McGill University

Department of Geography

MASTER'S THESIS

An Analysis of the Feasibility of Developing a Network of Residential Outdoor Schools Within the Canadian Biosphere Reserve Association.

A thesis submitted to the Faculty of Graduate Studies and Research

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Abstract

Residential outdoor schools are multi-day learning camps that provide unique settings in which to deliver environmental education. However, such schools are also very complex to develop and difficult to maintain and operate. Within Canada though, there are many examples of successful outdoor school operations, three of which are considered here: the North Vancouver Outdoor School, the Olympic Park Institute and the Golden Ears Learning Centre. From these case studies lessons can be learned regarding issues such as: land tenureship, program design, staffing options, administrative systems, facility requirements, finance options and abilities to attract students. The discussion of these factors can then be applied to the development of a nation wide network of residential outdoor schools within the framework of Canadian Biosphere Reserves.

Currently there are ten Biosphere Reserves in Canada which, when analyzed, prove to be very adequate sites for environmental education from both physical and social stand points. The Canadian Biosphere Reserve Association is the coordinating body which fosters communication and cooperation between individual Reserves. If a network of residential outdoor schools were to be developed within this association framework, it would serve, both to fulfill the Canadian Biosphere Reserve Associations mandate to support environmental education and would help partially alleviate the lack of adequate environmental education facilities in Canada today.

Resumé

Les écoles extérieures résidentielles sont des camps d'étude de multi-jour qui fournissent une configuration unique dans lesquelles pour fournir l'éducation environnementale. Cependant, de telles écoles sont également très complexes pour se développer et difficile à mettre à jour et utiliser. Dans le Canada cependant, il y a beaucoup d'exemples des exécutions extérieures réussies d'école, dont trois sont considérés ici: North Vancouver Outdoor School, Olympic Park Institute, et Golden Ears Learning Centre. De ces études de cas des leçons peuvent être apprises concernant des issues comme: débarquez le tenureship, conception de programme, fournissant des options, des systèmes administratifs, des conditions de service, des options de finances et des capacités de personnel d'attirer des étudiants. La discussion de ces facteurs peut alors être appliquée au développement d'un réseau de la nation de Canada, des écoles extérieures résidentielles dans le cadre des Réserves Canadiennes de Biosphère.

A moment, il y a dix Réserves de Biosphère au Canada qui, une fois analysées, s'avèrent être les sites très adéquats pour l'éducation environnementale des points physiques et sociaux le meme. L'Association Canadienne de Réserve de Biosphère est le corps coordonné qui stimule la transmission et la coopération entre différentes réserves. Si un réseau résidentiel extérieur école pour développer dans ce association cadre, servir, pour accomplir Association Canadienne de Réserve de Biosphère mandat pour supporter l'éducation environnementale, et aider partiel alléger manque adéquat l'éducation environnementale service dans Canada aujourd'hui.

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1 Introduction

"By virtue of its objectives and its functions EE (environmental education) is necessarily a form of educational practice attuned to the life of society. It can only be effective if all members of society - workers, students, specialists, decision-makers - take part according to their abilities in the complex and manifold task of improving people's relationship with their environment." UNESCO, 1990.

Environmental education (EE) in Canada reflects the voices of a wide variety of people from schools, to individuals, to philanthropic organizations and government, yet seldom do these voices come together. As a result, environmental education faces a number of challenges both financial and administrative in nature. Co-operation between different interest groups could help alleviate these problems and yet, in a society where co-operation and teamwork are applauded, these values are seldom expressed in environmental education. The reasons for this may be many, but it should not prevent the exploration of possibilities to combine a variety of resources in order to improve the state of environmental education in Canada today and for the future.

Canada contains large tracts of undeveloped land and a large variety of landscapes and habitats. This has enabled the establishment of no less than ten World Biosphere Reserves within Canada. Mandated to encourage co-operation between local communities, conservation organizations and various levels of government, Biosphere Reserves also have the responsibility to provide support and programs to further the case for environmental education. Each Biosphere Reserve in Canada belongs to the Canadian Biosphere Reserve Association (CBRA). This association serves as support for the individual Reserves providing some financial and administrative assistance as well as acting as a conduit in order to promote co-operation and communication between each reserve. The Canadian network of Biosphere Reserves therefore does possess the attributes of both co-operation and teamwork, maintained through continued support from a contingent of dedicated volunteers and board members. However, there has been some concern that

Canadian Biosphere Reserves, as a whole, could do more towards fulfilling their mandate regarding environmental education.

Meanwhile, a number of successful environmental education projects are operating in Canada, although their individual scopes of influence may be limited. One such category of projects are the residential outdoor schools each operating independently in a different community. These residential outdoor schools provide introductions to the local environment, in addition to allowing for the examination of the relationships between humans and their environment and the intricacies and details of ecosystem processes. Residential outdoor schools provide the opportunity, setting and time to address many of the issues identified as being important to a successful environmental education program by educators throughout the world (UNESCO, 1990). While these sites fulfill environmental education requirements, the degree of co-operation and communication between sites is limited. This lack of co-operation restricts the ability of new residential outdoor schools to develop because of a lack of financial and administrative support.

In Canada there exists a Biosphere Reserve network, which may be falling short of its environmental education potential and an environmental education system that suffers from the lack of a structured network. Both Biosphere Reserves and residential outdoor schools are invaluable components of our society however; if the two were to be combined the question remains would the result be a successful environmental education network?

This thesis will examine three case studies of residential outdoor environmental education programs in order to identify constraining criteria and assess the feasibility of the development of a network of residential outdoor schools. A network is considered to be any grouping of institutions that are related administratively or financially. The study will then examine characteristics of Canadian Biosphere Reserves and the structure of the Canadian Biosphere Reserve Association (CBRA) in order to examine the suitability of the CBRA as a host for the outdoor school network. The two studies will then be aggre-

gated in order to examine the feasibility of developing a nation wide network of outdoor environmental education programs within the setting of Canadian Biosphere Reserves.

A number of key issues will be considered in each of the three case studies including: land tenure, program structure, staffing, administration, ability to attract students, facilities and finances. These issues will be examined for advantages and disadvantages and these results will be compared against the site suitability, structure and the potential utility of Canadian Biosphere Reserves and the CBRA. This comparison will allow for a final analysis of the three case studies and the development of a model network of residential outdoor environmental education programs within the framework of the CBRA and the individual Biosphere Reserves.

Main topics discussed in this study include both the theory and practice of environmental education and protected area management with specific reference to Biosphere Reserves.

1.1 Environmental Education

Environmental education is a very contentious and complex field (see Appendix 1) with a number of educators arguing for and against the utility, practicality and, in fact, the actual definition of environmental education (Hungerford & Volk, 1990; Gough, 2000). This thesis will assume that environmental education is intrinsically valuable although no attempt will be made to quantify this value. Rather, it is accepted that the mandate of Biosphere Reserves to provide logistic support for environmental education and the identified need to provide stronger support to environmental education by Environment Canada provides sufficient justification for the completion of this study.

Environmental education as a whole is a widely studied field. However, there is a significant gap in the current body of knowledge. Despite valuable insights that have been gained from the existing research, outdoor environmental education programs within Canada still face a number of administrative and operational challenges which have been

largely overlooked from an academic point of view.

1.2 Canadian Biosphere Reserves

The World Biosphere Reserve system is sponsored by the United Nations Educational Scientific and Cultural Organization (UNESCO), although management and control falls entirely into the hands of the specific nations and local communities. Once initiated into the program each site has a responsibility to maintain a standard of protection, support and local co-operation in order for membership to be sustained. Within the bounds of this responsibility, each site is free to achieve its objectives in whatever manner it sees as being most suited to its own, unique situation.

Canada hosts ten World Biosphere Reserves, which protect the unique and fragile ecosystems contained within the management area of each (Statutory Framework, 1995). Biosphere Reserves are sites where an area of strict ecological protection is buffered by areas of human interactions and usage. Furthermore, community level, bottom-up management is supported and practiced. Biosphere Reserves also have a mandate to provide logistic support for environmental education and have therefore been studied as potential sites for many different types of environmental education. There exists, however, a lack in information relating specifically to Biosphere Reserves in Canada and referring in particular to residential outdoor environmental education centers within these Reserves. As a result, the advantages of locating residential outdoor schools within the framework of Biosphere Reserves in Canada remains unstudied and a model network has never been developed.

1.3 Study Method

In order to accomplish the aims of this study, case studies of three residential outdoor environmental education schools were first conducted. Each case study is set in a different location and faced different operating conditions and stages of development; however,

all schools have similar educational goals. These case studies helped to identify both the problems and the advantages of a range of management and operational factors as described in greater detail below.

Canadian Biosphere Reserves were also examined through experience-based research and literature studies in order to identify both potential benefits and problems offered by the CBRA framework when considering the development of a model network of residential outdoor schools. The two studies are then merged in order to relate the opportunities and difficulties provided by Canadian Biosphere Reserves with some of the identified challenges and potential of residential outdoor environmental education programs.

2 Rationale for the Study

There are many studies referring to various facets of outdoor environmental education programs (Bogner, 1998, Dresner & Gill, 1994, Fulton, 1982). A large body of this research focuses on the quantitative and qualitative advantages of environmental education programs such as measurable educational achievements and changes in environmental and ecological values. Many of these discussions are based on the dichotomy of what are becoming known as the Hungerford versus the Gough schools of thought (Hungerford & Volk, 1990, Gough, 2000). These schools argue, first, about the definitions of "success" with regards to environmental education programs and, second, for the appropriate methods of measuring successes. Many programs have also developed their own measures, as is the case with the State Education and Environment Roundtable (SEER) program in the United States (SEER, 2000).

An additional body of research focuses on the requirements for outdoor environmental education sites and curriculum (Radchenko, 1987, Fulton, 1982). However, these studies often read like recipe books for building outdoor schools but neglect to address the difficulties in both establishment and operation that threaten many residential outdoor schools in Canada today.

Given that residential outdoor schools face many administrative, logistic and financial difficulties (Simmons, 1998) and given that the development of a network may elevate or minimize some of these problems (Filho, 1996; IUCN, 1995) the question remains as to what is preventing such a network from evolving. Such an issue has not been deeply discussed as many of the efforts involved in residential outdoor schools must focus on problems of particular existing programs. Yet there are many successful residential outdoor schools in North America, each one capable of overcoming these challenges. These cases should be studied in order to present a model framework, which can be used to develop a network of residential outdoor environmental education programs.

With regards to the setting for such a network, difficulties arise when examining the options for a viable framework. Education in Canada is administered under provincial authority; therefore it is not consistent nationwide (BC Ministry of Education, 2000). Most protected areas are also governed on a provincial level (BC Ministry of Environment, Land and Parks, 1999). For example, the province of BC contains 717 Provincial Parks, Recreation Areas and Ecological Reserves covering 10.5% of the land area of the province (BC Parks, 2000). Furthermore, national parks are typically remotely located and therefore, not conducive to residential outdoor schools (Fulton, 1982). Canada does, however, support a network of World Biosphere Reserves, which spans the nation. The Canadian Biosphere Reserve Association (CBRA) contains sites that incorporate both protected areas and education institutions. Although each province and structure may differ, the CBRA retains a national consistency through the network of Biosphere Reserve designations.

There is no true consensus as to the best method for administrating residential outdoor schools. Nor is there a significant body of literature regarding the ideal system of land tenure and location. As such it is additionally necessary to weigh the advantages and disadvantages of a variety of methods of developing, operating and maintaining residential outdoor schools in order to discover which factors would best complement a network developed in cooperation with the CBRA. This comparison will be accomplished through the consideration of the land tenure, program structure, staffing, administration, ability to attract students, facilities and finances specific to each case study.

Presently, it is given that there are certain factors that restrict the development of many residential outdoor schools in Canada, and a given that there exists a Canadian Network of Biosphere Reserves. The study, therefore, tests the hypothesis that a model network of residential outdoor schools could be developed within the existing framework of the Canadian Biosphere Reserve Association based on the experiences and knowledge garnered from three case studies . The study will further examine whether the CBRA setting would diminish, increase or not effect the severity of these development and operational restrictions.

2.1 Limitations of the Study

This study is intended to examine the potential advantages and disadvantages associated with locating residential outdoor schools within Canadian Biosphere Reserves. Additionally, the potential for using the three case studies to develop a model that could direct the development of such programs will be evaluated. In order for the model and analysis to be complete a full cost analysis should be completed on a site-by-site basis. Secondly, a political analysis should be completed detailing the remaining political issues and the potential for resolving conflict. Finally, the study does not identify specific sites that could be used to locate residential outdoor schools. This study was intended only to examine the potential of such a program, to merge residential outdoor environmental education programs with Canadian Biosphere Reserves, not to provide a step-by-step handbook on creating such a network. This study may, however, lay the groundwork for future, in-depth studies on the topic.

3 Literature Review

Environmental education can employ a range of tools from mass media to park interpretation to formal and non-formal school programs. The focus of this study is on project-based and curriculum based offsite environmental education programs within schools. However, since many Biosphere Reserves contain provincial and national parks with established interpretation programs, it is important to mention the advantages and concerns associated with this form of environmental education.

Within many parks and protected areas, managers turn to interpretation in order to provide information and generate concern. This interpretation can take place through a variety of media; personal contact has been identified as being a very important tool for presenting information while informative signs and brochures serve as a cheaper alternative (BC Parks, 1996). Each of these methods can be very useful when attempting to present information on a protected area and as such should not be entirely discounted. Interpretation programs are advantageous in their ability to provide a concentrated body of knowledge in a limited amount of time; however, there are concerns, especially when considering interpretation that, "programs they offer are simply preaching to the choir, rather than gaining new converts to the cause of valuing and conserving the natural world..." (Ben-Ari, 2000; 560). Park interpretation is limited to current users and requires the presentation of information in a very short period of time. Participation is always voluntary and there is little time to delve into issues or follow participants' interests if they run tangentially to the curriculum of information being presented. These factors, therefore, limit both the breadth and depth of learning potential through interpretation.

Environmental education presented in schools, however, has the advantage of being made available to all students regardless of background, socio-economic stature and pre-existing views. As such, school-based environmental education gains a role of significance and importance in the overall field (Agenda 21). This difference makes the

study of school-based, offsite environmental education a significant and different option when considering its contribution to the environmental education mandate of Canadian Biosphere Reserves.

3.1 Definitions of Environmental Education

School based environmental education is a complex field including many different accepted definitions. The different methods used to provide environmental education within the formal education system also provide an indication of the plethora of tools that can be applied and the complexity of concerns that may arise. As a result of these factors, it is important to begin with a discussion of some of the definitions of environmental education before discussing some of the different methods and major concerns associated with each. While conducting this discussion it is important to remember that, while each case study may be following a different definition of environmental education, the overall pedagogical goals remain similar throughout.

The Southern African Development Committee (SADC, 1999) divides environmental education into the study of natural systems, education for conservation and education for sustainability. In this division modern environmental education is expected to combine aspects of all three models. As a result, the SADC defines environmental education to include economics, cultural studies and politics in addition to the study of natural processes and systems. Also of significance with regards to the SADC's definitions of environmental education is the expected outcome of each program. The study of natural systems is intended to increase appreciation for the complexity of nature and knowledge of particular species. Education for conservation is intended to use the interrelationships of biotic and abiotic elements of a system to encourage conservation and responsible resource use. Finally, education for sustainability is intended to "develop the necessary knowledge, understanding, values and commitment to allow people to be proactive in securing a healthy and properly functioning environment that is sustainable..." (SADC, 1999; 6).

The above definition of education for sustainability bears similarity to the goals of environmental education as defined by Agenda 21, Chapter 36, which claims that environmental education, should promote and enable, "sustainable development and improving the capacity of the people to address environment and development issues." (Agenda 21,Pg. 264). In this same text "basic education" is again seen as an essential precondition to the formation of a program to address "sustainable development" issues. To translate into terms already established by the SADC, Agenda 21 also acknowledges that successful environmental education should contain aspects of natural studies, conservation education and sustainable education.

In a report on environmental education published through the New Zealand Minister for the Environment (1999), environmental education is listed as being, "concerned with building an environmentally responsible society, where people and communities are equipped with the skills, confidence and resourcefulness to address the complex questions inherent in sustaining the world's resources." (Minister for the Environment, 1999. Pg. 5). In order to accomplish this, the report requires that a variety of different subjects be addressed through a single environmental education program.

The above definitions each place a heavy burden on environmental education to provide a complete and broad-scope program, which results in high expectations of societal and personal change. Because of these assumptions and expectations this study will not refer to environmental education as described above. Rather, it will refer to the definition provided by the UK National Curriculum Council (1990),

> "Environmental education aims to: provide opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment; encourage pupils to examine and interpret the environment from a variety of perspectives; arouse pupils' awareness and curiosity about the environment and encourage active participation in resolving environmental problems" (NCC, 1990b; quoted in Scott & Oulton, 1998; 211).

This definition approaches the topic of environmental education from a pedagogical point of view rather than an environmentalist viewpoint. In doing so it acknowledges the value of environmental education as an opportunity not as an outcome. As such, the National Curriculum Council acknowledges the potential values of environmental education without requiring proof of learning outcomes from every child. Just as not every child that participates in an art class is expected to become an artist, not all children who participate in an environmental education program should be expected to become environmentally conscious.

From a further pedagogical point of view, environmental education can refer simply to any educational activity that takes place outside of the school in an environment-based setting (SEER, 2000). The goal of these programs, as defined by the State Education and Environment Roundtable (SEER) is to "change long-standing pedagogical paradigms, and influence the way young people learn to live successfully in the world that surrounds them." (SEER, 2000; iii). These programs can range from camping trips to science field study courses and SEER argues that each has educational value. While SEER provides evidence to support these claims I find the definition on which they base their studies is rather broad. Since each school runs its own "environmental education" program, comparison between programs is difficult.

Within Canada, the Council of Ministries of Education in Canada define education for sustainability by stating that, "The goal of education is to make people wiser, more knowledgeable, better informed, ethical, responsible, critical and capable of continuing to learn." (Council of Ministries of Education, 2000, p.4). This definition reflects the variety and complexity of programs that fall under the umbrella of environmental education; however, it may remain too vague to be considered a real working definition.

3.2 Measuring the Value of Environmental Education: the paradigm debate

The significance of considering each of these definitions relates to the expectations that are held for environmental education. Depending on the definition applied and the tool used, there are many different outcomes associated with environmental education programs. Many documents such as the New Zealand Handbook(1999) , Agenda 21(1990), and Hungerford and Volk (1990) articles claim that successful environmental education should change environmental awareness and attitudes in a direction that tends towards sustainability. Unfortunately these claims are difficult to support since concepts such as changes in environmental awareness are abstract and difficult to measure. Furthermore, it is acknowledged that the full effects of environmental education on environmental decision-making are often not apparent until children mature and begin making decisions for themselves (New Zealand Ministry for the Environment, 1999). Because of these difficulties, many articles that argue for environmental education based on improvements in environmental attitudes, are easily refuted. This is evident in an article written by Katherine M. Emmons (1997), which argues that students gain a more participatory perspective on environmental action as a result of a residential outdoor school experience. While the results gathered by Emmons are promising, the sample size is limited to ten students and a control group is non-existent. Furthermore sampling methods were biased in favor of students with pre-existing affinities towards environmental action. Finally results were snapshots only leaving no data on the long-term effects, which have been identified as being quite significant (New Zealand Ministry for the Environment, 1999). The issue of long-term results is addressed by Joy Palmer (1995) who conducted interviews with a number of identified "environmental sympathizers". In these interviews participants were asked to identify the factors that they feel contributed to their current environmental outlooks. Environmental education was amongst the possible responses, as was experiences in the outdoors. Again, however, there was no control group and the sample size was limited. These factors reduce the reliability of the data and call into question the validity of the results.

For a different approach to the evaluation of environmental education, Noel Gough

(2000) focuses on the theory of narrative inquiry and critical pragmatism. This paper refers to the advantages of curriculum development through the telling of stories. Using this model, Gough argues against the collection of arbitrary measures in the form of data as is often employed in both quantitative and qualitative studies and instead writes of narrative inquiry as seeking, "...solutions to our problems where problems lie." (Gough, 2000; 13). This paper is an example of one of the many different views that surround research in the field of environmental education and thus, has value in its provision of choice and a different point of view.

From these studies, regarding the different methods of measuring environmental education, there has arisen a number of studies that dispute the value of environmental education programs (Gillett *et al*, 1991 and Eagles & Demare, 1999). These studies use survey methods for pre and post outdoor experiences in order to measure changes in environmental attitudes. Eagles and Demare (1999) however also offer an explanation for the results they found by calling on the work of Dresner and Gill (1994) and Lisowski and Disinger (1991). These studies express the belief that the effects of an environmental education program on changes in environmental attitudes has an inverse relationship to the level of prior environmental experience. That is to say that children with strong environmental attitudes or ethics are likely to benefit less from an environmental education program than those children with no prior experience. This theory is supported by Eagles and Demare's findings, which show little change amongst students within the Waterloo Country Board of Education, which has a very strong environmental education program.

With regards to more measurable claims, SEER states that environmental education, defined as education within the natural environment, elevates students' standardized testing results, decreases instances of school absences and decreases the number of reported behavioral problems (SEER,2000). These claims are based on a study of 40 case study schools in the United States, although the study was weak in the number of inconsistent systems of measuring; however, the sample size was large enough to give the results some validity. Furthermore, schools that used grade point averages and standardized testing did conduct comparative analysis with non-participant students as controls under the

direction of the SEER council (SEER, 2000). The value of this study to the overall field of environmental education, however, can be questioned based on the generalist nature of the definition of environmental education employed.

Changes in environmental knowledge as a result of environmental education programs have also been measured through studies conducted by Keen (1991), Lisowski and Disinger (1991), and Gillett *et al* (1991). As a result of these studies it can be concluded that environmental education programs do have a measurable pedagogical value concerning increases in environmental and ecological knowledge, although their values with regards to moral and attitudinal changes can be disputed. In order to gain a better understanding of the measures and concerns regarding the value of environmental education it is necessary to narrow the focus from environmental education at large, which can include "various media, experiences and programs" (Eagles & Demare, 1999; 33). For the purpose of this study, residential outdoor schools will be considered separately.

3.3 Residential Outdoor Schools

The value of exposing children to the outdoors has been examined by a number of authors including Tanner (1980), Palmer (1993) and Chawla (1998). Each of these authors used surveys and interviews to try to establish the critical factors effecting environmental sensitivity. In his work, Tanner used an open-ended survey of 45 leaders of conservation groups. The results show that 78% of those questioned identified experiences in natural areas as a factor, which they perceive as influential to their current career choices. Likewise, Peterson attempts to isolate key factors relating to career choices and environmental sensitivity, with 91% of respondents including some mention of the outdoors. Of this percentage, 41% specifically referred to participation in youth groups and camps. Similar results are reflected in Palmer's report in which the outdoors was recorded 91% of the time and, in Chawla's report in which 77% of respondents identified experience in natural areas as influential factors with regards to their current levels of environmental sensitivity. All of these studies, however, rely on self-reporting, not on the results of a specific

outdoor education project. Franz Bogner did compile a comprehensive study of the effects of a specific outdoor ecology education program (Bogner, 1998). In this work, Bogner surveyed almost 700 fifth grade students who participated in single day and five day environmental education programming in the Bavarian Forest National Park. Bogner took great care through the duration of his study, to ensure that he employed the best available methods and avoided as many biases and analysis errors as possible. As a result, Bogners' work is considered to be very high quality and therefore can be considered credible. Bogners' results showed that the students had a very positive view of the experience and surveys showed that students believed that they had learned and understood more about science and nature. Furthermore, there was some evidence that the five-day program resulted in a change in certain environmental behaviors specifically measured through reported behavior and verbal commitment. Also of significance is the fact that Bogner discovered that these changes persisted for at least six months after the outdoor education experience. In addition to behavioral changes, Bogner identified gains in "normal" knowledge referring to curriculum learning factors. With regards to this measure Bogner stated that the most remarkable aspect of this gain in "normal" knowledge is the fact that, "evaluations at school are usually tackled on a lesson-to-lesson basis in biology, whereas the present study was administered 1 month after the program." (Bogner, 1998; 26). This note of the pedagogical advantages of outdoor school has also been supported by Milton, Cleaveland and Bennnet Gates (1995) who specifically examined the Park/School Program for inner city children. This study was conducted within two public elementary schools amongst the fifth grade classes. As with Bogner's study, Milton et al showed that outdoor education programs can have a number of significant effects. Specifically Milton et al used surveys administered to the students to establish that 96% of the participants believed that the activities they partook in throughout the program helped them understand what they were taught in in-school science classes. Furthermore, using qualitative measures, interviews with teachers and principals identified that the program "...revealed the potential of some of the least promising students." (Milton et al, 1995; 35) in addition to improving the behavior of some students. The program instructors also noted a marked increase in students' interest levels with regards to environmental concerns and actions.

3.4 Outdoor Schools as a Network

There are many advantages associated with involving residential outdoor schools in a larger network. In the Netherlands, planning for environmental education on both a formal and non-formal basis involves co-operation from six different government ministries. These include the Ministries of: Agriculture , Nature Management and Fisheries, Health, Welfare and Sport and Education, Culture and Science. Together these ministries work towards using environmental education to diminish, "environmental decay as well as the loss of biodiversity." (IUCN, 1995). This co-operation both displays public support and takes advantage of a wide variety of resources and knowledge bases. Deborah Simmons (1998) surveyed a number of grade school teachers in order to establish the perceived benefits and barriers to outdoor environmental education. The measures used in this study include: teacher confidence, worries associated with off-campus instruction, need for teacher training, hazards, difficulty of teaching environmental education and the appropriateness of teaching setting. The results show concerns expressed for all factors. This study does not eliminate the fact that if a network of outdoor schools were to be established, the formal framework may alleviate some concerns and leave teachers with a far greater perception of benefits and a largely diminished view of the barriers discussed above. Walter Leal Filho (1996) conducted a survey of current trends in environmental education amongst European Union nations. Through this study Filho noted that countries with no national environmental education policies regularly experience, "...difficulties in securing funding for projects, provisions for teachers' training, and the systematic production of resource materials." (Filho, 1996, p. 9). Filho clarifies that these problems are significantly related to the lack of a national network. In an article published by Carvalho et al regarding the problems associated with developing environmental education programs in Brazilian National Parks, the lack of network support was identified. This lack of support is pinpointed to include limitations on financial resources, lack of training, insufficient material resources and a lack of a large-scale policy on environmental education.

3.5 Conclusion

As written in the IUCN report on environmental education in the Netherlands, "EE is situated at the crossroads of two worlds: environmental protection and nature conservation on one hand and education-at home, in schools and elsewhere- on the other hand." (IUCN, 1995). It is the balancing of these two components which gives the study of environmental education its complexity and character. By wading through the definitions, research methods and tools as presented in the literature it is possible to move forward from the existing body of knowledge in order to expand the field and facilitate the adoption of appropriate environmental education on a greater expanded scale. While some issues will remain contentious for years to come, in order to progress on the more practical applications of environmental education studies it is necessary to move beyond these debates. As a result, for the purpose of this study, it will be assumed that environmental education, specifically through outdoor environmental education programs, does have some intrinsic value.

Given that environmental education is an appropriate priority and given that residential outdoor schools are an appropriate tool and, finally, given that networks of environmental education are advantageous and perhaps even necessary, it is essential that we embark upon a quest to find an appropriate framework in which a network could successfully integrate. In Canada, the potential for such a network may be revealed by the Canadian Biosphere Reserve Association.

3.6 Biosphere Reserves

The concept of Biosphere Reserves was developed in 1974 through UNESCO's Man and the Biosphere Program. At this time, Biosphere Reserves were developed in order to answer the questions, "How can we reconcile conservation of biodiversity and biological resources with their sustainable use?" (UNESCOa, 1995; 1). This goal should be achieved through scientific studies, community co-operation, and co-ordination with con-

servation and development groups and management organizations (UNESCOb, 1995). From this beginning, Biosphere Reserves have developed a strong association with community participation and environmental education. Currently there are ten Biosphere Reserves in Canada (CBRA, 2000)(See Fig. 1 Section 7.3). Most of the publications regarding these Reserves are associated with ecological monitoring, habitat quality and restoration and species compositions (Sian, 1997, CBRAa, 2000).

4 Methodology

Three case studies were chosen for analysis based on documented success (Fulton, 1982, Parsons & Sherlock, 1998). These cases consist of the North Vancouver Outdoor School (NVOS) in Brackendale, British Columbia, the Olympic Park Institute (OPI) in Olympic National Park, Washington and the Golden Ears Learning Centre (GELC) in Maple Ridge, British Columbia. The NVOS is the oldest facility with over twenty years of operational experience while the GELC began limited operations in the spring, 2000. Each case study differs in land tenure, program structure, staffing, administration, ability to attract students, facilities and finances, thereby providing a broad base from which to develop a model network. Sites were studied using available methods although more attention was given to the NVOS because of its long history and the associated experience of long-term employees and volunteers. The study of each case was preceeded by a literature review of the site and programs. Additional literature was acquired during the study and subsequently added to this body of data. Beyond studies of publications, other methodologies differed greatly. Given these differences in study methods, the specific methodology applied to each case study will be discussed independently below.

4.1 Methodology: North Vancouver Outdoor School

The North Vancouver Outdoor School was selected as the primary study site for a number of reasons. First, initial studies revealed that the NVOS is a well-established example of a residential environmental education program (Fulton, 1982, Parsons & Sherlock, 1998). Furthermore, since the NVOS is owned and operated by the North Vancouver school district (British Columbia District #44) all information pertaining to the school is publicly accessible. Finally, the NVOS has undergone a number of different partnerships, funding situations and land tenures, giving the directors and staff a well-earned, comparative perspective on the difficulties and advantages associated with the current system (Personal Communication with NVOS principal, 2000).

After deciding to use the NVOS as the primary site, the superintendent of the district was approached in order to obtain permission to work with the staff, children and parents within the district. This was the only site in which all parties involved with the program were also involved in the research stage since a large degree of effort and work was required to do so; however, it was deemed necessary for the following reasons: first, to ensure that the reports of the value and worth of the NVOS were at least partly substantiated; second, because of interest in knowing whether those not directly involved in the administration and operation of the program were aware of the difficulties faced by the school; and third, to ensure that the study was complete through the gathering of data from all potential sources, given time and monetary limitations. As a result a number of different qualitative methods were employed.

4.1.1 Participant Observation

After receiving approval from the superintendent to carry out research, the NVOS was approached in order to obtain the schedule for the classes they would host for the remainder of the semester. While the school has programs for both grades three and six, grade six programs were chosen as the focus of this study because of the increased length of the program (five versus three days). This extension in program length provided the opportunity to gain "intimate familiarity" with the scene before it was necessary to apply stuctured and formal research methods (Lofland, 1976). This group was also selected because of the belief that the grade six students would be more able to express themselves and would be more open and honest due to the decreased amount of time spent with classroom teachers and the increased confidence and independence gained from greater age and academic experience. Having selected a grade the study then chose students attending NVOS from a grade school located in a middle class area with a strong sense of community. This school was selected since it had a long history of participation in the program. This selection therefore provided more than a snap shot point of view and an idea of the deeper understanding associated with a location where the NVOS has become a school and community tradition. It was hoped that these factors would result in a popula-

tion that was better educated regarding the history and the processes of the NVOS as well as a group who would see their vested interest in aiding me through the provision of information. The school was also chosen because it was the easiest to access due to the researcher's "current biography" (Lofland & Lofland, 1995), specifically community and family connections. This easy access allowed communication of a more free and casual nature with both the staff and students in the area. Concern was raised, however, about possible biases as a result of the fact that, despite explaining and enforcing very high standards of confidentiality, there may have been certain members of the study who were uncomfortable being completely open with someone with an established relationship to others in the community. Being aware of this possibility allowed for a general avoidance of any problems, however.

After selecting the study school, the NVOS was approached in order to request permission to accompany the students from this class during their stay at the NVOS. Once this permission was gained through a phone conversation with the principal of the NVOS, the local school principal was approached in order to gain approval from the school level. At this point, contact was also made with the accompanying classroom teachers through a formal meeting at the school. Although it was not logistically necessary to approach anyone other than the NVOS principal, all other parties were contacted in order to ensure that their cooperation would be voluntary, thereby increasing the quantity and quality of data gathered from these sources (Richardson in Shafir & Stebbins, 1991).

The method of participant observation was chosen in order to gather general information regarding the residential outdoor education program presented by the NVOS. Acting as a participant observer, it was possible to have contact, on an informal basis, with teachers, students, NVOS staff and student counselors. One of the advantages of participant observation is that it allows for repeated and informal contact. As such it was possible to interact and observe a variety of people while ensuring that the levels of discomfort were kept to a minimum. That is to say, because of the adopted status as a participant observer, the people under observation could act as naturally as possible without the omnipresent knowledge and pressure of being continuously, officially observed. As a result of this

low level of discomfort all of the subjects appeared to be very open and expressive. It can be concluded that this did, indeed, increase both the quantity and quality of the data.

In order to fulfill the role of participant observer the researcher attended the NVOS as an aid to one of the students. This role was solidified during introductions to the students, staff and counselors, first as a student aid and second, as a researcher. In many instances it was the responsibility of the researcher to expose the research interests to others involved in interactions, a factor which led to minimal recognition of the role of researcher, which promoted friendly conversation and easy acceptance. Support was also quickly garnered from status entrepreneurs (Evans in Shafir & Stebbins, 1991) amongst both the teaching staff and the students. As a result of this, a large degree of acceptance and respect was afforded to the researcher. This was a key component of the research method since it allowed for a wide range of questions to be asked and relatively open answer from all subjects to be received. Feelings of being threatened on both professional and personal levels were very low amongst subjects at all levels.

As a participant observer it was appropriate to attend a selection of daily activities and to participate through assisting the teachers and counselors, although the degree of assistance offered was limited by the need to observe a variety of students and activities. When students had quiet time, such as during video watching or after lights out, time was spent with the teachers, staff and counselors. This time proved to be a good opportunity to ask specific questions and listen to the opinions and concerns of the day as expressed by the authority figures. All observations were recorded subtly either during breaks in the activity, when all students were writing, during meals or after lights out. Many of the conversations were loosely pre-planned with a list of probing questions designed to encourage conversation amongst groups. All informal interviews with staff were conducted in a group setting in the coffee room, which was off-limits to all students. This setting was selected since it is an area where faculty and staff felt comfortable and could talk without either interruption from students or opportunities to be over heard.

Limitations associated with using the method of participant observation included the lack of formal interviews, which prevented the establishment of structured lines of questioning. Because of this, some pertinent questions could not be asked at the opportune time. Furthermore, the role as participant resulted in more responsibilities than solely research (Goldenberg, 1992). This resulted in an effective research time less than the actual time spent on the site.

Overall, however, it is believed that the participant observation method of qualitative data gathering was best suited to the relaxed and busy atmosphere of the North Vancouver Outdoor School. The fact that the different roles were filled by different people coming from different locations meant that the researcher was treated less like an outsider and more like another guest or volunteer at the school. As such, few of the obstacles which often face participant observers when first they enter the field (Gurney *et al* in Shafir & Stebbins, 1991) were present in this case. The limitations in formal interviewing and difficulties in creating field notes were far outweighed by the quantity and quality of information that was gained through participant observation and informal group interviews.

4.1.2 Informal Interviews

A number of informal group and semi-private interviews were carried out with different members of the NVOS. A series of interviews were directed with small groups of students in order to gain their opinions on some of the issues and activities of the NVOS. The interviews commenced with a declaration of anonymity, all subjects were then advised that responses were voluntary for each question. Since the interview was conducted in the style of a classroom activity care was taken to ensure that the students were aware that they would not be graded on any responses. Also given the impressionable nature of students and the tendency to respond in a "desired response" manner students were told that they should not just say what they thought the "right answer" might be. Although these precautions did reduce the amount of data gathered through decreased numbers of responses, it is believed that the increase in reliability gained from these measures

outweigh the decrease in quantity of responses. The interviews were carried out in the auditorium after nighttime snack. The students were selected from those who had no chores. Because of this, there was some sense of urgency since the interviews coincided with what had been free time for the students. As such, every effort was made to ensure that the interview moved quickly in order to prevent excessive "passes" as a result of uninterest or urgency. The students sat on the floor in a rough semi-circle in order to ensure comfort and in order to maintain discipline. Each question was asked independently and each student gave a brief answer before continuing. The order of answers was decided by the researcher and followed the pattern of seating. This structure was important since it avoided many biases that may have resulted from students not responding because of hesitancy or shyness associated with the process of speaking out or raising hands. This eliminated most discomfort and allowed for the development of a friendly, open atmosphere conducive to the collection of good data.

In addition to the informal group interviews carried out with the students, group meetings were also held with the classroom teachers. These meetings were held in the teachers' cabin after the day's responsibilities had ended. Again, the interviews were informal with each of the three teachers contributing as they saw fit. The interviews consisted of a series of probe questions concerning the teacher's opinion of outdoor school as well as the difficulties associated with attending such a program with their class. These probe questions led to a number of follow up discussions which revealed data regarding residential outdoor schools as viewed from the perspective of teachers. This interview also revealed opinions on the advantages and disadvantages associated with the administration, and operation of a the specific NVOS program.

Further conversations were carried out on an informal basis with members of the staff of the NVOS. These were generally short unscheduled interviews consisting of responses to a series of specific questions designed to ask questions that could not be answered through other means of study.

4.1.3 Survey Design

To accompany the qualitative data gathered through participant observation and interviews, a single page survey was developed in order to gather data from the parents of the participating students (See Appendix 2). These surveys consisted of two parts, the first part was an exploratory series of questions designed to complement the information gathered from the students during their stay at the NVOS. The first question in this series was a place setter while the following two questions were open-ended. An open-ended approach was used because the range of possible answers was very wide and the purpose of the survey was to acquire a range of divergent responses (Black, 1999). Providing multiple-choice options would have been restrictive and would have encouraged biased answers. The second part of the survey attempted to discover the value, placed by the parents, on the NVOS experience. These three questions were all closed-ended since the data desired was very specific.

The surveys were distributed to students during class time. Each survey contained information regarding the purpose of the study as well as a declaration of anonymity. The students were asked to take the surveys home to their parents and then return the completed forms if their parents agreed to participate. The completed forms were then collected from the classroom teachers. Parents were given one week to complete the surveys. This method of dispersion was chosen because of time and monetary restrictions. Personally delivered surveys would have been very time consuming and subjects would have been difficult to procure as a result of the proximity of the study to the end of the school year. Additionally, there arose a concern that support and knowledge of the NVOS would have been presented in a biased way during a face-to-face survey as a result of biases arising from social desirability (Black, 1999). This conclusion was drawn based on the prominent position of the NVOS within the community and the natural desire to support programs resulting in the education of children. Mail distribution was not chosen since the rate of return would be expected to be very low and the cost of conducting surveys, quite high. Access to the parents through the students and the classroom proved to be a very viable option unique to this case study.

4.2 Methodology: Olympic Park Institute

The second case study, the Olympic Park Institute (OPI) was selected because of its unique location within a national park. In order to access the OPI, the program director was approached with the assistance of an external sponsor. After contacting the gate-keeper, a site visit and a series of two formal interviews were arranged. Both the site visit and the interviews were conducted in a dual capacity as a researcher and a professional colleague. While the role as researcher was weighted more heavily than the professional position, the subjects viewed the researcher far more as a colleague. This proved to be advantageous as it developed a sense of camaraderie and diminished hesitancy to respond to questions.

4.2.1 Formal Interviews

Given the official capacity of the sponsor, the best method of gathering data emerged as being a system of using well-structured formal interviews. The subjects were selected based on their positions in the organization and their relationship to the data to be gathered. For each interview an appropriate set of probe and follow-up questions were developed. The interviews were held in the offices of the subjects and, while a general description of the project was given, no specific details were discussed until after the interviews. This prevented the subjects from responding to biases that may have arisen from a desire to project their institution in a positive light or to influence the personal opinion of the researcher. The formal interview with the program director lasted for almost thirty minutes while the interview with the Chair of the Board of Directors necessarily lasted less than twenty. Both interviews were concluded with an informal discussion. Neither the formal interviews nor the subsequent discussions were recorded since comfort levels tend to decrease greatly with the use of a recording device. Since the questions asked were of both a factual and opinion-based nature, and in sensitivity to the possible professional ramifications of some responses, a recorder was forgone in favor of notes taken by the researcher. Field-notes were also recorded during the informal discussions although at a

lesser rate.

4.2.2 Site Visit

A site visit was conducted on a Monday during the summer season. This day was selected during the initial access conversation since it coincided with the end of an elder hostel program. This timing granted me better access to the staff who were occupied for only the first portion of the day and allowed me to visit the facilities, which were completely open. Given the timing, the morning of the site visit was spent viewing the facilities and gathering literature. A lecture was also attended although this served more purpose with regards to increasing the depth of involvement in the field (which improved data gathering) than it did towards the direct gathering of data. The afternoon was divided into time spent in formal interviews and time spent conducting informal discussions. The informal discussions were carried out during regular staff activities, in which a participatory role was taken, and through office discussions with staff who sought to express their opinions. Field notes were taken during regular intervals either between visits or activities or at moments when it was appropriate to write.

The combination of formal and informal interviews combined with the status as both a researcher and a member allowed for open access to many sources of data at the OPI. These sources allowed a solid picture to be drawn of the site and assisted, when combined with literature studies, in the development of a useful and complete case study.

4.3 Methodology: Golden Ears Learning Centre

The Golden Ears Learning Centre (GELC) was selected as a result of a number of factors. First, current biography through professional relationships granted the researcher invaluable, professional access to the site; second, the centre is located within a Provincial Park, which suits the goals of the research project. Finally, the GELC is in the early stages of development. Thus there were many people with recent memories of the experiences associated with the development of a residential outdoor environmental education

program. This final factor proved significant since it allowed for reasonably easy access to the ideal subjects.

4.3.1 Site Visit

The study on the GELC was carried out in a very similar manner to that which was applied to the Olympic Park Institute with a few notable exceptions. First, the site visit to the Golden Ears Learning Centre was unaccompanied. This restriction limited the quality of data gathered through the site visit as buildings were closed and the staff was not present. However, the depth of the interviews counteracted this shortcoming.

4.3.2 Interviews

Formal interviews were carried out with a consultant in the development of the Golden Ears Learning Centre and with members of the board for the Golden Ears Learning Centre Society, the not-for-profit administrative group associated with the program. As with the OPI research approach, formal interviews consisted of a number of predetermined probe and follow-up questions although circumstances led to a number of phone interviews in place of face-to-face interactions. While these phone interviews did allow the subjects to express an opinion that was likely more honest than one that would have been given face-to-face, as per the expectation of Lofland & Lofland (1995) it also decreased the amount of interest time. With no visual stimulation, subjects could not respond to visual clues to encourage response and expansion on statements. However, phone interviews did allow for interviews to be conducted with busy subjects who may otherwise have remained inaccessible. In addition to these formal interviews, in-formal discussions proved valuable sources of data and provided an opportunity to verify external consistency (Lofland & Lofland, 1995).

4.4 Methodology: Conclusion

A combination of qualitative methods were used to study each case although the nature of each site dictated the methodology far more than any other factor. The amount of time spent at the NVOS and the relaxed nature of those attending it allowed the researcher a large degree of freedom to explore a number of investigative methods. The OPI was a more formal setting and the site visit limited by many circumstances. This necessitated the use of more structured research methods in order to procure the same information as was gathered in the first case. Access through a sponsor did assist in this site, however and permitted complete staff access and facilitated an open and friendly atmosphere. The Golden Ears Learning Centre presented a third set of challenges since it was not operating during the study period. Access to this site and the subjects associated with it, however, was fairly open and could proceed independent of the site visit. This permitted the researcher to conduct phone and informal interviews at a wide range of times convenient to the subjects involved. Through such flexible research methods, high quality information was gathered from each source and allowed for the construction of a fairly complete analysis of each site.

5 Results

The results of each of the afore mentioned methods of research provided a significant body of knowledge regarding the seven issues identified earlier: land tenure, facilities, program, staff, administration, finances, attracting students. These issues were originally selected based on a combination of the identification of important factors by the subjects who provided information and a consideration of the future goal of the research to apply the case studies to the development of a model network. From this identification of important issues, information gathered from the above methods was categorized into seven subdivisions for the purpose of the presentation of results. As in the case of the methodology, results for each case study are presented separately.

5.1 Results: North Vancouver Outdoor School

5.1.1 Background

The North Vancouver Outdoor School consists of two separate programs, a natural history program and a cultural history program. The focus of this study is the natural history program. The NVOS, is owned and operated by the North Vancouver School District and is a public institution available for use by all students. It was opened in 1969 and has been in operation every year since with an annual attendance of approximately 5500 students.

5.1.2 Private Land

When the NVOS was first opened it operated through a lease agreement with the Anglican Church. This lease included both land and facilities, which were being used by the church for the purposes of operating summer camps. Eventually, in 1975, school district #44 began to explore the possibilities of purchasing the land and buildings from the Anglican Church (Fulton, 1982). Given legal restrictions which prevented any school district from owning land outside its boundaries, arrangements were made with the Vancouver Society to negotiate a sale. Currently the school owns the land on which the NVOS is located and, as such, the NVOS is responsible for all construction and maintenance costs associated with the site (Personal Communication with NVOS principal, 2000). However, there are no associated lease costs to include in the operating budget. The NVOS land is surrounded by both crown land and private property. Students are taken onto crown land for the purpose of instructional hikes, under the supervision of counselors and classroom teachers.

5.1.3 Student Campus

The NVOS is located on a 165-hectare site with a variety of different land types and features. Some of the highlights include virgin and second growth forest, river frontage, artificial and natural ponds, and habitat for a variety of species including salmon and bald

eagles (NVOS, 2000). All of these features are within easy walking distance of the main campus, which is comprised of student cabins, a dining room, auditorium, offices, a health clinic and a number of education buildings. These educational buildings include a small farm, a salmon hatchery, and a duck-nesting house. The main campus also contains recreational facilities including a canoe pond, a large athletic field and a basketball court. Student cabins are heated and each cabin contains two bathrooms with showers and bunks. Within the main building is located the dining hall, the principals office, an auditorium and a teachers lounge. The auditorium doubles as a lab and, as such, contains audio-visual equipment, microscopes and worktables.

5.1.4 Natural History

Each day of programming consists of a different combination of fieldwork, classes, free time, athletic activities and chores. The students are divided into instructional groups, which differ from the cabin groups and contain students from different classes, although the classes are of the same grade and originate from the same school. Each day students take part in field studies, chores, recreational activities and free time. Chores and free time are conducted within cabin groups while recreational activities and field studies are conducted within larger instruction groups. In addition, each classroom teacher has one hour with his or her regular class each day. This opportunity is taken to write diaries, discuss issues learned that day or conduct games or other learning activities as deemed appropriate by the teachers. The classroom teachers decide upon the topics for the daily field studies before attending the school. This decision is based on both student and teacher interests since the teachers are responsible for leading some of the studies. Possible topics include animal studies, wildlife studies, forest studies and farm studies. Students may also participate in pond studies and wilderness survival programs. The educational goals of the program are to introduce the students to the intricacies of the environment in which they live and provide some examples of the effects of human/environment interactions (Personal Communication with NVOS instructor, 2000). By the end of the program it is intended that the students will develop a sense of respect for themselves,

their classmates and the environment.

5.1.5 Teachers and Counselors

The NVOS has three teachers on staff and one principal. These teachers specialize in one of the topics that the students have the opportunity to take. The classroom teachers instruct the other topics. There are also two first aid attendants on staff, one working during the day and the other on call after hours. Maintenance staff and kitchen staff handle the day-to-day operations of the school and a counselor coordinator/recreational director trains and supervises the counselors. The counselors themselves are volunteer high school students generally from school district #44. These students are granted time off from their regular course of studies in order to attend the outdoor school and are responsible for the students in their cabin almost twenty-four hours a day. Training takes place before the program starts each year and the students who act as counselors are elected by their high school teachers.

5.1.6 School District #44

The NVOS is operated as a school within school district #44. As such it is operated under the supervision of a principal who acts within some of the same capacities as a school principal in any other setting. While attending the outdoor school, classroom teachers operate along similar hours as they would at their home schools. Because of this, the NVOS operates under the guidelines and regulations set by the teaching union. Given its status as a school, the NVOS is classified as a not-for-profit organization.

5.1.7 Sponsors and Government

The NVOS no longer receives complete funding from the school district since operating costs increased while the district's ability to cover these costs decreased (Personal Communication with NVOS principal, 2000) As such, funds are generated both from tuition

charges and from fundraising. Fundraising has become one of the responsibilities of the NVOS principal who looks to both private and corporate sponsorship. Recent corporate sponsorship has included pond building and stream restoration through a program in cooperation with BC Hydro. Another significant source of funds comes from the Vancouver Sun Fund, which also contributes to capital costs. Students were charged $65 for a four-night program through the 2000 season. This fee covered room, board, instruction and transportation; those students who are unable to pay are given scholarships. While teaching at the NVOS classroom teachers are still paid by their local school. During the summer, facilities at the NVOS are rented out for conferences and camps. These rentals provide another important source of income.

5.1.8 School Commitments

The NVOS draws from all schools in District #44 as well as supporting elementary schools from other Lower Mainland districts. Being associated with a school district has meant that the NVOS never has difficulty drawing students. Also, since the agreement for attendance is made with the schools, which have integrated it into their curriculum, there is no risk of losing student attendance when teachers leave the classroom.

5.1.9 Student Views

The student interviews indicated that, while the students are aware of some of the advantages of the current way in which the NVOS operates, they are largely unaware of many of the financial disadvantages. Some students did, however, recognize the advantages to being associated with local schools. One student expressed, "It's really cool that I could come here cause my brother used to come here and now I get to do it too." (NVOS student, 2000).

This is an indication of the value of integrating a residential outdoor school into local schools since it reinforces a traditional value, which encourages community support. This opinion was reaffirmed by the parent surveys, which demonstrated that the community

members do, indeed, see the NVOS as a worthwhile community institution.

With regards to land tenure, again the students saw only the advantages with comments such as, "There's lots of space." And "It's nice 'cause there's no one around here but us.". The costs associated with owning the land including maintenance were largely unnoticed except by one student who commented that, "There are mice in the cabins.". This comment, while lodging a complaint, did not lay blame, however, and therefore is not representative of an overall displeasure towards the NVOS. Most of the comments from the students revolved around their participation in the program. Many students made positive comments about the presence of high school counselors and the setting of the activities such as, "The pond's really nice." and, "I liked playing predator/prey.". The students also admitted to having learned, "about nature and stuff." and, "How to look at things differently, like a pond or a river which might have bugs in it.". Overall, I believe that the student interviews provided the researcher with an affirmation of the advantages to the situation and operation of the NVOS but did little to expound upon the disadvantages.

5.2 Results: Olympic Park Institute

5.2.1 Background

The Olympic Park Institute was established in 1988 under the greater guidance of the Yosemite Institute, a non-profit umbrella organization. Located along the shore of Lake Crescent, in Olympic National Park, Washington, the OPI conducts field science programs for classes from along the entire West coast of the United States. The OPI also subsidizes the income from these students with other programs including participation in the Elderhostel program and summer seminar series. The room and board facilities at the OPI can support up to 100 guests at any given time.

5.2.2 National Park

The OPI is located within the Olympic National Park on land owned by the National Parks service. Land tenure was established through an agreement which allowed the OPI to locate on this land free of charge. This agreement was negotiated with support from the Yosemite Institute, which is considered to be the parent organization to both the OPI and a similar program in California.

The OPI is responsible for all maintenance related costs on the campus including the construction of infrastructure exclusive of Rosemary Inn and the accompanying small cabins which are maintained by the Parks Service as a result of their place on the National Register of Historic Places.

Classes attending the OPI are granted access to Olympic National Park free of charge although the development of permanent structures is forbidden outside the OPI campus. The hiking trails and interpretive walks are located in the National Park and thus are maintained by parks staff, however the OPI has no exclusive use agreements within the park and, as such, all of these trails are open to public access. In addition, the regulations regarding behavior within an US National Park remain in place for all guests of the OPI. These restrictions extend to the collection of samples and the responsibility for remaining on marked trails.

5.2.3 History and Development

The OPI operates primarily out of the historical Rosemary Inn. This facility contains a meeting area, a classroom and a dining hall with the second floor hosting a lab and staff offices. The lab in Rosemary Inn contains work areas, lab equipment, and samples of local flora and fauna. The accompanying cabins are in the process of being restored, after which they will be used for staff housing. Students are housed in six cabins, each containing a central entrance hall and four rooms with two bunk beds each. Showers and bathrooms are located in a separate bathhouse located a short distance from the cabins. The cabins circle a central gazebo, which is used for meetings and activities. With

regards to recreational facilities, the OPI campus contains a large open field, which can be used for sports and other outdoor activities, and a canoe shed on the shores of Lake Crescent.

5.2.4 Choice and Variety

Students at the OPI can expect to take part in a variety of programs as decided upon by their classroom teachers. The courses must be selected before the class arrives at the OPI and choices include: forest, freshwater, intertidal and alpine ecology, botany, mammal studies, ecological concepts, invertebrate studies, native culture, marine science, meteorology, pioneer history, team building and geology. Generally, formal learning takes place between 09:15 and 16:00 with time taken for breaks and lunch. Each class is divided into instructional groups of twelve to fifteen students, with each group requiring one adult chaperone, to be provided by the attending school. These groups will remain together for the duration of the program and may or may not coincide with cabin groups. Instructors for these field science classes are full time staff members of the OPI, while classroom teachers are expected to act as chaperones only. Teachers can request material in order to conduct preparatory and follow-up lessons although this is not required. Meals are prepared by OPI staff in the common dining hall. Students are expected to serve their own dishes and assist in clean up, under the guidance of the counselors. There is also ample opportunity for recreational activities including canoeing, sports activities and hiking. Evening programs run from 19:30-20:30 and are led by the OPI instructional staff, although counselor participation is required. Quiet time is called for between 21:30 and 07:00 during which students are required to remain in their cabins. The overall goal of the OPI Program is to introduce students to the Pacific Northwest environment and provide some examples of environmental issues that effect the students.

5.2.5 Professionals

The staff at OPI is all well-trained and work as full time seasonal employees. Instructors

are hired by the institute based on their knowledge of field programs and teaching experience. These instructors are responsible for both teaching the programs and leading some of the recreational activities such as canoeing. The OPI also has full time administrative staff including a program director, a marketing/advertising specialist and a director. In addition, OPI employs professional cooks and maintenance staff to assist in the provision of operating services during sessions. Finally, in order to assist with financial stability, the OPI has a fundraiser on staff who runs both the annual campaigns and seeks grants and funding from major private donors.

5.2.6 Networked NGO

The Olympic Park Institute is one component in a network of three residential outdoor schools. The parent school is the Yosemite National Institute (YNI) which was established in Yosemite National Park in 1971. The third school in the network is the Headlands Institute, located in the Golden Gate Recreation Area in California. This site was established in 1977 in response to the swift success of the Yosemite site. The YNI is a not-for-profit organization run under the direction of a board of directors. Funds are raised through operational surpluses and charitable grants and are divided amongst each school as required. Each school has its own board of directors, which meets on a regular basis as deemed necessary by the specific sites. The director of each board also sits on the board of the YNI and attends regular meetings in order to discuss issues that effect the entire network. Each year an annual meeting is held at one of the sites. Every employee from every institute attends this meeting, including cooking staff and instructors. This meeting is intended to allow each institute to take better advantage of its status as a member of a network by facilitating communication and cooperation between institutes on all levels. Ultimately, each institute must answer to the YNI, although daily operations are under the control of the individual schools and program directors.

5.2.7 Loans and Fundraising

The OPI was initially funded by the YNI, which fronted the capital necessary for the inception of the program and the operating costs during the start-up phase. The OPI also secured a low interest bank lone through a board member when an injection of funds was required. After ten years the OPI began to show a surplus, at which point it was able to contribute to the YNI fund dedicated to the repayment of debt and the establishment of a scholarship fund. The OPI receives funds from tuition, summer field courses, the Elderhostel program, facility rentals and from private donors. The tuition for the field science courses is, on average, $44.65 US per student per day, which includes room, board, instruction and materials for the duration of the course. Not included in this price is transportation to and from the site and equipment rentals for those students who require it. Scholarships are available to both schools and individual students although attending classes are encouraged to develop fund raising methods.

Currently the OPI receives 85% of its funds from tuition for both field science and summer programs with the remaining 15% of funds being raised through donations. For the previous year, the OPI has been running with an internal budget surplus although transfer payments to the YNI, established in 1998, have eliminated this surplus and created an overall deficit. The director of the OPI believes, however, that the coming year (2001) will post an overall budget surplus (Personal Communication with OPI executive director, 2000).

5.2.8 Attracting Students

The Program Director identified that the most usual method for attracting students was through the classroom teachers. She believed that the majority of classes come because their teachers have approached OPI, or one of the affiliated sites, and received approval to bring their classes to the OPI. There are a few schools for which attendance is a regular feature of a certain grade (usually grade five or six).

5.3 Results: Golden Ears Learning Centre

5.3.1 Background

The Golden Ears Learning Centre is a joint project developed between BC Provincial Parks and a non-profit organization, the Golden Ears Learning Society. The Centre is located within Golden Ears Provincial Park in Maple Ridge, BC with current facilities on the shores of Alouette Lake. Pedagogical focus for the centre is currently on social history with an emphasis on First Nations culture and use of the environment. The feasibility study for the GELC was completed in 1998 and, as such, the program is still in its infancy. Current programs are limited however, this situation is expected to change as the Golden Ears Learning Society addresses issues such as funding and site development.

5.3.2 Provincial Park

The Golden Ears Learning Centre is located within the Golden Ears Provincial Park. The park falls under the jurisdiction of the BC Parks, Lower Mainland District Office. In order to facilitate the development of the centre, BC Parks will grant the associated non-profit organization, the Golden Ears Learning Society, a special-use permit with an indefinite time span. This special-use permit will allow the GELS to develop the site and conduct learning and recreational activities within the bounds of the permit. The permit does not, however grant exclusive-use rights nor does it eliminate public access to the site.

Students attending the GELC have access to all the facilities of the provincial park although building and facility development would be limited to the permit area. The initial feasibility study assumed that BC parks would assume financial responsibility for all capital developments, although this assumption seems unlikely.

5.3.3 Building Process

The Golden Ears Learning Centre currently operates out of a traditionally constructed longhouse. The longhouse was built through co-operation with the Katzie First Nations on the shore of Alouette Lake. Access is gained through hiking trails and a short canoe ride. Currently this is the only portion of the site development that has been completed and brought into operation.

With regards to future development, the GELC intends to develop a base camp using existing BC Parks buildings. Current infrastructure includes nine cabins, previously used by BC Parks youth crews, an cookhouse, a bathhouse, and a garage and conference room. These buildings will be given over to the GELS through the special-use permit as discussed earlier. The cabins have been identified as potentially usable although it has been advised that a new bunkhouse be developed since the cabins are old and reaching the limit of their use value (Mahe, in Parsons & Sherlock, 1998).

The base camp will be developed in order to house students and teachers during multi-day programs. A wet-lab is also proposed as is a challenge rope course and an interpretive learning trail. At a later date the GELC would also like to develop an outdoor amphitheater where students could attend lectures and presentations. The final intended capacity, upon completion of the base camp, is four classes (84-106 students) including the accompanying classroom teachers and parent supervisors.

5.3.4 Program Planning

Current programming at the Golden Ears Learning Centre focuses on complementing British Columbia's Social Studies curriculum through exposure to hands-on activities regarding First Nations traditions, stories and views of the environment. Day programs are held in the longhouse and are directed by representatives of the Katzie band.

In the future, residential outdoor school programs are intended to cover the "three C's of learning; caring, concern and connection." (Parsons & Sherlock, 1998). These learning goals will be accomplished through the teaching of ecology, environmental ethics, conservation biology and visual arts. Proposed examples include a pond study course, First Nations studies, astronomy, and ethno botany. Students will attend the centre with their classroom teachers, counselors will be present; but whether they will attend on a volunteer basis as with the NVOS or on a paid basis, as with the OPI has yet to be decided.

5.3.5 Staffing Choices

The GELC currently employs lecturers from the Katzie First Nations. These instructors were trained during the development of the longhouse program in order to foster positive connections with the First Nations and take advantage of a unique set of knowledge. Classroom teachers also accompany their classes to the current programs and it is intended that the same apply to the residential outdoor school program once it has been implemented. Further staff, specifically maintenance staff may be shared with BC Parks although negotiations must take place before this policy can be implemented.

The number of staff is limited at the moment but will increase once the full program has been initiated.

5.3.6 Independent NGO

A board of directors representing the non-profit Golden Ears Learning Society will run the Golden Ears Learning Centre. This organization was created through co-operation between BC Parks and local educators and, accordingly, the board contains representatives from both fields in addition to members of the local community (Maple Ridge). The board will eventually be responsible for all decisions associated with the development and expansion of the school although the current focus is on fundraising.

5.3.7 Local Fundraising

The Golden Ears Learning Centre currently receives income from the day program which charges $160 per half-day for a maximum of 30 students. The Centre has identified capital development costs of $800 000 and an annual operating budget of $487 625. It is expected that the annual operating costs will be covered completely by student tuition, given an attendance rate of 2200 students per year. The capital costs may be slightly off set by government funding which could be obtained through BC Parks programs such as youth employment strategies. Those funds that cannot be garnered through this method must be raised through grant seeking and fundraising.

5.3.8 Local Schools and Overflow

The GELC intends to draw students from many different school districts in Vancouver and the Lower Fraser Valley. By including Maple Ridge educators on the board of directors, the centre hopes to be able to elicit a commitment for students from this school district in particular. At the moment, however, there is no formal agreement between the GELC and any school district and, participation in the day program is entirely voluntary, with no financial support from school districts.

5.4 Results: Conclusion

Each of the above case studies provides a different method and point of view regarding the operation of a residential outdoor school. These results demonstrate the diversity of options available when designing a model network. Before imparting judgment, however, it is important to make a closer examination of the consequences of selecting one

option over another. This can be best examined through a discussion of the advantages and disadvantages associated with each issue as described above.

6 Discussion

The following discussion will help to place the case study results in the context of suitability for the development of a model network. It will examine the pros and cons of each decision and management option although no judgment will be imparted regarding the relevance of these advantages and disadvantages to the development of a model network within the framework of Canadian Biosphere Reserves. As with the above sections, the discussion for each case study is presented separately.

6.1 Discussion: North Vancouver Outdoor School

6.1.1 Background

The North Vancouver Outdoor School has had over thirty years to nurture connections with administrators and funding agencies and to become an established member of North Vancouver life. It has also used these thirty years to find a system of operations and management that best fulfills the NVOS goals within its current setting. As such, it is important to study the NVOS in order to profit from this experience and to learn some of the advantages and disadvantages associated with its unique set of characteristics.

6.1.2 Private Land

The NVOS is the only case within our study that is located upon private land and, it was only through a specific set of pre-existing conditions that this was possible. In particular, school district #44 was originally granted a large amount of land in an area where land

values have increased drastically over the past fifty years. The sale of some of this land allowed the district to invest in the NVOS through the availability of funds, which are largely unavailable to most other school districts.

Being located on private land gives the NVOS almost complete freedom to develop the facilities as it sees fit. This has allowed for changes in the surrounding habitat to be enacted without costly ecological studies or lengthy bureaucratic discussions. This has allowed the NVOS to create man made ponds and contribute to stream restoration projects. It has also allowed the NVOS to locate a small farm on the site with a variety of livestock. This would have been very difficult, if not impossible, had the campus been located within a national or provincial park (Personal Communication with BC Parks employee, 2000).

Another advantage to locating on private land is the ability to exclude non-users. Although the NVOS has a very open policy regarding visitors, the staff does have the authority to ask for an explanation of visitor presence. This allows the NVOS to increase student safety at the site.

The greatest disadvantage associated with locating on private land is the associated costs. As mentioned earlier, the NVOS does not currently have any lease or mortgage costs; however, the school is entirely responsible for the maintenance of the site and facilities with the exception of the BC Hydro right of way. Currently, maintenance costs contribute approximately $200,000 per year to the annual operating budget of the NVOS (Parsons & Sherlock, 1998). Because the campus is located on private land, there are no opportunities to share these costs with other user groups.

6.1.3 Student Campus

The NVOS has a well-developed infrastructure of facilities and an opportunistic approach to facility development.

The greatest advantage associated with the facilities at the NVOS is the variety. The learning sites are widely varied and provide opportunities to cover a number of pedagogical topics. This variety allows instructors to retain student interest through the presentation and promise of new and completely different settings and subjects.

The NVOS located on land that already had a developed infrastructure for camping. Thi s decreased the amount of initial construction required in order to operate the program; however, it results in a very old infrastructure. Many of the cabins, classrooms and main buildings are quite old and are showing their age through increased requirement for maintenance and repairs. The cabins are also spread over quite a distance, increasing difficulties associated with monitoring children during the night.

6.1.4 Natural History

The program at the NVOS involves a very intense sequence of activities providing students with full days and many different learning opportunities.

Involving students in all aspects of the operations of the outdoor school from classes to leisure time to chore activities fully integrates students into the learning experience. This gives the students a better understanding of the outdoor environmental education process and demonstrates the environmentally responsible actions of the NVOS (such as recycling, composting and farm maintenance).

Another advantage is the hands-on nature of the programming. All learning chapters involve visits to different sites and require the use of all senses. This theory exposes students to many different habitats and allows them to explore many different leaning methods. These factors are thought to increase learning through increasing participation and attention spans.

During interviews and through teacher interactions, students expressed a number of concerns regarding the NVOS program. Firstly, many students found that the days were too long and too full of activities so that, by the end of the day, students' attention was wavering and fewer lessons were being learned. Secondly, students expressed concerns over the fact that they could not choose which learning chapters they participated in. No learning group could experience every chapter, and, for the sake of organization, students in the learning groups had no influence over which chapters they did take. This resulted in a number of students who never had the opportunity to learn about the topics that interested them specifically.

6.1.5 Teachers and Counselors

The NVOS combines a number of different staffing methods, using classroom teachers in conjunction with NVOS as instructors, relying on student volunteers as counselors and sharing salary costs with the school district. As a result, there are a number of advantages and disadvantages to the NVOS staffing method depending upon what aspect is being considered.

The most obvious advantage to the staffing methods used by the NVOS is the cost-saving factor. By using classroom teachers who are already being paid by their home school and having volunteer student counselors, the NVOS drastically reduces its operating costs.

In addition to financial advantages there are a number of other advantages associated with the NVOS method of staffing. First, the student counselors, who are responsible for the students for most of the day, are typically between the ages of sixteen and eighteen. As a result, the younger students respond well to the counselors seeing them more as "cool people" (NVOS student, 2000) as opposed to strictly figures of authority. Many students mentioned this as a positive feature of the outdoor school program. Furthermore, since classroom teachers are also teaching some of the programs, instructor authority is established even before the start of the program and class management is made easier. Also,

since classroom teachers know far ahead of time what subjects they will be teaching, they often take time to prepare both themselves and their classes before the start of the program.

Despite the fiscal advantages, there are some disadvantages associated with the staffing method at the NVOS. Specifically, while using classroom teachers as instructors saves money, the classroom teachers are not trained to teach environmental education and are therefore, not necessarily the most qualified people to be teaching at the NVOS. Furthermore, the degree of preparedness of the classroom teachers is entirely a function of their own interest. Therefore, it is possible to have a teacher with little knowledge of the topic that they are teaching and a poorly developed lesson plan for teaching it. Finally, when using student volunteers, the NVOS is somewhat reliant on the schedules of the local high schools for the provision of counselors. This is especially a problem during exam periods and times when special events are planned at the high schools.

6.1.6 School District #44

The NVOS was conceived of and established by a single school district and, as such, has always been under the management of this district. This system of administration has a number of unique ramifications, which effect many facets of the NVOS.

The study of the North Vancouver Outdoor School revealed that it is unique, amongst the case studies, in its status as a community institution. Part of this may be attributed to its longevity but some of this sense of community likely arose from the fact that the NVOS actually belongs to the local schools.

A further advantage to being associated with a local school district is related to the guaranteed attendance of students from every school in the district. This allows the NVOS to accurately plan for expected costs and incomes in a remarkably accurate manner. Because of this, the NVOS rarely has an imbalance between incoming and outgoing

funds.

Finally, the association with the school district assists in the delineation of classroom teacher responsibilities and hours. Because the NVOS is treated as any other school, when teachers are attending they operate as if they were teaching at their own school. This has ramifications with regards to hours and the degree of teacher responsibility for the students in their class. This factor also increases teacher comfort levels during their planning for and attendance of the program (Personal Communication with teacher attending NVOS, 2000).

Because the NVOS is a school operating within school district #44, it is subject to the same problems as all other schools. Specifically, the NVOS is very susceptible to budget cuts when the school district must decrease spending. Also, concern was raised because the NVOS teachers must necessarily belong to the local teachers union. This presents restrictions with regards to hiring practices in that the NVOS must follow union hiring guidelines although these guidelines may not be appropriate for the purpose of an outdoor environmental education program.

Finally, since the NVOS is run as a public school, it has a moral obligation to make the program accessible to all students in the district. This has made necessary the founding of a large scholarship fund and limits the tuition which can be charged to cost recovery only.

6.1.7 Sponsors and Government

The NVOS has, over the history of its operations, gained experience with a number of funding options and partners. The following is an analysis of the current funding situation as has grown out of thirty years of programming.

The NVOS currently has a number of crown and private sponsors, which have established a long history of donating. Specific agencies include the Vancouver Sun Fund and BC

Hydro both of which have donated significant amounts to the Legacy Project headed by the Pacific Foundation for Understanding Nature. These relationships have developed a solid fundraising infrastructure, which has made the procurement of specific funds much easier.

The NVOS is also funded, in part, by the school district. These funds decrease the amount of cost recovery that the NVOS must accomplish through the elimination of salaries from the calculation of the annual operating budget.

Perhaps the greatest disadvantage associated with the funding situation as described above, is the reliance on school district funding, which is susceptible to cut-backs (Personal Communication with Principal of NVOS, 2000). Typically, when the school district has been subject to budget cuts, the NVOS has received decreases in funding in a more than proportional amount. Since the NVOS has little influence over the district and provincial education budgets this leads to a general lack of control by the NVOS over its own financial future.

6.1.8 School Commitments

The administrative position of membership in a school district and the curriculum based nature of the NVOS results in a steady stream of students who are required to attend the NVOS program. As a result, there are no apparent disadvantages associated with the current method of attracting students employed by the North Vancouver Outdoor School.

6.2 Discussion: Olympic Park Institute

6.2.1 Background

It is important to study the OPI since it presents us with a glimpse into the possibility of locating a residential outdoor school within the core protected area setting of Canadian Biosphere Reserves. Additionally the OPI is the only case school that is a member of a larger network; and, as such, studying this site provides information pertaining to factors associated with developing a network of residential outdoor schools. The following contains an analysis of this information.

6.2.2 National Park

Being located within a National Park presents a number of fiscal and operational advantages versus different operational and programming challenges. Most of these advantages and disadvantages were foreseen by the developers of the OPI and were a consideration in the site selection.

With regards to fiscal advantages, having no associated land payment costs, in terms of either lease or purchase, the OPI has reduced operational and capital costs in comparison to schools located on private land. This allowed the OPI to overcome one of the greatest challenges facing residential outdoor schools in terms of funding. Likewise, the presence of existing buildings decreased construction costs. While student cabins and additional office space was required, the main building was in existence prior to the establishment of the school. This situation is relatively unique, however, and, in fact, was one reason for the selection of the site. Operational advantages also revolve around the location within

the Olympic National Park. First, many of the study sites and hikes are maintained by a body external to the OPI (US National Park Service). This factor allows the OPI to operate without an extensive maintenance crew or the responsibility for monitoring and constructing facilities. It once again, decreases the costs associated with the operation of the Institute.

Finally, as mentioned by one interview subject, locating within the National Park gives the OPI an air of authority and credibility. The National Park network in the United States in well known and, as such the thoughts of an outdoor school within a National Park appeals to many people. It is believed by the staff at the OPI that some people view National Parks with fond familiarity and that this fondness is then transferred to the OPI. The staff believes that this may be a drawing factor for some groups.

While there are many advantages associated with OPI's location within Olympic National Park, there are also many mitigating factors, the most significant of which revolves around the fact that responsibility equates with control. While the OPI experiences positive financial windfall since the National Parks Service takes responsibility for trails and the surrounding land, it also must acknowledge limitations on the use and development of the same land. The inability to expand beyond the OPI campus was expressed by the program director who provided the example of a challenge course. In an effort to expand the team-building program, OPI staff wishes to install a physical challenge course, which would require cooperation to complete. Unfortunately, there is no appropriate space on the campus for such a course to be constructed. In order to run such a course on National Park land, however, the course could not be permanent. Since a modular challenge course is not feasible, neither financially nor logistically, the expansion is not possible. If the OPI was located on private land, the campus would necessarily be larger and the opportunity to purchase adjacent land might well exist. The other disadvantage to locating within the National Park revolves around the fact that most of the school's study sites lie off-campus. Because of this, the study sites fall under the regulations enacted by Olympic National Park regarding the collection of samples. Because it is forbidden to remove any samples (organic or inorganic) from the National Park, no field samples can

be collected. This limits program options since students cannot experience sample collection nor can field samples be used in the classrooms where microscopes and other resources are available.

Additionally, the hikes taken by students at the school are conducted along National park trails, which, are by right of law, fully publicly accessible. This presents problems of overcrowding during the busier months and requires a lower student to instructor ratio for safety reasons. This disadvantage is seen as minimal compared to the advantages, however, since the busiest months on the trails fall during the summer when school programs are not being run.

Finally, while the association with Olympic National Park does stir fond memories in some, as stated above, the same association presents negative connotations to others. Specifically, the OPI has no control over the actions of the National Park and, regardless of that, the institute is often viewed as a part of the National Park. Discomfort over decisions made by the National Park may extend to negativity towards the OPI. This is especially true of the local community which is most effected by the decisions made by Olympic National Park; for example there have been recent debates over the banning of motor craft on Crescent Lake. This decision effects many Port Angeles residents who have homes along Crescent Lake and who resent the National Park's attempts to control their activities on what many view as their front yard. Some of this dislike has also fallen on the OPI although it is questionable as to whether this has effected the enrollment levels in the school.

6.2.3 Historical Buildings

The OPI is located within a combination of newly constructed buildings and older, historical buildings. Likewise, study sites fall into two categories, those which are on campus and those which are within the National Park. This dichotomy presents a number of advantages and concerns.

The OPI has the obvious advantage of locating some facilities within historical buildings, which have been well maintained and will continue to be maintained by the National Parks Service. This greatly reduces maintenance costs and, thereby, annual operating costs. Also, by locating some study sites and interpretive hikes within the National Park, the OPI reduces development and operating costs associated with campus development.

The study sites at the OPI are not all located on campus and, in fact, some are located beyond walking distance from the Rosemary Inn site. As a result, while a good variety of study sites are maintained, effective learning time is reduced with the addition of travel time.

Also, since few of the study sites are private, some sites are potentially quite busy during high tourism seasons. This increases discomfort levels with regards to class management (Simmons, 1998) and decreases the efficiency of the learning process because other visitors may distract students.

6.2.4 Choice and Flexibility

The program at the OPI is very flexible in order to suit the needs of a variety of classes and grade levels. Program content is decided upon through communication with the classroom teacher or organizing parent based on an extensive list of options. Topics covered can vary from forest ecology to cultural history.

As stated above, the program at the OPI is very flexible. This allows for adjustments to be made in order to conform to the curriculum of the state from which the students are visiting. With such a wide range of topics to choose from, classes can cover a variety of subject headings including: history, geography, science, art and creative writing. This fact helps encourage teachers to bring their classes since is ensures that no one subject is studied to the exclusion of all others thereby making the OPI program more similar to teach-

ing schedules within the school. This variety also allows teachers to explore their own interests beyond science.

Also of note is the fact that the OPI provides programming external to the outdoor environmental education program. This programming, available to the general public and to Elderhostel participants, provides an income subsidy, which is used to decrease the costs to students participating in the residential outdoor school.

Some of the program options offered by the OPI do have additional costs associated with them. Since students are already paying tuition, this fact often dissuades the selection of some topics thereby making the choice of study topics effectively smaller then it actually is. Furthermore, the provision of introductory or follow up material for use in the class could be more developed in order for students to benefit more from the OPI learning experience (Personal Communication with OPI employee, 2000).

6.2.5 Professionals

Staffing at the OPI is very important as evidenced by the annual conference for all staff working within the YNI system. This conference is held at a different learning site each year and all costs associated with attendance are covered for every staff member including administrative, instructional, cooking and maintenance staff. This attention to staffing results in a number of advantages; however, there are areas that may benefit from some changes or improvement.

All members of the OPI staff are specifically trained and particularly selected for the OPI environmental education setting. As a result, the quality of instruction, administrative efficiency and operations are very high. This is especially relevant with regards to instructors who are all very knowledgeable about specific topics and are specifically able to teach this information to children in an outdoor environmental education setting.

OPI staff members are also very loyal, resulting in low turnover rates and a high feeling of job satisfaction (Personal Communication with OPI employee, 2000). These factors decrease operating costs through lower need for training and losses due to inefficient or dissatisfied employees.

The OPI does not employee counselors, nor does it support a system of volunteer counselors. Rather, the OPI requires that attending classes provide their own parent supervisors who must also pay tuition to the OPI. This method increases costs for students attending the institute and may dissuade some classes from attending due to increased organizational requirements. Specifically, it may be very difficult for parents who work or who have other small children to leave their homes for the duration of the program.

There is also an additional cost associated with reliance solely on OPI employed instructors in comparison to the NVOS model where classroom teachers are responsible for approximately 50% of the total teaching duties. Again, these costs are added to the annual operating costs of the OPI requiring a greater income of funds in order to ensure continued operations.

6.2.6 Networked NGO

The Olympic Park Institute is unique amongst the case studies in its role as a member of a larger network of residential outdoor schools. In fact it is this very association, which facilitated the development of the school. Yet, an association also creates larger responsibilities to other sites and to the superior board of directors.

The OPI developed many programs that were designed specifically to take advantage of the opportunities provided by the unique ecosystem of the temperate rain forest and coastal environment. However, these programs were partially developed from a model stemming from existing programs at the other institutes. Furthermore, the YNI has a plethora of environmental education readings and resources, which it has been collecting

since its inception. As a result of its place in the YNI network, the OPI was able to take advantage of these resources without the requirement of repeating the work already conducted by other sites; this was identified as a factor that played a significant role in the ease with which the OPI was able to begin operations. These advantages have also continued throughout the years of operation through the annual meetings of all staff from all sites. These meetings have proved to be invaluable settings for problem solving and brainstorming and have, again, limited the amount of redundant work each site would otherwise have to do.

Another significant advantage of being associated with the YNI relates to enrollment. During the first years of its operation, the OPI was having difficulty filling program vacancies. Now, however, the peak program times are filled early (although off-season vacancies still exist). The YNI or the Headlands Institute, which are often overbooked, have referred many of the classes, which are now filling these spots.

The staff at the OPI identified few disadvantages associated with being a member of a larger network. There was minimal expression of the fact that decision-making freedom was somewhat limited however, there was no identified case of a decision on the level of the OPI being reversed or refused by the YNI.

6.2.7 Loans and Fundraising

Every residential outdoor school must overcome financial barriers before becoming a successful environmental education program. In the case of the OPI, part of this financial burden was alleviated through locating on National Park land. And yet, many capital costs still remained; residences and offices had to be constructed, equipment had to be purchased and staff had to be hired and trained. To help overcome these costs, the OPI was able to lean on the Yosemite Institute for assistance.

Without the support of funds from the YNI, the OPI would have had difficulty securing

the funds necessary for the construction of the cabins, the development of curriculum and the hiring of qualified staff. These funds were available to the OPI because both the Yosemite site and the Headlands Institute had been contributing to a fund designed for such a purpose since each began earning a surplus. As such, the OPI had the option of securing grants on a fund matching basis, undergoing development with minimal loans and relying on the financial support of the other institutes to cover losses during the first years of operations. The OPI also has advantages securing donations as a result of its association with the YNI. Many donors felt secure granting money to a field science school which had a high probability of success based on the records of its predecessors. Furthermore, since the YNI is such a large organization, it has the capabilities to run a large-scale fundraising effort, the profits from which trickle down to the OPI. Finally, since the YNI is a not-for-profit organization, all donations to both the parent organization and the OPI are tax deductible.

The disadvantage of relying on the YNI for both financial support and, to some degree, financial control is the fact that the OPI will be effected by the decisions made by the OPI. For example, the OPI did not begin to earn a surplus, or even cover the costs of operation as stated by the schedule set by the YNI. As a result the OPI was threatened with closure. It was only through the procurement of a low interest bank loan that the OPI was able to continue operations. While the threatened cutting of funds did not result in the closure of the OPI it does provide an example of the dangers of financial interconnections between a school and its network.

6.2.8 Attracting Students

Currently, the OPI is not operating at full capacity during the winter months. This can be attributed to difficulties attracting students. During the spring months, however, the OPI is usually full. There is some question as to how much of the winter lack of students is a result of the high seasonal rainfall and how much can be overcome through the application of different methods of attracting students (Personal Communication with OPI

employee, 2000).

By taking students who cannot attend the YNI because of over bookings, the OPI is able to take advantage of the marketing skills and reputations of two other schools. Also, by sending pamphlets and brochures to past participants, the OPI attempts to retain customers despite circumstances such as the organizing teacher or parent leaving the school or moving to another grade.

Often, schools that send classes to the OPI because of a lack of space at the other institutes do put their name on the waiting list at the YNI. As a result, the OPI often loses repeat business to the YNI.

More importantly, however, the OPI has no connection to local school districts within the Puget Sound and Seattle area. Because of this, no formal relationship has been formed and there is no school district that has provided a long-term commitment to providing students for the program. This factor seriously limits the OPI's ability to fill its schedule and to accurately predict the total number of students attending the program in any given year.

6.3 Discussion: Golden Ears Learning Centre

6.3.1 Background

The advantages of studying the Golden Ears Learning Centre are numerous. Firstly, its current development presents the modern problems that are faced by a residential outdoor school during its inception. This is important since most outdoor environmental education programs can never overcome these start up difficulties. As a result, studying these factors will present a more realistic view of what difficulties are likely to be encountered or overcome through the development of a network within Biosphere Reserves. Also, since the GELC is located within a Canadian Provincial Park, there are many lessons to be learned regarding administrative co-operation and legal and bureaucratic issues.

6.3.2 Provincial Park

The Golden Ears Learning Centre is unique in British Columbia because it represents a co-operation between BC Ministry of Environment Land and Parks and local communities in a concerted effort for environmental education. While BC Parks often offers use permits for private service providers such as ski hill operators and boat rentals, this permit is unique because it is being offered to a non-profit organization.

When conducting the feasibility study, Bufo Inc. discovered that one of the main obstacles to outdoor environmental education centres is capital cost. By locating on crown land free of charge, the GELC has avoided one of the main contributors to these costs. T he special use permit will allow the GELC to develop its facilities in whatever manner it sees fit and does not preclude the centre from using provincial park land.

In addition, Golden Ears Provincial Park is a large park within a short driving distance from Vancouver and its suburbs. As a result it is a very popular destination for weekend camping trips. This popularity will lend a note of recognition to parents and teachers who may consider the GELC as an appropriate activity for their students and may increase their tendency to attend.

Finally, Golden Ears was designated as a Provincial Park because of the presence of unique and varied landscapes. Within the park, there is easy access to lakes, rivers, wooded areas, and alpine ecosystems. This variety of landscapes will increase the potential quality of programming for the GELC (Fulton, 1982).

The GELC has already been exposed to a number of difficulties related to being located within a provincial park. Firstly, BC Parks mandates forbid the exclusion of the public from any areas within a provincial park unless exclusion is for reasons related to public safety. As a result, while the GELC will operate under a use permit, there will be no recourse with which to exclude the public from the campus. This may present difficulties with regards to class management (Simmons, 1998) and student security.

Second, discussions have already been undertaken regarding responsibility for development and maintenance of the campus. Since the GELC is located within a provincial park, rangers are already present to care for the park; however, it has been argued that these rangers are already overworked and, as such, can not afford to take on the additional responsibilities associated with the maintenance of the GELC.

Finally, a common concept when a government agency is involved in a project is a low willingness to pay on the part of the participants. This can be attributed to the fact that some participants believe that they have already paid for all services, which should be provided within provincial parks through taxes paid to the government. This phenomenon may result in a decreased ability to fundraise for the Golden Ears Learning Society.

6.3.3 Building Process

Currently the facilities for the GELC are limited to the day program site however; it is possible, based on the feasibility report and on discussions held with GELS members, to examine future facility plans for advantages and disadvantages.

The GELC will be developing a base camp on land that currently contains buildings that were once used by BC Parks staff. As a result, the infrastructure is in place for the provision of water, sewage and electricity. This will decrease the overall costs of construction, which is especially important to the GELC since it is currently not funded for future development. The fact that some construction will have to take place is also somewhat advantageous for two reasons. Firstly, the GELC will be able to implement green architecture and construction practices. These practices are intended contribute to the environmental education experience through the demonstration of a campus with a minimal negative impact on the environment. Secondly, new construction will allow the GELC to design cabins and meeting areas for the specific purpose of providing outdoor environmental education to a group of students. This is important because it allows the center to tailor its facilities to support expected class sizes and to provide sites for intended activities.

Presently, the GELS is seeking funds in order to be able to fund the construction of the base camp. It has been called into question whether or not the site had sufficient, usable pre-existing buildings to reduce these costs significantly. Also, since the base-camp site has never been used for environmental education there are no established study sites and no recreational facilities. All of these will have to be developed before the GELC can begin operations.

6.3.4 Future Program/Staff

Since the residential outdoor environmental education program has not yet been initiated

or even finalized, it is not possible to discuss the program or staffing methods in great detail here. The development plan for the program will be based, however, on the model of the North Vancouver Outdoor School, although the roles of classroom teachers have not been assured and the specific lesson plans have not been formed.

6.3.5 Independent NGO

The creation of the Golden Ears Learning Society makes the GELC unique to the study since it is administered by a non-profit organization whose only raison d'être is to develop and operate one residential outdoor school site. The association with the Ministry of Environment Lands and Parks also contributes to the GELC position as a unique and important case study.

Since the Golden Ears Learning Society is responsible only for the supervision of one residential outdoor school, the GELC is given top and complete priority by the board. Furthermore, the composition of the board drawing from local school districts, environmental education experts and members of BC Parks results in a very well informed society which has access to many resources.

BC Parks does benefit from administrative influences; however this influence is somewhat limited. Within the provincial parks system, providing environmental education to schools and park users is mandated. Given the complexity of developing a program of outdoor environmental education, however, BC Parks is not in a position to fulfill this form of the mandate without co-operation with other agencies. The GELC provides this opportunity and, therefore, helps BC Parks achieve its mandate.

At present, the GELS has no paid staff positions, meaning that all board members and all labor and efforts are voluntary. Given the relatively high-powered, professional nature of the board it is difficult for the GELS to schedule meetings and successfully accomplish their goals. As a result, while the GELC is the top priority of the GELS, the GELS is not

the top priority of many of its members. This fact somewhat tempers the advantage stated above.

6.3.6 Local Fundraising

With initial capital costs for the Golden Ears Learning Centre estimated at $800,000 and given a minimum attendance of 2200 students per year in order to cover costs, the GELS has already begun to examine its financial potential and limitations.

The Golden Ears Learning Society's status as non-profit increases opportunities for fund-raising and grant seeking. If the GELC was run by BC Parks, fundraising opportunities would be limited since BC Parks in not in a position to collect funds specifically targeted to a particular program. Rather, provincial regulations dictate that all funds donated to BC Parks must be placed in a common pool, which is administered as the government sees fit. The creation of the non-profit society allowed this difficulty to be circumvented. With regards to grant seeking, there are many donors who wish to support environmental education initiatives, especially at a community level. Since many of these grants are restricted to non-governmental, not-for-profit organizations, the GELS allows the centre to conform to these restrictions.

Since the GELC is run by a small and specific non-profit organization, fundraising opportunities will likely be limited to local communities. Whereas local, regional and national donors support the OPI, the GELS cannot offer the same sense of prestige nor the same breadth of influence and the Yosemite Institute.

Additionally, the composition of the board is very diverse, and the advantages of this have been explained; however this diversity also presents challenges. Specifically, there may be clashes between groups with very specific agendas and interests. Already there has been much debate over the division of fiscal responsibility with no one organization willing to take full responsibility. Each member represents a larger organization which, while willing to work for the success of the GELC, does not wish to take on more responsibility

than his or her organization will be capable of through the foreseeable future. Unfortunately, spending restrictions and budget cuts are effecting all levels of government and neither school districts nor BC Parks is sufficiently comfortable with their financial situation to commit to a long term expenditure.

6.3.7 Local Schools and Overflow

The GELC is currently only seeking students to attend the day program at the longhouse. However, the same advantages and disadvantages that apply to this can be expected to apply to the residential outdoor school once it is brought into operation.

The Golden Ears Learning Centre has forged connections with local school districts through the composition of the GELS. Thus far, these connections have resulted in local schools being made aware of the GELC program that has resulted in surprisingly good registration rates for the day program. The GELC is also continuing relations with a representative from the NVOS and it is hoped that, once the residential outdoor school is initiated, any schools that cannot be accommodated at the NVOS as a result of space or timing restrictions, may be directed towards the GELC. This may result in a relationship similar to that which currently exists between the OPI and the YNI with regards to student attendance.

There is currently no formal commitment from the local school districts with regards to incorporating the GELC program into local curriculum. While the GELS is hoping that such a commitment will be garnered, since the GELC is not operated by the school district, little advantage is seen to forming a commitment with it. As a result, despite the efforts of the GELS it is possible that problems finding a steady supply of students may be encountered.

6.4 Discussion: Conclusion

Each issue discussed within the case studies has ramifications on the potential success of the residential outdoor environmental education program to which it is applied. However, it is important to remember that no solution can be applied universally to each case, the advantages and disadvantages must be considered and applied to the specific setting in which the model is being developed.

It should be noted that there are many methods through which an evaluation can be conducted for each model and each criteria. Individual planners can use these models in order to draw information pertinent to their own however; the summary below does provide a brief evaluation and points for discussion (see Table 1).

By and large, the old adage, 'you get what you pay for' holds true for the development of a residential outdoor school and each of the criteria discussed demonstrates the tradeoffs that may be required in each case. With regards to land tenure, costs and control over campus development are weighed. The NVOS has the greatest control but is also the model with the highest land tenure costs. The OPI model has the lowest costs but also, the least control while the GELC acts as a median with lower costs than the NVOS and higher control than the OPI. A similar pattern can be found when examining facilities. The NVOS has the highest development and maintenance costs although the variety of learning sites and the suitability of the buildings is almost ideal. The OPI has the lowest associated costs but is limited in the development of suitable buildings such as classrooms. Once again, the GELC acts as a compromise with high development costs but shared maintenance costs. The GELC will also be able to develop as it sees fit within the bounds of financial constraints.

When examining staffing choices, it is evident that the OPI has the highest costs although it employs many very specialized staff, which likely increases the quality of the learning experience. The GELC also employs environmental education professionals although

classroom teachers still have a well defined role. The NVOS has the lowest costs associated with teaching staff however, few programs are taught by specialists. With regards to administrative staff, the OPI has the greatest costs, the NVOS the median amount and the GELC the lowest costs with an entirely volunteer-based board.

Administratively, the degree of control over decision-making and the nature of public relations are important criteria to consider. The GELC has the greatest control over decision-making procedures while the NVOS is restricted by school board decisions and the OPI is constrained by dictates from the YNI. The relationship with the school board does provide the NVOS with a very positive public image while the GELC and OPI are affected by the decision-making and policies of government organizations. Closely related to administrative criteria are the financial considerations of each model, which can be broken down into issues of control and overall fundraising ability. As with administration, the GELC has the greatest degree of freedom over its finances however, it also has the most limited fundraising ability. The OPI represents the other extreme with the greatest access to fundraising but the most severe constraints on its own budget and spending. In this case, the NVOS represents the median with reasonable fundraising ability but less than complete control over its budget.

Finally, with regards to attracting students, each model selected a different approach. T he NVOS has the greatest ability to attract students through its association with a school district while the OPI has a reasonable method through connections with the YNI. Although the GELC is attempting to recreate the close school associations of the NVOS, efforts have, thus far, been unsuccessful, leaving the GELC with the lowest ability to attract students. This may change in the future. For a complete summary please see Appendix 3.

Table 1

		NVOS	OPI	GELC
Land Tenure	Cost	$$$	$	$$
	Control	***	*	**

Facilities	Cost	$$$	$	$$
	Variety	***	*	**
Program	Cost	$$	$$$	$
	Variety	***	**	*
Staff	Cost	$$	$$$	$
	EE Experts	~	~~~	~~
Administration	Control	**	*	***
	Public Relations	~~~	~	~~
Finances	Fundraising Ability	$$	$$$	$
	Control of Budget	**	*	***
Attracting Students		~~~	~~	~

The above table represents a subjective ranking of each model as compiled from the data gathered. $ - three equates highest cost; one equates lowest

** - three equates greatest control or variety; one equates least*

~ - three equates highest ranking; once equates lowest

As a result of the different methods of examining each criteria, the three case studies cannot be applied to the development of a model network without first discussing the framework in which the network will be developed; Canadian Biosphere Reserves. Similarly, the very fact that advantages and disadvantages can be so clearly identified for each issue and each case study emphasizes the need to examine the case studies before developing a model network based solely on the setting in which the network will be developed. The following sections address the analysis of the potential network framework and considers the suitability of the CBRA and individual Biosphere Reserves for fulfilling this framework role.

7 Biosphere Reserves

There are currently ten designated Biosphere Reserves in Canada, representing the provinces of Alberta, British Columbia, Manitoba, Ontario, Quebec and Saskatchewan. Thes e Reserves have been nominated and accepted by UNESCO, the governing body of the Man and the Biosphere (MAB) project because of their compliance with Biosphere Reserve criteria (Statutory Framework, 1995, CBRA, 2001). The question that must be considered when examining these Reserves is: Are Canadian Biosphere Reserves appropriate sites for outdoor school programs? Before answering such a question, however, it is important to develop a cursory understanding of the World Biosphere Reserve system.

Specifically, each Reserve must have a core area of legally protected land such as a national or provincial park. This core area is surrounded by a buffer zone in which the Biosphere Reserve encourages residents to participate only in activities that are commensurate with the conservation goals of the core area and a zone of co-operation (or transition area) where sustainable development practices are implemented (Statutory Framework, Article 4, 1995). In order to achieve these criteria, the Biosphere Reserve must rely on the voluntary co-operation of local residents and communities since status of a Biosphere Reserve provides no legal authority (CBRA, 2001).

Through local co-operation and systems of co-management, Biosphere Reserves have three official functions (Statutory Framework, 1995):

I. Conservation of ecosystems, species and genetic diversity.
II. Foster sustainable human development in appropriate areas.
III. Provide logistic support for education, research, projects and monitoring.

If sites succeed in fulfilling the above criteria and can demonstrate the potential for administrative capabilities through the development of a board of directors and prove to

be regions of significant ecological value, then an application can be sent to UNESCO, which can offer official designation. Once designation has been achieved, each Reserve is responsible for ensuring that it achieves the goals of the World Network of Biosphere Reserves and must successfully complete a review every ten years (Statutory Framework, 1995).

7.1 Canadian Biosphere Reserve Association

Each of the ten Biosphere Reserves in Canada is a member of the Canadian Biosphere Reserve Association (CBRA), which was developed in 1997 in order to, "blend the benefits of national coordination with the energy and dedication of individual biosphere reserves and their communities." (CBRA, 2001). The CBRA is a non-profit organization with one part time employee funded by Parks Canada. The remainder of the CBRA is based on voluntary membership. Each year, the CBRA and representatives from each Biosphere Reserve come together for an annual general meeting, at which time the director of each reserve can exact influence over funding decisions and the future activities of the CBRA. The CBRA cannot pass edicts to individual Biosphere Reserves; rather, it acts as an important source of support and provides a focal point for national co-operation and problem solving.

7.2 Biosphere Reserves as Suitable Sites for Residential Outdoor Schools

A number of researchers have considered which characteristics result in a desirable site for outdoor environmental education (Fulton, 1982, Radchenko, 1987, Parsons & Sherlock, 1998). The following list is an accumulation of these research efforts.

Desirable Site Characteristics for Outdoor Environmental Education

- ❑ Varied and unique ecosystems
- ❑ Water availability

- ❑ Minimal natural hazards
- ❑ Good access/ proximity to schools
- ❑ Seasonal restrictions related to weather or altitude
- ❑ Sufficiently large area
- ❑ Site of particular ecological, scientific or historical significance
- ❑ Compatible land management
- ❑ Existing infrastructure

In order to establish the potential for developing a network of residential outdoor schools within the CBRA it is first necessary to conduct a cursory evaluation of the suitability of each member Biosphere Reserve as a potential site for outdoor environmental education. The following is a brief description of each Biosphere Reserve in Canada followed by a short evaluation of site suitability based on the above list of characteristics. It should be noted that the following evaluation applies to the Reserve as a whole, not to a specific pre-determined site on the Reserve. Additionally, since a Biosphere Reserve must represent varied or unique ecosystems in order to be designated by UNESCO (Statutory Framework, 1995) it follows that every Biosphere Reserve achieves this characteristic. W ith regards to site suitability ratings, the following methodology was developed for this study in order to calculate this comparative tool.

I. Varied and Unique Ecosystems: There are many measures with which to quantify the variety and uniqueness of a system. For the purpose of this study, Canada Land Inventory Maps on the 1:1,000,000 scale were used. Specifically from this series, land capability for supporting ungulates and importance for waterfowl were used since these maps provided a good and consistent method of expressing species and habitat diversity. These maps were available for all sites. Each site was then assigned a value based on the categories contained within the management areas. In the case of ungulates and waterfowl, the maps illustrated five different categories. Accordingly, values from one to five were assigned with values of five representing the highest level of importance or support and one representing the category corresponding to very low capability or importance. All

Biosphere Reserve management areas contained more than one category in which cases, the values associated with all categories represented were summed. In order to include a component of diversity, the number of categories represented in each Biosphere Reserve was also added to the category totals. The totals were then subdivided into three categories, one representing values less than fifteen, two encompassing all values from sixteen to twenty-five and three indicating a value of twenty-six or greater.

II. Water Availability: Water availability was also divided into three categories with the following assigned values. "Zero" was assigned to sites with no surface water, "one" was assigned to sites with flowing surface water, "two" was assigned to sites with flowing water and lakes or reservoirs; and "three" was assigned to sites with well developed water and sewage systems which could be easily extended to the core.

III. Minimal Natural Hazards: Natural hazards can be defined in a number of ways; in this case hazards consist of potentially dangerous wildlife such as large carnivores and potentially dangerous habitats such as cliffs and high alpine conditions. In Biosphere Reserves where many different landscapes are present, it was assumed that an outdoor environmental education centre would be built in an area with the fewest natural hazards. Also taken into consideration in defining this measure is the proximity of the core to areas where medical treatment could be administered. "Zero" indicates a site with very high natural hazards; this value was not used since it is assumed that such a site would not be used. "One" represents a remote area with potentially dangerous wildlife, "two" represents both remote areas with few large carnivores and areas with dangerous wildlife present in high concentrations that are located very close to medical facilities (within approximately 50 km). Finally, "three" represents sites with few dangers which are never-the-less, close to medical facilities (within 100 km).

IV. Good Access/Proximity to human Populations: For the purpose of this measure, a radius of 200 km or approximately two hours travel time was considered. Since access is good to all sites with year-round bus capable routes, only population proximity was con-

sidered for this measure. A value of "one" was assigned to sites with fewer than 100,000 people within 200 km. "Two" was assigned to sites with less than a million people within the same radius and "three" was assigned to sites with more than a million people living within 200 km of the Biosphere Reserve management area.

V. Seasonal Restrictions: Seasonal restrictions play an important role in determining the dates in which a program can operate. This is especially significant for formal outdoor environmental education programs, which succeed best if they can operate throughout the duration of the school year. For the purpose of measuring sustainability, a value of "one" equates to a site with severe seasonal restrictions, "two" refers to a site where access to some learning sites may be limited by seasonal variations and "three" refers to a site with no weather or seasonal restrictions on operations and access.

VI. Sufficiently Large Area: When examining Biosphere Reserves for suitability, the core area is considered as an ideal setting given the pristine state of its wilderness and the fact that land is public belonging either to the region, province or crown. As a result, when considering size, core areas are used as the measure. For the purposes of this study "one" refers to a core area less than 10,000 ha, "two" refers to cores between 10,000-100,000 ha and a "three" indicates a core area greater than 100,000 ha in size.

VII. Site of Particular Significance: Before being designated a World Biosphere Reserve, each site must prove to be unique or significant (Statutory Framework, 1995). As a result, all sites have been assigned a site suitability value of "three" for this consideration.

VIII. Compatible Land Management: Within each Canadian Biosphere Reserve there are a number of different land ownership and management methods. The measure of site suitability will consider the ability of the Biosphere Reserve to co-ordinate and form relationships between these various management agencies and the local community. As a result, board compositions were examined and, those with representation from land holders in all three zones (core, buffer and zone of co-operation) were given a value of

"three", those with representation from only two zones were given a value of "two" and those with representatives from only one zone were given a site suitability rating of "one".

IX. Existing Infrastructure: Some Biosphere Reserves contain a well developed infrastructure for environmental education, others provide basic services within the core while others offer very few amenities that could be converted or utilized in order to decrease the capital cost associated with the development of a residential outdoor environmental education program. As a result, sites with only a minimal infrastructure within the core were given a suitability rating of "one", sites with a solid infrastructure with marginal application to environmental education were assigned a value of "two" and sites with a number of key facilities such as labs, dormitories and libraries were assigned a value of "three".

The above nine ratings (assigned values of 1-3) were then added together and the resulting numbers provide the site suitability ratings as listed below. The minimum theoretical site suitability number is nine while the maximum is 27. For comparison, the North Vancouver Outdoor School and the Golden Ears Learning Centre were also judged based on the same criteria and received values of 17 and 18 respectively. For a complete list of details and results please refer to Appendix 3.

7.3 Description of Canadian Biosphere Reserves

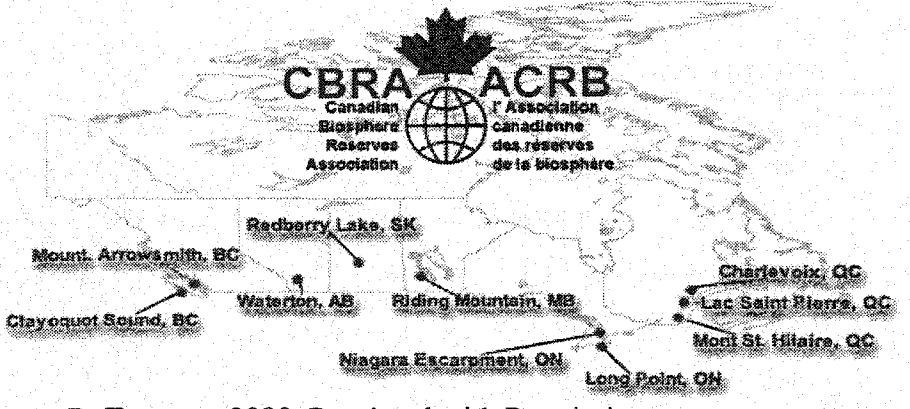

Fig. 1 R. Turgano, 2000. Reprinted with Permission

7.3.1 Charlevoix Biosphere Reserve, Québec

The Charlevoix Biosphere Reserve is located along the St. Lawrence River in the Central Laurentians. The core area consists of one wilderness park, one newly designated Provincial Park and one privately owned ecological centre. The Charlevoix management region contains broadleaf forest, gorges, coastal escarpment, headlands, bays and the St. Lawrence estuary. Management of the Reserve is achieved through a fifteen-member administrative board with representatives from organizations and municipal governments as well as individuals from the community. The Charlevoix Biosphere Reserve relies on membership fees and grants from the CBRA and a millennium fund for its operating and project budgets.

Current facilities include an atmospheric monitoring station, conference facilities, hydrological stations laboratories and libraries. The ecological centre (Centre ecologique de Port-au-Saumon) also contains lodgings, a library, marine laboratories and boats while the Canadian Wildlife Service operates an additional library, an observatory and a museum (Cap Tourmente). There are a number of towns and villages within the zone of co-operation including Notre-Dame-des-Monts, Saint-Urbain and Baie-Saint-Paul. The Biosphere Reserve contains many major roads, which results in a very high level of access; and, with a low altitude, there are few access restrictions associated with seasonal factors.

Given the above characteristics, there is little concern over the suitability of Charlevoix as an outdoor school site with its site suitability rating of 23.

7.3.2 Lac St.-Pierre Biosphere Reserve, Quebec

The Lac St.-Pierre Biosphere Reserve extends through the St. Lawrence waterway between Sorel and Trois-Riviere, approximately 65 km from the city of Montreal. The core area contains a National Bird Sanctuary and a legally protected military testing ground. Lac St.-Pierre contains the largest freshwater floodplain in Quebec, which results

in large populations of breeding herons and migratory waterfowl. The Reserve also contains aquatic grass beds, swamps, riparian systems and an important waterway. The Reserve is newly designated (November, 2000) and will be administered by a committee involving local residents from the 27 municipalities included in the management area. Currently there are no formal facilities for outdoor environmental education although lodgings are available along the shores of the lake. The Lac St.-Pierre Biosphere Reserve management area encompasses many small towns and is within an hour of the city of Montreal. Lac St.-Pierre is also a very popular tourist and hunting destination and, as a result, road access is good and is well maintained year round.

Despite a current lack of infrastructure and organization, Lac St.-Pierre represents a very unique ecosystem within easy access of a major urban center and a number of smaller towns. As a result, Lac St.-Pierre has a site suitability rating of 21.

7.3.3 Mt. St.-Hilaire Biosphere Reserve, Quebec

Mt. St.-Hilaire is located within the Monteregion Hills, 30km southeast of the city of Montreal. The core of the Mt. St.-Hilaire Biosphere Reserve consists of the privately owned Gault Estates, which were given to McGill University in 1958. Although this area is not legally protected, it has been accepted as fulfilling the requirements of a core area because of the mandates for protection passed down by those who bequeathed the estate. A Nature Centre has also been incorporated into the core region. Mt. St.-Hilaire contains broadleaf forest, both in virgin and secondary growth, in addition to rivers, streams, marshes, lakes and bogs. The Biosphere Reserve is administered jointly by the Director of the Gault Estate and the Director of the Nature Centre, with assistance from a twelve-member board of directors, of which seven members are local residents and the remaining five are appointed by McGill University. Official funding comes from the Gault Estates fund and McGill University. The Nature Centre generates funds through entrance fees and supplemental funding is garnered through fundraising and grant seeking. The Mt. St. Hilaire Biosphere Reserve currently contains dormitories, laboratories and a conference

centre. The Nature Centre operates an interpretation centre, which provides project display areas as well as washroom facilities and an information kiosk. A building near the lake shore operates as a cross-country ski shelter in the winter. Since Mt. St.-Hilaire is only 30 km from Montreal, a city of 3.5 million, there is a large potential pool of students who could attend the site. Also, access routes are well maintained and capable of supporting school buses. Finally, while Mt. St.-Hilaire is at altitude, winter access is maintained since the Reserve is a very popular location for cross-country skiing and snowshoeing.

Overall, Mt. St.-Hilaire is a site with many favorable characteristics and a site suitability of 22.

7.3.4 Long Point Biosphere Reserve, Ontario

The Long Point Biosphere Reserve is located on the shores of Lake Erie in Southern Ontario near the town of Port Rowan. The core area consists of the Long Point Wildlife Area administered by the Canadian Wildlife Service. The Long Point Biosphere Reserve is important because it contains many unique ecosystems including Carolinian forest, Great Lakes habitat, sand spits, dunes, marshes, meadows and riparian systems. The Reserve is managed by the Long Point World Biosphere Reserve Foundation, which is comprised of five elected directors. Directors are nominated and elected from the local community and may serve a maximum of two consecutive three-year terms. The Long Point Biosphere Reserve receives a majority of its funding from the Norfolk District Community Futures Corporation and other local non-profit and conservation groups. The Reserve also holds annual fund-raising events in order to garner contributions from individual community members. There are currently no permanent environmental education facilities within the Long Point Biosphere Reserve. Being located in Southern Ontario, the Long Point Biosphere Reserve is in close proximity to a number of major cities; it is within two hours of Toronto, Kitchener and London. As a result, Long Point has a very large potential population from which it can draw students. Access to the core area of the

Reserve is well maintained and roads can support school buses. Finally, access is not restricted by seasonal variations, meaning that Long Point could potentially operate year round.

The Long Point Biosphere Reserve therefore has a site suitability rating of 20.

7.3.5 Niagara Escarpment Biosphere Reserve, Ontario

The Niagara Escarpment Biosphere Reserve covers a very large area, from Queenston on the Niagara River to Bruce Peninsula and the islands off this point. The core area is proportionally large and includes portions of a National Park, and a Marine National Park, two Provincial Parks, two Conservation areas and a number of Regional Parks. Within these areas, broadleaf forests are well represented, as are shore ecosystems, bogs, shallow lakes, riparian habitats, limestone cliffs and talus slopes. These different ecosystems are all managed by the Niagara Escarpment Commission, which employs twenty-two staff and contains eight representatives from the counties within the Reserve and eight members selected from these communities. Smaller committees are being developed in order to address issues and co-ordinate management on smaller, community-level scales. The Niagara Escarpment Biosphere Reserve is very well funded with the Commission receiving an annual operating budget of $1.7 million. Other funds are garnered from the Ministry of Natural Resources and the Ontario Heritage Foundation. Certain projects also receive funding on an individual basis. This high level of funding has resulted in the development of a number of facilities within the Biosphere Reserve, specifically conference rooms, hydrological monitoring equipment, libraries and permanent vegetation monitoring plots. Program provision consists of interpretive programs and opportunities for day trips from schools. There are a number of other environmental education facilities within the Biosphere Reserve management area; however, these are not under the jurisdiction of the Commission. The population within the management area itself is very large, with many additional towns nearby. Therefore, the Niagara Escarpment Biosphere Reserve has the greatest potential pool of students. Since the parks within the Escarp-

ment area draw many tourists to the region, access is good and is maintained year-round. Season-specific activities do exist in the northern area of the reserve However, while the activities within these resorts change, access and availability does not.

With a combination of diverse landscapes and a high population, the Niagara Escarpment Biosphere Reserve has a very high potential for developing and supporting an outdoor environmental education program, with a site suitability of 25.

7.3.6 Riding Mountain Biosphere Reserve, Manitoba

The Riding Mountain Biosphere Reserve is located on the Manitoba Escarpment, 300 km northwest of Winnipeg. The core are of the Reserve consists of the 297,000 hectare Riding Mountain National Park. Within the Manitoba escarpment, boreal needle-leaf forests and temperate grasslands are represented and comprise five major watersheds. These habitats support a variety of wildlife including wolves, cougar, black bear, deer, elk, moose and beaver. The fifteen member Riding Mountain Biosphere Reserve Committee administers Riding Mountain. This committee consists of six municipal representatives while remaining members are elected from interested local residents. The Committee receives staff support from the Departments of Natural Resources and the Environment and is funded by an annual $5,000 grant from Parks Canada. Additional funds are gar-nered from non-profit organizations, government grants and private donations. Rela tionships with the University of Manitoba have resulted in the development of a meteoro-logical station, a water monitoring lab and an ungulate disease lab. Education program-ming consists largely of daylong workshops for the local communities on such issues as farming and wildlife and climate change. The Riding Mountain Biosphere Reserve encompasses fifteen municipalities although the distance to a major urban centre, Winni-peg, is quite great. As a result, the potential pool of students is somewhat limited. While roads and access is well maintained through the buffer zone and the zone of co-operation, within the core area roads are sparse, although access to camping facilities is usually

good. Access may be limited by weather in the winter; therefore seasonal variations in access do exist.

Despite some logistic limitation, Riding Mountain represents many unique landscapes and habitats and, therefore holds great value for environmental education although site characteristics may not be ideal. Site suitability for Riding Mountain is 21.

7.3.7 Redberry Lake Biosphere Reserve, Saskatchewan

Redberry Lake Biosphere Reserve is located north of Saskatoon near the town of Hafford. The core is a Regional Park centred on Redberry Lake itself. Redberry Lake is a saline lake with many beaches, marshes and habitat for a wide variety of waterfowl. Surrounding management areas contain many native grasslands, creeks and riparian habitats, which provide additional habitat for ungulates and other native species. Redberry Lake is managed by the Redberry Lake Biosphere Reserve Community Committee in conjunction with the Redberry Pelican Project Foundation. This committee is composed of representatives of local municipalities, the Park Board, and provincial members of parliament. The Community Committee is also supported by the Biosphere Reserve Technical Committee, which includes representatives of locally active scientific, and conservation agencies. The Redberry Lake Biosphere Reserve relies on project specific funding from government grants and non-profit and private donors. Currently, the Reserve operates an interpretation centre and provides educational programming to local primary and secondary schools. Being located within approximately 100 km of Saskatoon, Redberry Lake has the potential to service a large population of students. Access to the area is good, with roads capable of supporting school busses. Seasonal variations in weather may effect some access routes although, overall access will still be available.

Redberry Lake Biosphere Reserve is set within an unique ecosystem in close proximity to a major urban area. As a result, it possesses many characteristics that are considered favorable when considering a site for outdoor environmental education programming. S

ite suitability for Redberry Lake is 22.

7.3.8 Waterton Biosphere Reserve, Alberta

Waterton Biosphere Reserve is located in Southern Alberta along the provincial border with British Columbia and the international border with Montana. The core of the Reserve consists of Waterton Lakes National Park, which continues as Glacier National Park (also a Biosphere Reserve) in the United States. The Waterton Biosphere Reserve management area consists of alpine ecosystems, prairie grasslands, riparian habitats and a number of lakes, marshes and other wetlands. Waterton Biosphere Reserve is managed by the Waterton Biosphere Association, which is comprised of local residents (including ranchers) and three members of the parks staff. Additional projects are managed by specific project-based volunteers although all activities are sustained by a core membership of six to eight people. Administrative costs are covered by an annual grant from Parks Canada in the amount of $5,000 while other projects are funded separately through grant seeking and fundraising. Facilities in the Biosphere Reserve are limited, although a small library is maintained in the interpretive centre. The Biosphere Reserve does, however, offer some environmental education programming for local schools. Students could potentially be drawn from the town of Waterton and the larger urban centre of Lethbridge, which is less than 200 km away. Access to the area is well maintained year round and seasonal restrictions are limited to some higher alpine areas.

Overall, the Waterton Biosphere Reserve has a site suitability rating of 18.

7.3.9 Clayoquot Sound Biosphere Reserve, British Columbia

The Clayoquot Sound Biosphere Reserve is located on the west coast of Vancouver Island in the region of the towns of Tofino and Uculet. The Reserve extends from the Esowista Peninsula to Estevan Point and borders tradition lands of many First Nations bands. The core area of the Reserve consists of Pacific Rim National Park in addition to sixteen

provincial parks and two ecological reserves, including marine reserves. The region represents subtropical and temperate rainforest as well as smaller sections of alpine habitat, rivers streams and freshwater lakes. Along the coast, marine ecosystems support a variety of fish, bird and wildlife species. Clayoquot Sound Biosphere Reserve is managed by the Clayoquot Biosphere Trust, which contains members of the local community, and local First Nations peoples. This core board is supplemented by "ec officio" directors appointed from federal and provincial agencies with interests in the area. The federal government has granted the Trust a $12 million grant, which is to be dispersed to local communities and groups for specific projects and ongoing initiatives. National and Provincial parks within the core contain a number of interpretive facilities and visitors centres. Also within the management area is the Bamfield Marine Station, which provides laboratories and accommodations, although this facility is not under the operational jurisdiction of the Clayoquot Biosphere Trust. The Reserve is located near the town of Port Alberni and is within approximately 300km of the larger urban community of Victoria. Tofino and Uculet are very popular tourist destinations and, as a result road access is very good and able to support school bus access year round. Seasonal weather variations are minimal and, as a result, programming could continue year round.

Given the wide variety of site characteristics and the well-developed network of roads, Clayoquot Sound Biosphere Reserve has many characteristics considered desirable when considering outdoor environmental education. Some of the characteristics are tempered, however, by the lack of proximity to a major urban centre and the lack of pre-existing facilities within the core. Clayoquot Sound Biosphere Reserve has a site suitability rating of 20.

7.3.10 Mt. Arrowsmith Biosphere Reserve, British Columbia

Mt. Arrowsmith Biosphere Reserve is located on the Southeastern portion of Vancouver Island just north of the city of Nanaimo. The core area consists of provincial parks and national and provincial wildlife management areas. These areas support a very diverse

ecosystem consisting of alpine areas, temperate rainforest, rivers and estuaries, lakes and coastal shorelines and islands. The Reserve is managed by the Mount Arrowsmith Biosphere Reserve Foundation, a non-profit committee composed of local residents and community organizations, which received $120,000 of funding for projects and continuing initiatives. Funding is garnered primarily from government and NGO grants and private fundraising efforts. Environmental education facilities within the Mt. Arrowsmith Biosphere Reserve are very limited, although one of the primary goals of the Foundation is to improve public education (Executive Summary, 1997). The total population within the Reserve management area is approximately 38,000 and ferry services between the city of Vancouver and Nanaimo result in Vancouver also being within easy accessible distances of Mt. Arrowsmith. Roads within the Reserve are well maintained and include the Island Highway, a major thoroughfare running along the east coast of Vancouver Island. Given differences in altitude, some areas of the Reserve will be affected by seasonal variations in weather, although access will be limited only in alpine regions.

Mt. Arrowsmith Biosphere Reserve is located within a short distance of the city of Vancouver and contains a number of smaller towns that could supply a student population. A variety of landscape types and unique opportunities to explore ecosystems is tempered, however, by the lack of existing facilities. Overall, Mt. Arrowsmith Biosphere Reserve has a site suitability rating of 21.

8 CBRA and Residential Outdoor Environmental Education

The previous chapters have outlined a number of considerations with regards to the development of residential outdoor environmental education programs. Canadian Biosphere Reserves have also been examined as potential future sites for these programs. With regards to the development and advantages of a network of outdoor schools within the CBRA, however, both of these separate issues need to be combined. The following section isolates each issue discussed during the case study component of the work and discusses these issues in relation to Biosphere Reserves.

8.1 Land Tenure

As discussed earlier, one of the greatest opposing forces to the establishment of residential outdoor environmental education programs is the initial capital cost associated with land acquisition (Personal Communications with NVOS Principal, 2000). The case studies all provided solutions to this problem, either through raising the funds (NVOS) or locating on public lands (OPI and GELC). Locating within the management areas of Biosphere Reserves can facilitate either of these solutions in a number of ways.

First, every Biosphere Reserve except, for Mt. St.-Hilaire, contains a core area of public land. In some cases this land is provincial, in others it is regional, in others it is crown land and in others still the core is a combination of many of the above tenure ships. Even in the case of Mt. St.-Hilaire, the private estate is managed by a public, not-for-profit institution. As a result, the CBRA is in a position to negotiate a method whereby it could fulfill the mandate for the provision of public education on land where lease-free permits could be garnered.

In the cases of both the GELC and the OPI however, permits were acquired only after many discussions and negotiations between representatives from different interest groups. Biosphere Reserves necessarily foster communication and co-operation between

different levels of government, as evidenced by the composition of many boards such as the Waterton Biosphere Reserve board, which is comprised of members of the community and parks staff. This pre-existing template of co-ordination should help foster discussions regarding the acquisition of permits for use of crown, provincial or regional land for the development of a residential outdoor school.

In areas where locating on public land is inappropriate, Biosphere Reserves administer buffer zones and zones of co-operation which consist primarily of private land. While the Biosphere Reserve would have no precedent or authority to appropriate private land in either of these zones (Statutory Framework, 1995), land acquisition could be made easier in a number of ways. First, many Biosphere Reserves already have land acquisition agreements with a number of non-profit organizations, such as the case of Ducks Unlimited, which has contributed a significant amount of funding to the Long Point Biosphere Reserve for the purpose of securing ecologically important habitat within the Reserve's management area. A similar situation can be found in the Niagara Escarpment Biosphere Reserve where $12 million has been committed specifically to land purchases for the five-year period from 1998 to 2003. These funds are made available, in part, because of the fundraising ability of Biosphere Reserves and their commitment to preservation, education and community development.

8.2 Facilities

The development of facilities and the selection of an appropriate site assists in the success of the educational experience (Simmons, 1998, Milton et al, 1995). As a result, site selection and facility acquisition is a very important issue to consider when examining the potential for integration a network of outdoor environmental education programs into the CBRA.

With regards to site selection, there are a number of features that are considered desirable when planning the development of a learning area (Fulton, 1992, Parsons & Sherlock,

1998). Finding a location with appropriate land tenure and desirable physical and ecological characteristics is often very difficult (Personal Communication with OPI executive director, 2000). Biosphere Reserve management areas are ordained because of the uniqueness and variety of habitats they represent. Often Biosphere Reserves contain an entire watershed or more and cross through a number of land and water based habitats. T his variety and quality associated with a complete system makes Biosphere Reserves desirable teaching locations.

In order to operate an outdoor environmental education program it is necessary to balance the effects of learning and increased human use with a maintenance of the quality of habitat. In the case of the OPI this is accomplished through adherence to National Park regulations, which force students to remain on marked trails and forbid the removal of live or biotic samples. In the case of the NVOS, the presence of an environmental education program actually improved the quality of the habitat surrounding the campus. Through sponsorship of the school, BC Hydro and other donors funded a stream enhancement project. The salmon hatchery learning site also doubles as a breeding station to ensure the health of the salmon population in the region. Use of the land for the NVOS has also removed the area from possible logging activities. Likewise, the GELC is looking to improve on the base camp area, applying green architecture and habitat restoration to what is presently a disused office area and yard. The CBRA follows the mandate of UNESCO, and the Man and the Biosphere Program, to find a balance between human use of the environment and the conservation of nature and habitats (Statutory Framework, 1995). The above examples demonstrate how this mandate can be achieved through the development of residential outdoor schools in addition to providing a mechanism through which the Biosphere Reserves can fulfill their education mandate. A reciprocal relationship could thus be formed between the two networks with the residential outdoor schools providing an example of sustainable use and the CBRA providing many appropriate sites for school locations.

With regards to facilities, many Biosphere Reserves already have skeleton facilities in place. These facilities should be evaluated on a site-by-site basis in order to judge the

feasibility and practicality of expanding these sites into residential outdoor schools. Parsons and Sherlock (1998) discovered that one method for succeeding in the development of an environmental education program is to start small, with the programs which are easier to implement, and then expand as opportunity arises. On a network scale this same finding can be applied to the development of sites with sites with more pre-existing facilities being developed first and future sites being developed when means are available. This system of expansion is very similar to that which is employed by the Yosemite Institute, which gradually expanded from one campus to three, including the OPI, as funds became available, and demand for programming increased. This is one example of the advantages that would be associated with the development of a network under the direction of the CBRA. One other advantage to being a member in a network, specifically associated with facility development, is the fact that the same architectural designs can be used for a number of sites, thereby decreasing the total cost of development. In the case of the GELC the cost associated with plan development it estimated at approximately $108,000 or about 13% of the total capital costs.

An additional advantage to having a network involved with the CBRA is the increase in fundraising and grant-seeking potential. Through the individual Biosphere Reserves, the CBRA already has a number of sponsors who are donating key funds (Environment Canada, Ducks Unlimited, Wildlife Trust etc.). Given a new project, these sponsors may be more likely to contribute funds than cold contributors who have never given to Biosphere Reserves before (Personal Communication with OPI employee, 2000). Also, since each Biosphere Reserve fund raises separately, there is a large pool of volunteer fundraisers from which to draw. Care would have to be taken, however, to ensure that efforts to raise funds for residential outdoor schools does not diminish the ability of Biosphere Reserves to raise money for essential functions.

8.3 Program

Each of the cases examined in this study has a similar program that combines physical sciences with cultural heritage. These two general subjects fit in well with the goals of

the Biosphere Reserves, to increase human understanding of our environment and ourselves. With regards to integration with current programming, there are a variety of interpretation and school-based educational material available depending on the particular Biosphere Reserve. This program material provides a good indication of the issues of concern to the management area of the Biosphere Reserve, in addition to providing information on the resources available for a residential outdoor environmental education program.

Specific program design is, however, dependent on the particular Biosphere Reserve and, in that regard, the case studies have limited use concerning program content with the exception of Clayoquot Sound and Mt. Arrowsmith Biosphere Reserves, which are in the same region as all three case studies. What the case studies do provide, however, are good examples of different program structures.

The North Vancouver Outdoor School has a number of different developed study sites within easy walking distance of the central campus. This is very advantageous with regards to classroom management and learning efficiency. The NVOS also offers a very wide variety of programs in order to suit the interest of teachers and students. These programs are both academic and recreational in nature and keep students well entertained and provide for a more memorable experience (NVOS student, 2000). These factors should be kept under consideration during the site selection and program development process in every Biosphere Reserve. However, if there is no site which provides the same variety of activities within a short distance the Biosphere Reserve should not be excluded from the network.

The Olympic Park Institute also has a number of different learning and leisure sites although the distance between them is far greater. Although this does cause a few problems, the OPI has proved to be successful despite them. The OPI also demonstrates the value of developing programs to be presented to the general public and special interest groups. These programs can help raise important funds in order to decrease the amount

of tuition that must be charged to students. Since many Biosphere Reserves have very high rates of visitation during the summer months when school is not in session (Clayoquot Sound, Charlevoix and Mt. St.-Hilaire Biosphere Reserves have especially high visitor rates) high demand could likely be created for environmental education programs held on these sites.

8.4 Staff

Staff training and hiring are important issues with regards to the viability of a residential outdoor environmental education centre. In each of our case studies a different pool of resources and knowledge is drawn upon to deliver the environmental education material.

Teaching staff in the NVOS consists of a small group of core professionals supported by classroom teachers and volunteers. The involvement of classroom teachers and student counselors is made possible through very close connections between the administrative body and the local schools. Many Biosphere Reserves in Canada offer learning material and support to local schools and some even offer educational programs to select classes as is the case in the Long Point Biosphere Reserve. In fact, the Long Point Biosphere Reserve Foundation has had local schoolteachers on the board of directors for a number of years of operation. These close connections could be strengthened in those Reserves that currently maintain them and expanded into those Biosphere Reserves that currently do not. This relationship could then be used to encourage classroom teachers to participate in instruction through the development and leadership of suitable courses that interest them. The NVOS demonstrates that this can accomplished with minimal training and very little disruption to teachers' lives beyond the duration of the program. Similar relationships can also be fostered with local high schools in order to develop a student-counseling program. In the case of the NVOS, participants in this program are nominated by teachers and their workload is adjusted so that they can miss a week of school without any detriment to their academic career.

Schools are a very important and valued component of any community. Since Biosphere Reserves are intended to be run by the community for the development and enjoyment primarily of the local areas, many Canadian Biosphere Reserves make a particular effort to foster co-operative relationships with local elementary and high schools (Personal Communication with past LPBRF member, 1999). These connections could be expanded and solidified through the close involvement of both parties in the development and implementation phase of a Canadian network of residential outdoor schools within the CBRA.

The OPI takes another approach to staffing and hires all members of the teaching staff external to the schools. This approach would benefit less from inclusion in Biosphere Reserves because hiring and training would necessarily take place on a site-by-site basis. Although some of the costs associated with this staffing tactic may be offset through the possibly greater fundraising capabilities of Biosphere Reserves, this benefit would not differ significantly from the fundraising capabilities currently associated with the OPI and the Yosemite Institute.

Currently, there are many discussions being held regarding the staffing of the GELC. C urrently, participants in the discussion include parks managers, school board representatives, the Katzie First Nations and environmental education specialists. These discussions have been proceeding slowly, however, due, in part, to the fact that there is no precedent in the Golden Ears area for such co-operation. Being associated with a Biosphere Reserve may help facilitate such discussions regarding the division of costs and responsibilities since, in such settings, precedents do exist and working relationships between a number of parties have been formed. In cases where Biosphere Reserves have been less successful, these working relationships may be weak (CBRA Conference Speaker, 2000) making these discussions even more difficult. However, despite the challenges this issue may present, it is essential for Biosphere Reserves to develop working relationships with all local interest groups and levels of government, and discussions over non-sensitive issues such as education may serve to strengthen these connections.

8.5 Administration

Each Biosphere Reserve has its own system of administration in place in order to co-ordinate cooperation between interest groups and carry out projects within the Biosphere Reserve management area. The Canadian Biosphere Reserve Association provides an additional administrative body that unites all ten Biosphere Reserves and offers logistic and financial support. The three case studies each provide a different method of administration, which have different advantages, disadvantages and degrees of feasibility when considering the Canadian Biosphere Reserve setting.

The North Vancouver Outdoor School is operated as if it were a public school with a principal in place of a director and with close connections to all other schools within the same district. Biosphere Reserves in Canada often try to form relationships with local schools for the purpose of fulfilling the environmental education mandate of the World Biosphere Reserve Network (Statutory Framework, 1995). Currently the Long Point Biosphere Reserve and Niagara Escarpment Biosphere Reserve have fostered very close relationships with local schools offering opportunities for day programs and, in the case of Long Point, for summer field science camps. It may be possible for relationships such as these to evolve into a situation in which a school district will operate the residential outdoor school while the Biosphere Reserve provides support and funding opportunities.

The OPI is a member of a larger organization, the YNI, which acts in a manner similar to the CBRA. Although the YNI has more influence and authority than the CBRA and the OPI has less autonomy than the individual Biosphere Reserves. The potential is still present, however, to compare the two systems of administration and examine the advantages and disadvantages of having a parent non-profit organization within the context of the CBRA and a outdoor school network in the Biosphere Reserves.

The GELC is currently operating on a system similar to that of the individual Biosphere

Reserves with a board of directors representing a broad base, volunteering for a non-profit organization. One of the key identified advantages of the GELS, however, is the fact that its sole focus is on the development of the GELC. As a result, when applying the GELC case study to the CBRA framework, it is important to either consider the creation of a subcommittee within each Biosphere Reserve or discount the specific focus advantage associated with the system of administration employed by the GELC.

8.6 Finance

Every residential outdoor environmental education site studied faces some degree of financial concern and relies to some extent on fundraising and donations. The value of applying the case studies to the Canadian network of Biosphere Reserves therefore lies in the tools that the case studies have used to minimize or alleviate these financial difficulties.

The NVOS relies heavily on a long-term donor who selected the NVOS because of its commitment to the environment, education and providing a community institution. All of these qualities can be transferred to any Biosphere Reserve site and used to develop a list of reliable contributors. These efforts would, however, be necessarily carried out by the individual Biosphere Reserves based on the focus on community donors.

The OPI, on the other hand, receive funds both on local levels through their own efforts, and on national levels through the efforts of their parent organization, the YNI. Potential should be examined for a similar system within the CBRA with each Biosphere Reserve focusing on obtaining local sponsors and the CBRA attempting to generate a pool of funds on a national level. As with the case of the YNI this pool of funds could then be distributed as needed.

The final case study, the GELC has accomplished a minimal amount of fundraising thus far. However, the funds that have been raised have been done so through cooperation

with a government agency. Many Biosphere Reserves such as Clayoquot Sound and the Niagara Escarpment currently receive government funds for specific projects and the CBRA acquires much of its operating budget from the federal government. With precedents in place, it may be possible to expand the amount of these grants or extend the grants to new levels of government or new agencies.

8.7 Attracting Students

No residential outdoor environmental education program can be successful without students. For the OPI, attracting students is an important issue while the NVOS is assured of a full season every year. When designing an environmental education strategy plan it is very important to consider the supply of students. This is taken into consideration first during measures of site suitability in which distance from populations is considered; however, the case studies can provide critical information for attracting these students to the sites.

The NVOS is incorporated into the curriculum of the schools within its district. In Biosphere Reserves where there is a close relationship between the Reserve and local schools already in place, it may be beneficial to attempt to negotiate a commitment of students from a number of different schools. The NVOS case demonstrates that this may be achieved through offering schools control over the environmental education centre although the contribution of a great amount of funds should not be expected.

The OPI attracts some students through the efforts of classroom teachers and others through its association with the YNI. If one Biosphere Reserve develops a program that receives more applications than it can accept, the existence of a network may prove beneficial for the transfer of these applications to other sites. This model would be successful over small spatial scales only such as between Niagara Escarpment and Long Point or Clayoquot Sound and Mt. Arrowsmith. However, some of the more remote Biosphere Reserves such as Riding Mountain might still face attendance problems if these methods

are the only ones used to attract students.

Finally, the GELC has only just begun operations; therefore it is quite difficult to predict whether or not the method for attracting students that it is utilizing will be successful or not. As a result, its use in the analysis and selection of methods for attracting students is very limited at the moment.

8.8 Potential Problems

The CBRA is a small organization operated by a part time staff member and through the support of volunteers. Coordinating a network of residential outdoor environmental education programs would require a large degree of effort and organization. The CBRA could not accomplish it without the support of the individual Biosphere Reserves. In addition, the CBRA is a poorly funded association, which does not have the finances with which to support the development of outdoor schools without extensive fundraising. However, each of the case studies presented also has similar issues and each has been able to overcome the difficulties through the dedication of a number of individuals.

In addition, while the World Biosphere Reserve program preaches community, bottom-up, management, not every Biosphere Reserve has a flawless working relationship with all of the local community members (Personal Communication with representative of the Waterton Biosphere Reserve, 2000 and Personal Communication with past member of the LPWBRF, 1999). Some concerns exist over the true intentions of UNESCO and the Biosphere Reserve program and this concern breeds some mistrust. These negative feelings could be transferred to an outdoor school network as a result of the association with the CBRA.

9 Conclusion

This thesis has examined three case studies of residential outdoor environmental education programs with the purpose of assessing the feasibility of applying this knowledge to the development of residential outdoor schools within the CBRA framework. The results of this analysis reveals a number of interesting conclusions.

The case studies demonstrate that there are a number of different management and operational options that can be adopted and adjusted to suit local needs. The study of the CBRA has identified that Canadian Biosphere Reserves are good potential sites for residential outdoor schools. Finally, it has been postulated that residential outdoor schools would benefit from the development of a nationwide network and that the CBRA has the potential to be the administrative force behind such a development.

Throughout this study, a number of key issues were consistently considered, including challenges facing outdoor schools and the site suitability of Biosphere Reserves. When considering the three case studies, the first of these issues was the concern over evaluating the need for residential outdoor schools within Canada. The second question concerned the challenges that outdoor schools face. Finally, the third question addressed the potential for learning from the case studies in order to design programs that would circumvent as many of these problems as possible.

The study then examined Canadian Biosphere Reserves and, again, a number of issues were considered throughout the data gathering and analysis process. First, it was important to analyze the CBRA network in order to assess the feasibility of using this agency as a host for a network of residential outdoor schools. Second, it was necessary to consider each individual Reserve with regards to site suitability.

Finally, the two sections of the study were merged in order to answer the question of the

overall feasibility of developing a Canadian network of residential outdoor schools within Canada, through which the utility of the case studies were also analyzed and lessons were drawn. The conclusions associated with each of the above issues are discussed below.

9.1 The Need for Environmental Education in Canada

The first aspect to be considered when examining the conclusions drawn from this study is the evaluation of the need for developing an expanded system of environmental education in Canada.

When Environment Canada evaluated the current state of environmental education, it was found to be lacking. This conclusion was based on the input of a wide variety of experts and was attributed to a number of factors including the lack of governmental support, difficulties in sharing and distributing material and lack of funds and fundraising ability (Proceedings of the Environment Canada Workshop, Kelowna, BC, 2000). This recognition of a problem by the Federal Government is an indication of the true nature of the situation and demonstrates that environmental education in Canada does, indeed, need to be expanded or solidified.

9.2 Challenges Facing Environmental Education

Through initial interviews and studies it was established that environmental education programs face a number of challenges. These challenges range from financial to operational to political in nature and involve representatives from all sectors of society. Seven key issues were then identified and used to analyze the case studies throughout the research process. These issues are: land tenure, facilities, programming, staff, administration, finances and ability to attract students. Each of these issues was identified as an important concern that must be addressed before residential outdoor schools can begin operation. Ignoring any one of these concerns may be sufficient to prevent the success of

an outdoor school program; however, it is important to consider the fact that each of these issues can and has been very successfully addressed by at least one of the case studies.

9.3 Learning from the Case Studies

Each of the case studies brought under examination in this study were successful; yet, each followed a different system of management. The most important conclusion to draw from these facts is the value of each different option in a different setting. In other words, decisions regarding new residential outdoor school sites must be made on a case-by-case basis. However, the case studies can provide a glimpse into the future with regards to the results of decisions made during the initial phases of development. For example, the case study of the Olympic Park Institute demonstrates that locating within a National Park decreases initial start-up costs and leads to a greater degree of recognition. However, this same example demonstrates how such a system of land tenure can be restrictive during subsequent expansion and may cause difficulties through necessary outdoor school-Park agency interactions.

It is far easier to make good decisions when the unknowns are minimized. By examining the case studies presented in this work, new and developing residential outdoor schools will have far more knowledge on which to base their design, management, operational and programing decisions.

9.4 The CBRA as a Host Agency

The CBRA is a national agency with members throughout Canada. As such it has the scope to support a nationwide environmental education program. Likewise, the CBRA has a mandated responsibility to provide logistic support for environmental education within each individual Biosphere Reserve. Therefore, the CBRA has the motive to support a residential outdoor school network. However, funding limitations and the lack of

full time staff members may limit the ability of the CBRA to fulfill the proposed roll of host agency. The increased fund raising ability available to a national organization may partially alleviate these problems, although the development of such a network, and the subsequent search for solutions to the above problems, is not currently a priority of the CBRA.

As a result, it can be concluded that, although the CBRA does possess great potential for becoming the proposed host agency, some challenges must be overcome before the proposal can become a reality.

9.5 Site Suitability of Canadian Biosphere Reserves

The calculation of a site suitability rating of the Canadian Biosphere Reserves (range: 18-25), when measured against the site suitability of two outdoor school sites (range: 17-18) demonstrates that, indeed, Canadian Biosphere Reserves would be appropriate sites for the installation of residential outdoor schools.

Furthermore, Canadian Biosphere Reserves exist to foster relationships and communication between different levels of government and between the public and private sectors. Since each successful case study has, at some point relied upon and struggled with such relationships, locating in a region where the paths for cooperation are pre-existing would be very beneficial to the outdoor schools.

For both of the above reasons, one physical and the other political and social, it can be concluded that, in fact each of the ten Biosphere Reserves in Canada would be an appropriate site for the construction of a residential outdoor environmental education program.

9.6 Final Conclusions

Environmental education in Canada is in need of assistance in order for the nation to assure an ecologically conscious citizenship. Biosphere Reserves require a means through which they can stretch a limited number of resources in order to fulfill all of their mandates to the World Biosphere Reserve Association. This study has shown that the above two requirements can be achieved through the development of a nation-wide network of residential outdoor schools designed and based on the examples and lessons provided by the three case studies taken into consideration.

By taking all of the above lessons and possibilities into consideration, perhaps it will be possible to effect a change that will have positive repercussions for the entire nation. Perhaps residential outdoor schools can become the best possible tool for environmental education and Canadian Biosphere Reserves the best vehicle of delivery.

Appendix 1

Brief Discussion of Environmental Education Types

There are many different varieties of environmental education programs, each of which is designed for a specific setting and level of instruction and learning. This study used a characterization of different methods of school-based environmental education: project-based and curriculum-based programs with a further subdivision into onsite and offsite programs.

Both onsite and offsite project-based environmental education consist of specific learning projects that can be provided either over long or short terms. Examples include the salmon hatchery program initiated by the BC Ministry of Education (long-term) or day-long field trips to parks or other ecologically significant sites (short-term). The defining factor of these programs is that they are approved and initiated on a project-by-project basis with little follow up and accompanying long term commitment to continue environmental education. The advantages of these programs include the fact that they are often easier to initiate than curriculum-based projects and learning goals can be well matched with specific projects. Disadvantages do exist, however, in that funding for such programs is often sporadic and teacher training and program evaluation programs are often not included in the development plan. With regards to project-based environmental education, programs can either take place within the school grounds or off campus. Offsite programs have greater pedagogical potential in that many different habitats or environments can be exploited. However, there are a number of associated administrative and cost difficulties associated with taking a class off school grounds (Simmons, 1998). Contradicting these difficulties, learning in a new, often hands-on environment increases rates of participation and improves student learning (Bogner, 1998).

Curriculum-based environmental education programs require a greater commitment from schools and districts. Similarly to project-based programs, curriculum-based environmental education can take place either on the school campus or offsite. Curriculum-based

programs have the advantage of a constant flow of students to support the program and require the implementation of infrastructure for funding, training and monitoring. As such, the success of such programs can be better measured and monitored (New Zealand Ministry of the Environment, 1999). Curriculum-based programs do require a large degree of co-ordination and cooperation between different levels of government in order to be implemented (Personal Communication with NVOS principal, 2000). However, once such obstacles have been overcome, curriculum-based programs have a far greater longevity than project-based environmental education.

For the purpose of this study residential outdoor environmental education centers were considered offsite environmental education programs, which can be either project or curriculum based. They are large and complex programs, which have a great potential to teach (Milton *et al*, 1995) as well as a great number of potential difficulties in establishment and operation (Parson & Sherlock, 1998). Residential outdoor school programs typically last between three to five days (Fulton, 1982) and provide concentrated teaching opportunities since students remain at the learning site throughout the entire program length. Outdoor School programs are very diverse and can touch on many subjects relating to environmental science and awareness such as cultural heritage and human/ecosystem interactions; and scientific topics, for example, ecology and habitat studies (Fulton, 1982). However, residential outdoor schools also tend to be very costly with high operational costs and complicated administrative requirements.

Appendix 3

	Charlevoix	Lac St-Pierre	Mt. St-Hilaire	Long Point	Niagara Escarpment
Varied and Unique Ecosystems	2	2	1	2	2
Water Availability	2	2	3	3	3
Minimal Natural Hazards	3	3	3	2	3
Good Access/Proximity to Populations	2	3	3	3	3
Seasonal Restrictions	3	3	2	3	3
Sufficiently Large Area	2	2	1	1	2
Site of Particular Significance	3	3	3	3	3
Compatible Land Management	3	2	3	2	3
Existing Infrastructure	3	1	3	1	3
Total Suitability Rating	23	21	22	20	25
	Riding Mountain	Redberry Lake	Waterton	Clayoquot Sound	Mt. Arrowsmith
Varied and Unique Ecosystems	3	3	3	2	3
Water Availability	2	2	2	2	2
Minimal Natural Hazards	2	2	1	2	3
Good Access/Proximity to Populations	2	2	1	1	3
Seasonal Restrictions	2	3	2	3	2
Sufficiently Large Area	3	2	2	3	2
Site of Particular Significance	3	3	3	3	3
Compatible Land Management	2	3	3	3	2
Existing Infrastructure	2	2	1	1	1
Total Suitability Rating	21	22	18	20	21
	Outdoor School	Golden Ears Learning Centre			
Varied and Unique Ecosystems	1	1			
Water Availability	2	2			
Minimal Natural Hazards	2	2			
Good Access/Proximity to Populations	3	3			
Seasonal Restrictions	3	2			
Sufficiently Large Area	1	2			
Site of Particular Significance	1	1			
Compatible Land Management	1	3			
Existing Infrastructure	3	2			
Total Suitability Rating	17	18			

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