Lesson Plans with Provincial Curriculum links)

Canadian Nature Federation

A non-profit conservation organization with over 40,000 supporters and a network of more than 100 affiliated naturalist groups. The CNF's mission — to protect nature, its diversity and the processes that sustain it — reflects our roots.

<http://www.cnf.ca>

Are you looking for an exciting and effective education program for your classroom? The Canadian Nature Federation's FrogWatch Teachers' Guide and Species at Risk Kit are now offered free through Green Street.

<http://www.cnf.ca/greenstreet/index.html>

Green Street

Green Street is a Standard of Excellence for high quality Environmental Education programs that are provided by prominent Canadian environmental organizations.

Are you looking for an environmental education program that is:

Free?

Credible?

Pre-screened and curriculum aligned?

Provided to elementary and secondary schools across Canada?

Based on creative pedagogical approaches?

Action oriented and encourages student engagement?

Designed for minimal teacher preparation and on-going teacher support?
Based on the Principles of Excellent Environmental Education Programs?

*Register for as many Green Street programs as you want!

*All Green Street approved programs are delivered to your school free of charge.
Funding for Green Street is provided by The J.W. McConnell Family Foundation.

Ontario Elementary Programs (Grades 1-6)

** http://www.green-street.ca/programs/element_program_e.asp?provinceid=5
<http://www.green-street.ca/>

Project Learning Tree

Project Learning Tree® (PLT) is an award winning, broad-based environmental education program for educators and students in Pre-K - grade 12. PLT helps students learn HOW to think, not WHAT to think, about the environment. PLT, a program of the American Forest Foundation, is one of the most widely used environmental education programs in the United States and abroad.

<http://www.plt.org>

David Suzuki Foundation

The David Suzuki Foundation website provides information on topics such as: Climate Change, Forests and Wild Lands, Oceans and Fishing, and the Web of Life. It also provides information on the David Suzuki Foundation and has a weekly column written by David Suzuki. The Suzuki Foundation publishes books about a variety of environmental issues, for both adults and children (e.g., “You are the Earth”, and “Eco-Fun”), and the website includes a link to its publications.

<http://www.davidsuzuki.org/>

Destination Conservation

Destination Conservation (DC) is a practical, activity-based program that brings environmental education alive in our schools. It not only combines hands-on learning with resource conservation, it saves school districts money! There are 914 schools across Canada participating in Destination Conservation. There are 86 schools actively involved in the **Destination Conservation** program in Ontario, Canada. The website includes links to DC Program Materials (Student Technical Audits, Lifestyle Campaigns, Action Modules), a Student’s Corner (cool green sites, fact sheets, etc.), and a Teacher’s Lounge (resources, funding, etc).

<http://www.dcplanet.org>

Earth Day Canada

Earth Day Canada (EDC) is a national charitable environmental communications organization. EDC is mandated to improve the state of the environment by empowering Canadians to take action and achieve local solutions. As well as hosting other valuable information, EDC has an interactive portion of their website designed specifically for students, teachers, and parents. (<http://www.ecokids.ca/pub/index.cfm>)

<http://www.earthday.ca>

The Green Group

The Green Group is a charitable organization that was established in 1991 to provide environmental programming to school-aged children, their teachers and families. Over the past thirteen years, The Green Group has provided highly valuable and successful programs such as the Comprehensive Litter-Less Lunch, the Composting Crew, the Clean Up Challenge, the Green Kid Club and ECO-PALS to more than 3,500 schools across Canada and the U.S. This is a Green Street approved program. Applications are invited in September of each year with a September 30th deadline for registration. Up to 500 classes are accepted on a first-come, first served basis each year. Classes in grades Kindergarten to nine in all parts and provinces of Canada are welcome to register.

<http://www.green-group.com/>

Canadian Parks and Wilderness Society (CPAWS)

The Canadian Parks and Wilderness Society is committed to promoting awareness and understanding of ecological principles and the inherent values of wilderness through education, appreciation and experience. CPAWS produces educational publications, some CPAWS chapters organize wilderness outings, some have staff dedicated to community outreach, and one ([Calgary/Banff](#)) has staff dedicated to curriculum reform, written activities for teachers, and offering school programs on ecology and conservation. Education is a key component of the Canadian Parks & Wilderness Society - Calgary/Banff Chapter - a not for profit, non governmental organization.

The Calgary/Banff Chapter's CPAWS Education team, helps teachers and students take informed action on important conservation issues such as endangered species, or the protection of Alberta's threatened ecosystems – as the culmination of a curriculum-based education process.

CPAWS believes in helping teachers, and they don't mind doing it for free! Lessons and activities, the edu action listserv, and the edu-action library are available at:

<http://www.cpawscalgary.org/education/free-resources/index.html>

<http://www.cpaws.ca/>

Environment Canada

"The Green Lane" is Environment Canada's Internet resource for weather and environmental information. "The Green Lane" helps connect Canadians, exchange information and share knowledge for environmental decision-making. It includes information on Acts and Regulation, Programs and Services, Conferences and Events, and includes links to related resources.

<http://www.ec.gc.ca>

Sierra Club

The Sierra Club is a grassroots organization. The Sierra Club of Canada's Eastern Canada Chapter has a mission to protect and restore the health of the natural environment, including human communities, in Ontario and Quebec, by empowering the membership and citizenry through education, advocacy, action and outdoor adventures.

<http://www.eastern.sierraclub.ca/home.asp>

Enviro-Link

The EnviroLink Network is a non-profit organization founded in 1991. EnviroLink maintains a database of thousands of environmental resources and provides internet services to non-profit organizations. EnviroLink does not take any positions on any specific environmental issues; it exists solely to act as a clearinghouse on the Internet for the environmental community, which is incredibly diverse in its views.

<http://www.envirolink.org/>

Ducks Unlimited Canada

Ducks Unlimited (DU) conserves, restores and manages wetlands and associated habitats for North America's waterfowl. These habitats also benefit other wildlife and people. DU's efforts in education are aimed at fostering public awareness of the value of wetlands and encouraging support for their conservation. Ducks Unlimited provides free resource materials to assist educators in meeting curriculum requirements in the life sciences (based on guidelines established in the Common Framework of Science learning Outcomes; Pan-Canadian Protocol for Collaboration on School Curriculum published in 1997). DU has developed three units in the wetland ecosystems series. Each unit consists of an educator's guide and accompanying student journal.

Link to the teacher resource page: <http://www.ducksunlimited.ca/edu/resource.html>

General Link: <http://www.ducksunlimited.ca/>

World Wildlife Fund (WWF)

World Wildlife Fund (WWF) was established to conserve wildlife and wild places. Since its founding in 1961, WWF has effectively safeguarded hundreds of species and millions of acres of wildlife habitat in pursuit of three goals: the preservation of the Earth's rich biodiversity; the sustainable use of natural resources; and the reduction of pollution and waste. WWF has a strong education program called "Schools for Wildlife." Through the support of concerned educators, WWF reaches thousands of classrooms and clubs throughout the school year with conservation-oriented curriculum materials. The mailings are free and include visual aids, conservation news and activities to inform and encourage young minds.

Teacher's corner: <http://www.wwf.ca/satellite/wwfkids/teacher/index.html>

Kids and Teachers Site: <http://www.wwf.ca/satellite/wwfkids/index.html>

General Link: <http://www.wwf.ca/Default.asp>

Office of Research Services
Faculty of Graduate Studies and Research
1125 Colonel By Drive
Ottawa, ON Canada K1S 5B6
Tel: (613) 520-2516
Fax: (613) 520-2521

13 May 2003

Ms. Erica Wilson
Department of Geography
Carleton University
1125 Colonel by Drive
Ottawa, Ontario
K1S 5B6

Re.: Ethics Clearance

Dear Ms. Wilson,

The Carleton University Research Ethics Committee has reviewed your ethics application for the project entitled *Evaluation of Teaching and Learning Resource Materials for Environmental Education* and given it approval.

The guidelines in terms of an ethics clearance from the Carleton University Research Ethics Committee are as follows:

1. Ethics clearance is valid for one-year (from date of this letter). If you do not complete the research portion involving human participants indicated in your proposal within that time frame you must contact the Research Ethics Committee so the research project can be considered for an extension.
2. Should there are any significant changes to the proposal you are obligated to contact the Research Ethics Committee with the changes.
3. Should any participant suffer negatively from the research please report this to the Research Ethics Committee and indicate what steps you have taken to resolve the situation.
4. Finally, this office will contact you annually to review the status of the research project, and if necessary the Research Ethics Committee will convene to review any problems that have occurred over the course of the year.

If you have any questions please do not hesitate to contact me. On behalf of the Carleton University Research Ethics Committee I wish you the best of luck with your research.

Yours truly,

Dear Ms. Wilson,

The [REDACTED] Research Advisory Committee met on May 27, 2003 and reviewed your research proposal entitled *Evaluation of Teaching and Learning Resource Materials for Environmental Education in Grades 4-6*. On behalf of the committee, I am pleased to inform you that your research proposal was approved.

Members of the committee made these suggestions and asked me to convey them to you.

1. Generally, the committee discourages initiation of research with teachers in the month of June simply because of time restraints. It was suggested that you may have a better response from teachers if your work began in September. We do however appreciate your need to gather preliminary information before your direct involvement in classrooms and the focus groups with children and leave this decision up to you.
2. We would caution you that you may experience some difficulty in interviewing teachers in the months of July and August.
3. We understand your concern with being precise in providing information to parents and guardians in order to procure consent. We would like to suggest that you consider rewording the parent and guardian letter in a more "conversational" style in the hope that you will gain a larger number of participants in your focus groups.

Should you need further information, kindly contact [REDACTED]
[REDACTED]

On behalf of the committee, I would like to wish you every success in this endeavour.

Respectfully,

[REDACTED]
Principal

[REDACTED] District School Board

On behalf of the [REDACTED] Research Advisory Committee

Office of Research Services

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**An Opportunity to Participate in
The Evaluation of
Resource Materials for Environmental Education in Elementary Schools
Parent/Guardian Consent Letter and Consent Form**

I am a Graduate student at Carleton University and in partial fulfillment of my Master's thesis, I am conducting research on the challenges associated with environmental education, particularly in the elementary school setting (Grades 4-6). My research plan is to evaluate teaching and learning resources for environmental education, as currently available within the XXXXXXXX District School Board, by interviewing 15-20 teachers, making classroom observations, and conducting student focus groups.

Environmental education is important because only by developing a familiarity with the natural environment can students come to understand how it may be used/abused. Only with an adequate understanding of the natural environment will they be able to judge the quality of environmental debates by the end of their high school experience.

I will work with both teachers and students to assess the curriculum, while using my skills as an environmental professional to provide feedback and possible enrichment to existing course materials. I am enthusiastic about working with students and hope that through the combined efforts of students, teachers, and myself, we will be able to better assess the strengths of environmental education in the curriculum, and the potential future needs of both teachers and students.

This research project has already been approved by Carleton University's Research Ethics Committee, the XXXXXXXX Research Advisory Committee and by the principal of your child's school. Student participation will include group discussions and activities involving environmental subject matter. I will be making observations on lesson presentation in the classroom and overall student reactions to the lessons. At the conclusion of the observations, a focus group of students (selected from those who have parental consent) will be convened to obtain student feedback. During the lessons and focus group session, students will be asked to behave in a manner that is consistent with regular class behaviour, to be candid when responding to questions and/or questionnaires, and to participate in new activities (possibly indoor and outdoor) if opportunities arise. Such new activities may be based on the Canadian Nature Federation's Environmental Education Kits that have been designed to match curriculum in each of Canada's provinces and territories.

Only students with written permission may participate, and participation will take place during class time, over 2-3 lessons (approximately one hour per session), at the teacher's convenience to minimize interference with daily routines. The focus group will be brief (approximately 10 minutes/focus group, with about 5 students/group), and will take place at the end of the third lesson in a supervised area such as the library. No information will be collected from individual student's files or records, and there will be no use of video or audio equipment.

Participation is voluntary and individuals may withdraw from the study at any time without giving a reason and with no adverse consequences.

The information collected will be used in my thesis to evaluate topics such as: environmental learning in the formal sector, student and teacher constraints, and access to current environmental information. Upon completion, a summary of the research will be available to participants, school staff, and parents, and a final report will be provided to the school board (all reports will respect the anonymity of all participants). The results of the study will not appear in any school records and will be reported in ways that ensure complete confidentiality.

I am looking forward to the opportunity to work with your son/daughter and his/her teacher.

Sincerely,

Erica Wilson
M.A. Candidate, Geography
Carleton University

**** If you have any questions about the interview process, or would like to learn more about my findings, feel free to contact me. If you have any ethics concerns, or complaints, you can contact the Carleton University Ethics Committee Chair. ****

Research Applicant:	Erica Wilson	XXXXXXXXXXXXXXXXXX	###-###
Thesis Supervisor:	Dr. J. K. Torrance	XXXXXXXXXXXXXXXXXX	###-### x ###
Carleton University Ethics Committee Chair:	Prof. Klaus Pohle	XXXXXXXXXXXXXXXXXX	###-### x ###

Consent Form

The information collected for this project is confidential and protected under the Municipal Freedom of Information and Protection of Privacy Act, 1989.

I have read and understood the request for my participation in the study of an "Evaluation of Teaching and Learning Resource Materials for Environmental Education in Grades 4-6." I have discussed it with my son/daughter and...

☐ I give permission for my son/daughter to participate.

☐ I do not give permission for my son/daughter to participate.

Date: _____

Name of Student: _____

Name of Parent/Guardian: _____

Signature of Parent/Guardian: _____

<p><u>Title of Project:</u></p> <p style="text-align: center;">Evaluation of Teaching and Learning Resource Materials for Environmental Education in Grades 4-6</p> <p><u>Research contact and e-mail address:</u></p> <p>Erica Wilson <u>XXXXXXXXXXXXXXXXXXXX</u> ###-#### M.A. Candidate in Geography, Carleton University</p>
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What this research is all about: Environmental Education

I am particularly interested in the resource materials available to elementary school teachers to assist them in lesson planning, preparation and presentation. My goal is to improve the ability of elementary school environmental education programs to inspire the students' sense of wonder about the world.

Strategies to be used at the school for collecting research information:

I wish to interview 15-20 elementary school teachers (individually) to discuss their backgrounds, approaches to teaching environmentally-related material and the sources of information that they can consult. The interviews will include teachers who have experience with the Canadian Nature Federation's (CNF) Environmental Education Kits or similar material, as well as teachers who work from their own experience. To augment the interviews, I wish to observe lesson presentation in the classroom, at the teacher's convenience, and conduct focus groups with students.

Amount of time needed at the school to complete this research:

15-20 Teacher Interviews: minimum of one hour/teacher (outside of class time; possibly at an external location; June-August 2003 - preferably July)

5-6 Classroom Observations: 2-3 lessons in each classroom as a silent observer (approx. one hour per lesson; totaling approx. 18 hours; September-October 2003)

Brief Focus Groups: approximately 10 minutes/focus group, approximately 5 students/group (after the third lesson of classroom observation; with students who have written parental/guardian consent; September-October 2003)

ADDITIONAL COMMENTS:

* It is important that the first portion of my research, involving the teachers, is completed or nearing completion, prior to entering the classrooms for observations in the Fall. It will allow me to learn more about the teachers' views (and potentially provide them with new Environmental Education teaching material), as well as to find teachers that are interested in having me make observations in their classrooms. It will also allow me to complete a portion of my research and write-up some of my findings during my Summer term. I hope to complete my thesis by the end of the Fall term.

* I am enthusiastic about the opportunity to work with your students and staff and eagerly look forward to hearing from you.

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**An Opportunity to Participate in
The Evaluation of
Resource Materials for Environmental Education in Elementary Schools
Teacher Consent Letter and Consent Form**

By way of introduction, I am Erica Wilson, B.A. Environmental Studies (Carleton, 2001), and M.A. Candidate in Geography at Carleton University. For my thesis research I am combining my interests in education and the environment to address the challenges associated with environmental education in the formal education sector, specifically Grades 4-6. My goal is to improve the ability of elementary school environmental education programs to inspire the students' sense of wonder about the world, with particular interest in the resource materials available to elementary school teachers to assist them in lesson planning, preparation and presentation.

I wish to interview 15-20 elementary school teachers (individually) to discuss their backgrounds, approaches to teaching environmentally-related material and the sources of information that they can consult. The interviews will include teachers who have experience with the Canadian Nature Federation's (CNF) Environmental Education Kits or similar material, as well as teachers who work from their own experience. It is desired to conduct the teacher interviews at the end of the 2002-2003 school year (June-August, July preferred). Each interview is anticipated to last a minimum of one hour per teacher. To augment the interviews, I wish to observe lesson presentation in the classroom during the Fall of 2003, at the teacher's convenience. This will require attendance at 2-3 sessions per class as conducted by 5-6 of the participating teachers. Following the last class I will conduct a focus group with students who have obtained parental/guardian permission to participate (10 minutes/focus group with about 5 students/group), in a supervised area such as the library. Teacher participation is voluntary, as is student participation in the focus groups. Only those teachers who grant permission in writing will be interviewed at a time and place that are convenient to you, to minimize interference with your daily routines and school schedule.

The research project has been approved by Carleton University's Research Ethics Committee, the XXXXX Research Advisory Committee and by the Principal of your school. No information will be collected from individual student and/or teacher files or records, and there will be no use of video or audio equipment, however I will be taking notes throughout our discussions. Participation is voluntary and you may withdraw from the study at any time without giving a reason and with no adverse consequences.

The interview questions are intended to guide our discussion on your experiences with environmental education. You are encouraged to be candid, to make additional suggestions and comments, and to consider incorporating new activities into lessons, based on the CNF Environmental Education Kits. The information that will be collected will be used in my thesis to evaluate topics such as: environmental learning in the formal sector, student and teacher

constraints, and access to current environmental information. The information that you share with me will be kept confidential and I will not reveal any names or identifying features (i.e., of you, your students, your school, or your school board). Upon completion, a summary of the research will be available to participants, school staff, and parents, and a final report will be provided to the school board (all reports will respect the anonymity of all participants). The results of the study will not appear in any school records and will be reported in ways that ensure complete confidentiality.

I am enthusiastic about both my research and with the opportunity to work with you. Given the growing emergence of environmental concerns, research on environmental education is extremely timely and has the potential to direct future environmental education initiatives. Your participation in this study is greatly appreciated.

Sincerely,

Erica Wilson
M.A. Candidate, Geography
Carleton University

**** If you have any questions about the interview process, or would like to learn more about my findings, feel free to contact me. If you have any ethics concerns, or complaints, you can contact the Carleton University Ethics Committee Chair. ****

Research Applicant:	Erica Wilson	XXXXXXXXXXXXXXXXXX	###-###
Thesis Supervisor:	Dr. J. K. Torrance	XXXXXXXXXXXXXXXXXX	###-### x ###
Carleton University Ethics Committee Chair:	Prof. Klaus Pohle	XXXXXXXXXXXXXXXXXX	###-### x ###

Consent Form

The information collected for this project is confidential and protected under the Municipal Freedom of Information and Protection of Privacy Act, 1989.

I have read and understood the request for my participation in the study of an "Evaluation of Teaching and Learning Resource Materials for Environmental Education in Grades 4-6."

By signing this consent form, I agree to participate in this interview.

Participant's Name

Participant's Signature

Date

Interviewer's Name

Interviewer's Signature

Date

Appendix I
Semi-Structured Interview Questions for Teachers

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Interview #: _____

1. What is your educational background? (degree) _____

2. How long have you been teaching? _____

3. What grades(s) do you currently teach?

4 5 6

4. Do you:

1. Teach the same group of students most or all of the day?
2. Teach the same subject to different students most of the day?
3. Teach several different subjects each day to different students?

5. Do you teach environmental topics?

1. Yes
2. No

6. Do you:

1. Teach a course(s) *about* the environment?
2. Include environmental topics *in other courses*
3. Both?
4. Other? _____

7. What **environmental topics** do you teach?

- a. Conserving energy
- b. Recycling and waste management
- c. Water quality
- d. Air quality
- e. Population growth
- f. Forests and wetlands
- g. Acid rain
- h. Global warming and the ozone layer
- i. Endangered species
- j. Other? _____

8. How long have you been *consciously* involved in the environmental education component of the curriculum? _____

9. Do you have much experience with the environment or environmental issues? If so, what?

10. What is your approach to environmental education?

11. **Where do you obtain environmental teaching materials?**

- a. Textbooks
 - b. Television or radio
 - c. Newspapers
 - d. News magazines
 - e. Journals
 - f. Internet
 - g. Library
 - h. Directly from groups or agencies
 - i. Other?
-

12. Of these sources, which *one* do you *use* the most?

13. Of these sources, which are you *most satisfied* with?

14. What's the main reason for your satisfaction?

- 1. Ease of locating materials
- 2. Cost
- 3. Quality of the sources
- 4. Other? _____

15. **Do you use materials from:**

- a. Business and Industry
- b. Environmental groups
- c. Local, provincial, or national educational agencies
- d. Local, provincial, or national natural resource/environmental management agencies?
- e. Educational groups (e.g. Nova)
- f. Commercial publishers

16. Of these materials, which one have you found the most useful? (a-f)

17. What's the main reason why you found it useful?

18. **How do you mainly *find out* about environmental education materials?**

1. Word of mouth
2. Conferences
3. Direct Mail
4. Internet
5. Catalogues
6. Attend training workshops
7. Other? _____

19. Have you ever obtained funding for environmental education materials, other than textbooks?

1. Yes (if so, from whom) _____
2. No

20. **Which of the following teaching methods do you use:**

- a. Discuss environmental topics covered in textbooks and/or other reading materials
- b. Hands-on activities or projects
- c. Independent or group research projects
- d. Debates on environmental issues
- e. Field trips
- f. Problem-solving exercises
- g. Civic action exercises (e.g., examining environmental legislation)
- h. Other? _____

21. Have you ever obtained financial support or time off for environmental training?

1. Yes
2. No

22. Prior to becoming a teacher, did you take:

- a. Courses or workshops in environmental teaching methods
- b. Courses or workshops in environmental science, ecology, or other environmental studies

23. Since you began teaching, have you taken:

- a. Courses or workshops in environmental teaching methods
- b. Courses or workshops in environmental science, ecology, or other environmental studies

(if yes....) If you have taken such courses or workshops since you began teaching, who provided the last course or workshop that you attended?

1. School or school district
 2. An education agency
 3. A provincial or national group (i.e. a non-profit organization)
 4. College or University
 5. Other?
-

24. Has your school had experience with environmental education kits before?

1. Yes (if so, which one(s)) _____
2. No
3. Don't know

25. Have you used lessons from environmental education *kits* before? Yes No

- a. *If yes*, how much do you use the pre-planned lessons, and how much do you use your own knowledge?
- b. *If yes*, who supplied them (i.e., Ministry of Education, Non-profit organizations, etc.)?

26. How do you prepare to teach environmental subjects?

27. How would you judge the quality of the resources that you use?

28. Do you typically use oral or written instructions with your students?

29. Do you do any outdoor activities?

30. Which method of teaching/approach do you feel that the students respond to the best?

31. What do you feel are the greatest constraints on your teaching (i.e., time, money for resources)?

32. Are there any reasons why you don't teach about the environment?

(circle) (check the most important reason)

1. Wish I had more environmental knowledge/training
2. Resistance from parents
3. Children aren't interested
4. Resistance from school district or school board
5. Need for more teaching materials
6. Too much other material to cover
7. Isn't relevant to my curriculum
8. Issues are too controversial
9. Other? _____

33. Do you feel that enough information on the environment is being provided to students, or is there a need for parents to supplement this information? If so, do you feel that parents are qualified to do so?

34. To what extent can environmental education be incorporated into the formal sector without compromising the rest of the education system?

35. Is it more effective to teach environmental education as a separate course or as concepts imbedded in existing courses?

36. Do you have any suggestions for changes with the curriculum or within the school that would improve upon the quality of environmental education that students receive?

Thank you, do you have any additional comments or questions?