

The University of Calgary

Designing Nature:

**Evaluating the Design Process for the Natural History Interpretation of the
Northern Forest Section at the Calgary Zoo**

By Valerie Barnes

**A Master's Degree Project submitted to the Faculty of Environmental Design
in partial fulfillment of the requirements for the degree of
Master of Environmental Design (Environmental Science)**

**Faculty of Environmental Design
Calgary Alberta**

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Like a great Poet, Nature produces the greatest effects with the fewest materials -- sun, trees, flowers, water and love; that is all. If, indeed the last is wanting in the heart of the beholder, the whole is likely to seem to him a daub; the sun only so many miles in diameter, the trees are good for firewood, the flowers are classified by the number of their stamens, and the water is -- wet.

-Heinrich Heine, Die Harzreise.

(Tilden, 1977, page 89)



Abstract

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By Valerie F. Barnes

**A Master's Degree Project submitted to the Faculty of Environmental Design
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Faculty of Environmental Design, The University of Calgary, April 7th, 2000
Committee Supervisor: Dr. Rich Revel**

This Master's Degree Project involved an examination of environmental education and natural history interpretation, and used the Calgary Zoo as an example. This case study provided an opportunity to assess the planning and implementation of the natural history interpretation for the educational signs in a new section of the Calgary Zoo's Canadian Wilds Project - The Northern Forest.

The objectives of this project were to: provide working definitions and descriptions of natural history interpretation and environmental education; identify the key concepts and components of the Calgary Zoo's Northern Forest Ecosystem exhibit; examine some general interpretive planning and design principles; describe the planning process and implementation of the natural history interpretation design for the Northern Forest exhibit; research, develop, implement, and analyze a visitor survey; evaluate interpretive indicators in conjunction with the results of the visitor survey to assess the overall effectiveness of the natural history interpretation in the Northern Forest section; and provide feedback and recommendations on this design process based on the results of the visitor survey.

Information sources and research methods for this project included literature reviews, key informant interviews, and the research, design and implementation of a visitor survey. The purpose of the visitor survey was to assess the success of the Northern Forest interpretive planning process by determining whether or not the natural history interpretation goals, objectives, and expectations developed during the Zoo's design process were achieved.

The basic findings from the visitor survey analysis, in conjunction with an assessment of interpretive planning indicators suggest that the Zoo's planning process was reasonably successful and effective in providing natural history interpretation relating to the Northern Forest in an engaging, entertaining, and appealing way. Recommendations for the Calgary Zoo include:

- devising and adhering to a specific interpretive planning model for the process of designing educational and interpretive goals;
- developing clearly defined interpretive objectives during this planning process;
- practicing ongoing assessments for the measurement and evaluation of educational and interpretive opportunities in order to determine the impacts on the Zoo visitor;
- incorporating social science research methods, especially formative and impact information-gathering and evaluation procedures, into their natural history interpretation planning process; and
- emphasizing learning-by-doing actions or activities in all educational and interpretive opportunities.

Keywords: Environmental Education; Natural History Interpretation; The Calgary Zoo; Northern Forest; Boreal Forest; Interpretation Design; Interpretive Planning; Interpretive Principles; Visitor Survey.

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Chapter 1

Through interpretation, understanding
Through understanding, appreciation
Through appreciation, protection
- Anon.
(Dun, 1991, page 19)

1. Introduction

The purpose of this chapter is to describe the goals, scope and limitations, objectives, and methodology of this Master's Degree Project (MDP).

1.1 Background and Goals of this Project

This project involved an examination of environmental education and natural history interpretation using the Calgary Zoo as an example. This case study provided an opportunity to assess the planning process and implementation of the natural history interpretation design for the educational signs in a new section of the Calgary Zoo's Canadian Wilds Project - The Northern Forest.

Natural history interpretation is a form of environmental education. At the Calgary Zoo, natural history interpretation is used to provide information so that visitors will have a more enjoyable experience, and develop an understanding and appreciation of the area or subject being presented. The techniques the Zoo uses in its natural history interpretation include: first-hand experience (programmes, special events, and visiting buildings, enclosures, and areas); personal contact with Zoo staff and volunteers; interaction opportunities with genuine objects (plants, animals, and artifacts); and illustrative media (signs, graphics, and displays). An example of the application of these techniques of natural history interpretation can be seen in the Calgary Zoo's Canadian Wilds Project.

The Canadian Wilds Project is the newest and largest development ever undertaken by the Calgary Zoo to date. It currently includes three sections: Aspen Woodlands, Rocky Mountains, and Northern Forest. The third section, the Northern Forest, opened to the public on June 25th 1998. Included in the Zoo's

design process for all the sections in the Canadian Wilds Project were efforts to create accurate representations of the natural ecosystems within these sections, and create a communication link with visitors about the nature, complexity, and diversity of these ecosystems.

The Calgary Zoo Education Department indicated that while much planning goes into the interpretive design process, formal assessment of the success of the process had been largely overlooked. For this MDP, the Calgary Zoo example provided an opportunity to evaluate the design process used by the Zoo in creating the natural history interpretation for the educational signs in the new Northern Forest section. This was accomplished by directly observing the various stages of the design process, and assessing the finished product - the interpretive signs in the new Northern Forest Section - using a survey of Zoo visitors. The survey was designed to determine what effect the natural history interpretation had on visitors' knowledge and attitudes after visiting the new section. This survey information was then compared to the natural history interpretation goals, objectives, and expectations that were developed during the Zoo's design process. Interpretive indicators were used in conjunction with the results of the visitor survey to assess the effectiveness of the natural history interpretation in the Northern Forest section. Analyzing the information from the survey and the interpretive indicators provided feedback about the design process, and can serve as a guide for further interpretive design applications.

1.2 Scope and Limitations of This Master's Degree Project

It was not the intent of this MDP to provide an extensive, detailed study and evaluation of environmental education and natural history interpretation theory. Rather, the aim was to furnish a background or context for this project by: providing information on general elements of environmental education and natural history interpretation; examining some aspects of interpretive planning and principles; and then exploring an example of the process of interpretive design. The focus of the project was on the case study, involving the planning and implementation of natural history interpretation at the Calgary Zoo.

One purpose of natural history interpretation is to provide information in an engaging, entertaining, and appealing way, with the intention of promoting awareness, understanding, and an appreciation of the interpretive subject. There are many possible opportunities for the application and implementation of natural history interpretation planning including: zoological and botanical parks; cultural and historic sites; municipal or subdivision green space areas; constructed wetlands; provincial and federal parks, and organizations such as Ducks Unlimited, World Wildlife Fund, and The Canadian Nature Federation.

The Zoo's interpretive mandate for the Canadian Wilds was to present natural history information through interpretive signs and re-creations of various ecosystems. This part of the Zoo's interpretive mandate did not specifically cover cultural anthropology, or human geography concepts. These are, however, important concepts as human activity has had a considerable effect on the environment. Humans share this planet with millions of different species of plants and animals. In light of the continued pressure placed on all aspects of the environment through human activities, what is needed now more than ever are environmentally sensitive practices, responsible choices, and carefully considered policies. The development and implementation of sustainable environmental practices and policies will be affected by political, cultural, economic, and aesthetic considerations and motives. Because of the importance of these issues, human interactions with wild spaces and species are incorporated into much of the educational programming presented through the Zoo's education department.

As the Zoo's mandate for interpretive signs in the Northern Forest section did not emphasize cultural anthropology or human geography, these concepts were not included in the scope of this study. However, while these concepts were not addressed in the Northern Forest section, the Zoo may consider incorporating them into future interpretive planning and design at the Calgary Zoo.

The author expects this research project to add to the existing body of knowledge regarding natural history interpretation. The process of information-gathering and analysis will provide valuable feedback from the Zoo public. As

well, this project can provide insight into attitudes and expectations regarding natural history interpretation. This information may be applied to future environmental education and interpretation designs.

1.3 Objectives

The objectives of this project were to:

- furnish background information on environmental education and natural history interpretation;
 - provide definitions and descriptions of environmental education and natural history interpretation
 - discuss the importance and value of environmental education and natural history interpretation
 - look in brief at environmental education and natural history interpretation in Alberta
- introduce the Calgary Zoo;
 - identify the Zoo's role and mission
 - look at the elements of the Zoo's interpretive programme
 - identify some of the aspects and elements of the Northern Forest Ecosystem here in Alberta
 - identify the key concepts and components of the Calgary Zoo's Northern Forest ecosystem
- investigate aspects of interpretation design;
 - look at interpretive planning and design principles
 - examine the process of interpretation design followed by the Calgary Zoo
- research, develop, and implement a visitor survey designed to determine what Northern Forest information or knowledge the Zoo public came away with after visiting the new section;

-
- analyze the success of the design process by comparing the survey information with the natural history interpretation goals, objectives, and expectations developed during the planning phase;
 - evaluate interpretive indicators in conjunction with the results of the visitor survey to assess the overall effectiveness of the natural history interpretation in the Northern Forest section; and
 - provide conclusions and recommendations on the Zoo's natural history interpretation planning and design process.

1.4 Methodology

The research approaches used to fulfill the objectives of this MDP included: literature reviews; interviews with key informants and experts in environmental education; and the research, development, implementation, and analysis of a visitor survey. A literature review generally involves locating and reading research reports (Neuman, 1994). This step in the research process is an essential part in developing an understanding and knowledge of the subject or topic. Literature sources can vary widely, and for this MDP included articles in journals, books, and government publications. As Neuman (1994) states "a literature review is based on the assumption that knowledge accumulates, that we learn from and build on what others have done" (page 80). For key informants, individuals with relevant knowledge and expertise were identified and questioned. The purpose of including information from key informant interviews was to: collect information on relevant literature sources; get suggestions for additional experts; obtain the benefit of up-to-date information, as well as insight and expertise on current issues that expanded on the existing body of published literature; and receive feedback on the content of this project. The interviews were taped and then reviewed and transcribed to serve as an information source.

Chapter 2

2. Environmental Education and Natural History Interpretation

The purpose of this chapter is to provide some definitions and background information on environmental education and natural history interpretation. The importance and value of environmental education and natural history interpretation are briefly discussed, followed by a review of environmental education and natural history interpretation in Alberta.

2.1 Environmental Education

*If you are thinking a year ahead, sow a seed.
If you are thinking ten years ahead, plant a tree.
If you are thinking one hundred years ahead, educate the people.*
-Chinese poet, 500 BC
(Environmental Education Advisory Committee to the Environmental Council of Alberta, 1989, page 6)

The term environmental education was first used in Paris in 1948 during a meeting of the International Union for Conservation of Nature and Natural Resources (IUCN) (Palmer and Neal, 1994). In 1970 this same organization held a working meeting on 'Environmental Education in the School Curriculum' in Nevada, USA. Palmer and Neal (1994) comment that the "deliberations of that conference continue to be a major influence on the development of environmental education" (page 12). The following definition was drawn up by the IUCN:

Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his biophysical surroundings. Environmental education also entails practice in decision making and self-formulation of a code of behaviour about issues concerning environmental quality (Palmer and Neal, 1994, page 12).

The purpose of environmental education is more than to simply promote an awareness and interest in the natural environment. As stated in *The Handbook of Environmental Education* (Palmer and Neal, 1994, page 18), there seems to be a general consensus that the goals and objectives of environmental education are to:

1. foster clear awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas;
2. provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment; and
3. create new patterns of behaviour of individuals, groups and society as a whole towards the environment. (United Nations Educational, Scientific, and Cultural Organizations (UNESCO), 1977).

Ideally, it attempts to develop the skills, attitudes, motivation, and commitment needed for individuals as well as groups to work towards solving environmental problems, and exercising environmentally responsible practices (Environmental Education Advisory Committee to the Environmental Council of Alberta, 1989). As noted by Simmons (1991), definitions of environmental education suggest “a model in which there is a direct relationship between awareness, knowledge, values, skills, and determination *and* the ability of individuals to act on environmental problems” (page 17). If visitors have gained an understanding of key concepts or principles, then it is more likely that behaviours and attitudes will change in appropriate directions (Sharpe, 1976). My personal observations and experiences as a Docent (volunteer teacher) at the Calgary Zoo over the past ten years have provided illustrations of this. Below are examples of the goals and content of environmental education as listed by Palmer and Neal (1994, pages 20 - 21).

1. KNOWLEDGE AND SKILLS

- To develop a coherent body of knowledge about the environment, both built and rural, sufficient to recognize actual and potential problems.
- To be able to gather information from or about the environment independently or as part of co-operative activity.

-
- To be able to consider different opinions related to environmental issues and to arrive at a balanced judgment.
 - To appreciate the ways in which environmental issues are interrelated so that one factor affects others.
 - To be able to evaluate information about the environment from different sources and to try to resolve environmental problems.
 - To understand and to know how to use the mechanisms available in society for bringing about environmental change.

2. ATTITUDES AND BEHAVIOUR

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

Environmental education is achieved through studies, research, and activities that centre on such principles as: biodiversity and the interrelationships between life forms; human interdependency with other life; responsible and sustainable management and use of the environment; conservation and preservation of wilderness areas; and an appreciation of the aesthetics of the environment (Environmental Education Advisory Committee to the Environmental Council of Alberta, 1989). The best way to achieve environmental knowledge and skills is through interdisciplinary activities (including research, studies, and discussion) involving a variety of natural and social sciences. The educational goals relating to attitudes and behaviour endeavor to promote environmental literacy. One component of environmental literacy is "the capacity to perceive and interpret the relative health of environmental systems and to take appropriate action to maintain, restore, or improve the health of those systems" (Reading, Person. Comm.). Integrating, or infusing environmental concepts into all courses in the formal system, and promoting and participating in environmental education opportunities in the informal sector, will serve to

encourage this literacy, awareness, understanding, and appreciation for environmental issues and concerns. In *Islands of Hope* (1971, page 142), Brown lists several general concepts that are inherent in environmental education. These are recorded below.

- The world is a finite system.
- Humans share the world with all other living things.
- Humans are not exempt from nature.
- All living things make use of some part of their surroundings, however, overuse damages or even destroys the system.
- The earth is one enormous system, composed of a series of many other systems. There are relationships and interactions both within and between these many systems. The most successful systems allow for change but at the same time maintain a stability that allows for continuity - in other words, a balance between flexibility and stability.
- No system is static and unchanging, rather, they are dynamic and constantly changing.
- The principles of ecology allow people to comprehend these systems and the place of humans in the world system.
- Changing one aspect of a system through human activities impacts on other parts of that system, and on other systems. It is the degree of the activity that determines the scope or range of the environmental impact.
- All systems have some ability to buffer or absorb impacts. However, this capacity is limited as to the number or degree of impacts and the populations it can sustain.

Environmental education takes place in both formal and informal education systems. The formal system includes elementary, junior, and senior secondary schools, as well as some post secondary institutions. The informal system includes parks, museums, zoos, historic sites, and other organizations and agencies that are involved in some way with educational and environmental subjects. The Report of the Environmental Education Advisory Committee (1989) identifies some of these other organizations in Alberta as including Athabasca University, extension departments of other universities and colleges, as well as programmes offered through television and Public Broadcasting Networks (e.g. ACCESS). The informal system deals with a wide variety of environmental

education areas and contexts, and is available to people of all ages (Environmental Education Advisory Committee to the Environmental Council of Alberta, 1989).

Environmental education, both formal and informal, is a process that can continue throughout life. It is not limited to a particular age range, or to a specific context. As summarized in Palmer and Neal (1994, pages 21 - 22), the Tbilissi Declaration (UNESCO-UNEP, 1978) advocated that environmental education:

- is a lifelong process;
- is interdisciplinary and holistic in nature and application;
- is an approach to education as a whole, rather than a subject;
- concerns the interrelationship and interconnectedness between human and natural systems;
- views the environment in its entirety including social, political, economic, technical, moral, aesthetic, and spiritual aspects;
- recognizes that energy and material resources both present and limit possibilities;
- encourages participation in the learning experience;
- emphasizes active responsibility;
- uses a broad range of teaching and learning techniques, with stress on practical activities and first-hand experience;
- is concerned with local to global dimensions, and past/present/future dimensions;
- should be enhanced and supported by the organization and structure of the learning situation and institution as a whole;
- encourages the development of sensitivity, awareness, understanding, critical thinking, and problem-solving skills;
- encourages the clarification of values and the development of values sensitive to the environment; and
- is concerned with building an environmental ethic.

The 'environment' could provide a unique opportunity for use as a common subject, spanning the entire curriculum throughout the formal education system (Reading, Person. Comm.). Environmental issues and concepts can be used as a general focus in a variety of subject areas including sciences (math, physics, biology, and chemistry), language arts, social studies, current events, geography, history, art, physical education, economics, political science, psychology, and philosophy. This would also result in more possibilities for cooperation between the formal and informal education systems. Educational

programmes and opportunities in the informal system can provide personal experiences and hands on learning that would enhance the formal learning experiences.

2.2 Natural History Interpretation

Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical or architectural. Any art is in some degree teachable.
(Tilden, 1977, page 26)

One way of characterizing the difference between environmental education and natural history interpretation is location. While environmental education tends to be most associated with the formal school system, natural history interpretation is often associated with recreational contexts (Knapp, 1997; Ballantyne and Uzzell, 1994). Environmental education and natural history interpretation tend to share the same goals and objectives. The Calgary Zoo is an example of the application of environmental education in the form of natural history interpretation.

Environmental interpretation in general has a varied background and history based in many disciplines including natural sciences, education, and philosophy. Long ago, accounts of natural phenomena were related by philosophers, hunters, and artisans. Natural history interpretation has evolved from these roots through developments in science, technology, discovery, and record keeping (Sharpe, 1976). Sharpe (1976) states that

interpretation, whether through talks or other means, is almost exactly what the word states. It is the translation of the technical and often complex language of the environment into nontechnical form, with no loss in accuracy, so as to create in the listener *sensitivity, awareness, understanding, enthusiasm, and commitment* (page 159).

Brown's (1971) definition of interpretation is "that body of communications, devices, and facilities that conveys environmental knowledge, stimulates discourse on environmental problems, and results in environmental reform" (page 77). The following figure (Veverka, 1994, page 13) is a simple, visual illustration

of four basic steps involved in interpretation resulting in awareness, knowledge, and behavioural change.

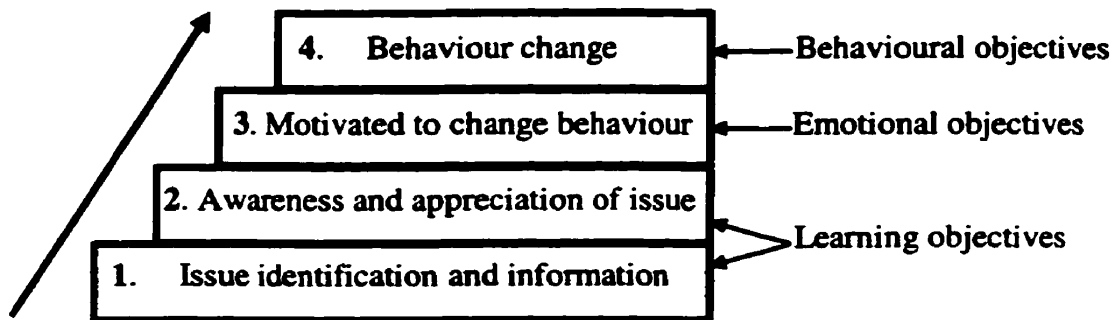


Figure 2-1: Perception and Behaviour Change (Veverka, 1994)

1. Information about a concept or issue is presented to the visitor.
2. The information builds or enhances the visitor's appreciation and awareness of the subject.
3. The visitor should then be provided with the incentive, motivation, and the means to change. An example might be to encourage a visitor to try a simple conservation activity at home.
4. After realizing some behaviour change, the visitor may become more aware of the value of individual and group action (Veverka, 1994, page 13).

Most descriptions of natural history interpretation agree that “interpretation takes the visitor beyond the point of his aesthetic joy toward a realization of the natural forces that have joined to produce the beauty around him” (Tilden, 1977, page 6), and that a “primary objective of interpretation is to assist the visitor in developing a keener awareness, appreciation and understanding of the area he or she is visiting” (Sharpe, 1976, page 4). In addition, Sharpe (1976) notes two other objectives of natural history interpretation: to accomplish environmental management goals through promoting thoughtful use of the specific site or resource, and minimizing human impact; and to promote increased public knowledge and understanding of an organization or agency and its programmes.

Specific interpretive objectives reflect the particular goals and purpose of the organization. As Dun (1991, pages 20 - 21) states, the general objectives of natural history interpretation include:

- the development of awareness, understanding, and appreciation of the subject;
- extending this knowledge and building public support toward other natural areas;
- providing an enjoyable experience for the visitor;
- instilling conservation awareness; and
- achieving management goals for natural areas and sensitive sites.

In Freeman Tilden's book *Interpreting Our Heritage* (1977), interpretation is described as an educational tool, used by national and municipal parks, museums, and similar natural and cultural institutions. He characterizes interpretation as an elective or voluntary educational activity "which aims to reveal meanings and relationships through the use of original objects, by first-hand experience, and by illustrative media, rather than simply to communicate factual information" (Tilden, 1977, page 8). Natural history interpretation is a "combination of good science and entertainment" (Kelba, Person. Comm.). It is interpretation that provides a "communication link between the visitor and the resources - be it geological processes, plants, animals, ecological communities, history or prehistory of man" (Dun, 1991, page 19). The individual who provides this communication link is the interpreter. As stated by Sharpe (1976), "natural history interpretation has evolved into a discipline requiring its practitioners to be professional in the fullest sense" (page xi). In other words, an interpreter requires a high level of competence in the subject matter, a good knowledge of the art of communication, and a familiarity with the tools of the craft. Interpreters use educational resources and background knowledge in history, natural sciences, education, and communication to create interactive learning activities. They research and write educational and entertaining interpretive programmes and present these programmes, using a wide variety of techniques (such as puppetry, drama or role playing, music, storytelling, graphics, audio-visual, etc.) to

audiences of all ages and educational levels. Interpretation is more than simply identifying or labeling something (Sharpe, 1976). For example, a label attached to a tree indicating its scientific and common name is not interpretation. As stated in Dun (1991), "the interpretation of a tree would say something about its wood, how much water it evaporates, about its seeds or about the animals that live and feed on it. Interpretation should satisfy people's natural curiosity" (page 34).

As mentioned, natural history interpretation can be characterized as that part of environmental education where the foundation for learning is based on actual experiences outside of a formal or structured classroom environment (Report of the Environmental Education Advisory Committee, 1989). This informal or community based system includes:

designated divisions or sections within some provincial government departments; museums, parks, zoos, and natural areas; television and radio programmes; printed media such as newspapers, periodicals, and special publications; special interest groups such as Scouts and Guides; and community special events such as Environment Week (Environmental Education Advisory Committee to the Environmental Council of Alberta, 1989, page 9).

All of these agencies or organizations have their own objectives and mandates, have their own sources for funding and support, and organize their own educational content and programming. There may be little or no coordination between some of these organizations and agencies, and a lack of a common agenda or curriculum can make it difficult to assess the effectiveness and impact of the informal system (Environmental Education Advisory Committee to the Environmental Council of Alberta, 1989). However, "the levels of cooperation and coordination are a lot better today than they were ten years ago" (Reading, Person. Comm.). While there may be a lack of environmental education coordination among some of the agencies and organizations in the informal sector, there are often examples of cooperation between the formal and informal sectors. The informal system has "become really supportive, concerned, and committed to providing quality educational programming" (Batycky, Person. Comm.). It is important to work to maintain this cooperation and coordination, and to have

teachers take advantage of the opportunities in the informal sector as well as for educators in the informal system to promote these opportunities (Ackroyd, Person. Comm.). Some of these examples include programmes through museums, historic sites, and zoos that expand on specific curriculum topics in social studies, history, and science courses at schools. Students have access to these programmes during school field trips, or occasionally through visits by these agencies or organizations to the school classrooms.

2.3 The Importance and Value of Environmental Education and Natural History Interpretation

Ultimately the behavior of entire societies towards the biosphere must be transformed if the achievement of conservation objectives is to be assured. A new ethic, embracing plants and animals as well as people, is required for human societies to live in harmony with the natural world on which they depend for survival and well-being. The long-term task of environmental education is to foster or reinforce attitudes and behavior compatible with this new ethic.
-(IUCN) World Conservation Strategy, 1980
(Environmental Education Advisory Committee to the Environmental Council of Alberta, 1989, page 6)

Dun (1991) states that over time, human attitudes, behaviours, and practices have become separated from nature, with the result that we are often ignorant of the complexities and interrelationships that exist in nature. The conveniences of modern life can isolate people from the most basic natural processes, reinforcing this separation. People do not connect the products and services they use with the soil, air, and water of the natural environment (Brown, 1991). For this reason, “conservation education then becomes a very important means for regaining the lost ground” (Dun, page 71). Environmental education and natural history interpretation are important and valuable tools that may serve as a catalyst to motivate people to cooperate and participate in the conservation and preservation of the biodiversity essential to a healthy environment. According to Brown (1971), environmental education does three things - it informs, motivates, and facilitates action. The type of action depends on the answers to the questions ‘what should be done’, and ‘how can I participate’. It is increasingly the case that

teachers perceive informal interpretive experiences as playing an important role in developing student environmental literacy. Visits to environmental centres, museums and heritage sites are undertaken to help students acquire environmental knowledge, concepts, skills, informed attitudes/values and sustainable environmental behaviour (Ballantyne and Uzzell, 1994, page 112).

It is also suggested that

learning contexts and learning methods should be mixed, in order to provide a good blend of learning experiences. In particular, compulsory school contexts should include informal learning experiences.... In addition to enriching the repertoire of learning opportunities, such blending can help meet the challenge of 'science for all,' i.e. providing science education tailored to diverse and heterogeneous populations of future generations (Hofstein and Rosenfeld, 1996, page 107).

Nine key informants were identified and interviewed in-depth for this project. Three of them had positions directly related to environmental education or natural history interpretation, three were involved with Science or Technology Studies, one was a coordinator for provincial curriculum standards, and two were involved with planning at the Calgary Zoo. All the key informants were asked to rate environmental education and natural history interpretation today as having a high value, some value, or no value. Responses from all the key informants interviewed indicated that environmental education and natural history interpretation have a very high value in both the formal and informal system. "Environmental issues are becoming more and more prevalent, requiring informed action - both at the individual and societal level. Environmental issues will play an increasing role in individual lives - and in our survival in a life-supporting environment" (Galbraith, Person. Comm.). As noted, an intention of information communicated through environmental education and natural history interpretation is to lead to the development of an environmental ethic. However, it is important to provide ideas, opportunities, or resources for the application of this environmental ethic, otherwise, the problem or issue can seem overwhelming, and the result would be to lose the motivation for an individual to become constructively involved on their own scale. An individual with an environmental

ethic and knowledge of how to apply it can use it as a measure to consider, judge, influence and reform behaviour and action (Brown, 1971). It is imperative to help students to become critical thinkers, “getting them to look at all aspects of an issue, and then incorporate these different perspectives before they make any decisions” (Reading, Person. Comm.).

As indicated in the Report of the Environmental Education Advisory Committee (1989), general survey results have suggested that the level of environmental awareness among Canadians has been increasing. People can become more environmentally aware as a result of studies and experiences in both the formal and informal education systems, and through educational information available in books, magazines, television shows, interactive computer programmes, and the internet. Although this environmental awareness is important, it needs to be acted upon by individuals, business, and governments in order to address environmental concerns.

Opinion polls consistently show that most Canadians are concerned about the quality of their environment and how pollution affects their health; many are willing to pay more to ensure a healthier environment. But despite our freedom to change our lifestyles if we want to, often we do not know what to do, how to do it, and what might happen if not enough of us do our part in addressing these problems (Environmental Education Advisory Committee to the Environmental Council of Alberta, 1989, pages 5-6).

Some of the reasons for this lack of action include: public apathy or disinterest; a general belief that environmental experts and government officials are taking care of the problems on our behalf; a notion that individuals cannot make a difference; and an unawareness about environmental issues and what actions we can take to rectify them (Environmental Education Advisory Committee to the Environmental Council of Alberta, 1989). This situation provides a valuable opportunity for environmental education, in both the formal and informal sectors, to play an important role in effecting change in awareness, attitudes, and behaviours regarding environmental issues. As stated in the

Environmental Education Advisory Committee to the Environmental Council of Alberta (1991)

learning means acquiring knowledge and understanding that enables the learner to think critically about problems, to form opinions and shape beliefs, to question conventional truths if reasoning justifies the challenge, and to make choices that contribute to the quality of the environment and, therefore, to the quality of life (page 18).

In the long term, this will lead to decisions, policies, and actions that enhance the environment (Environmental Education Advisory Committee to the Environmental Council of Alberta, 1989). As mentioned, the value and importance of environmental education is that it can

assist people of any age, at all levels in developing awareness, knowledge, skills and commitment so as to result in informed decisions, responsible behaviour, and constructive action. The intention is that people understand the complex interaction between man and nature, the enduring continuity which links the acts of today to the consequences for tomorrow, and acquire the knowledge, values, attitudes and practical skills to participate in a responsible and effective way in anticipating, tackling and solving social problems and conflicts between themselves and the protected areas, and in the management of the quality of the environment (Dun, 1991, page 71).

Perhaps the greatest consequence of environmental education is that “it confers power on the individual, who may then act on the basis of this knowledge, alone or with others” (Environmental Education Advisory Committee to the Environmental Council of Alberta, 1989, page 11).

2.4 The Alberta Context

Environmental education is not a new concept. Even for early hunter-gathers it had an important role in the learning system, as a certain amount of environmental knowledge was important for subsistence survival. In Alberta, at the time of European settlement, environmental education was based on the notion that the physical environment needed to be changed, developed, and improved in order to utilize the vast natural resources (Report of the

Environmental Education Advisory Committee, 1989). Over time, environmental education came to include investigations of natural systems, and the effects of human activities on the environment. In the 1970's, these changes in environmental education concepts coincided with growing public interest and concern about human impacts on natural systems, and quality-of-life considerations (Report of the Environmental Education Advisory Committee, 1989).

Environmental education at the elementary, junior, and senior high school levels was formalized in Alberta during the 1960's and 1970's (Report of the Environmental Education Advisory Committee 1989). At the elementary level, environmental education was integrated into classroom and school yard activities. At the junior and senior school levels, opportunities for environmental education could be found in optional outdoor pursuits courses, environmental studies programmes, and as components of required or core science courses such as Life Science and Biology (Report of the Environmental Education Advisory Committee, 1989). Post secondary institutions responded to growing environmental interest by developing courses and programmes that focused on skill development and provided environmental information. According to the Report of the Environmental Education Advisory Committee (1989), agencies and organizations in the informal sector concerned with the natural environment also experienced growth in environmental interpretive programming in response to public interest and demand.

The Report of the Environmental Education Advisory Committee (1989) states that for the most part, environmental education programmes have held only a nominal or marginal position in the Alberta curriculum for grades 1 to 12. Environmental studies are generally added onto existing units within social studies and science courses. Further, it is at the elementary school level where access to environmental education concepts is greatest. Opportunities for environmental education can be reduced at the junior and senior secondary school levels. The reason, as stated in the report, has to do with the development of

province-wide examinations in core subjects, which can limited the opportunities for optional subjects. However, “as the public interest and demand for environmental education grows, there is a definite trend away from marginalized programmes toward the integration of learning about the environment back into the very heart of education” (Report of the Environmental Education Advisory Committee, 1989, pages 20 - 21).

It was commonly agreed among the key informants interviewed for this project that environmental education in the formal system today is at its most general and encompassing at the elementary school level. From kindergarten to grade six, where one teacher teaches all or most of the subjects, it is easier to incorporate environmental themes that span the whole curriculum (Reading, Person. Comm.). While environmental topics are infused into the school curriculum at all levels, some of the key informants felt that it is currently more compartmentalized at the junior and senior high levels, where it becomes increasingly specific to subjects like biology or chemistry (Makowski, Person. Comm.). Still, environmental themes could be expanded and used to cover everything teachers need to teach across the curriculum, by looking at this one common theme from a social, cultural, economic, scientific, historical, and political perspective (Reading, Person. Comm.). Today, studies have progressed from simply looking at the science of the environment, to one of understanding relationships (Makowski, Person. Comm.), and at the junior and senior levels students do have a greater degree of choice for pursuing specific studies at depth (Galbraith, Person. Comm.). It is important that people acquire the knowledge, skills, attitudes, and behaviours needed in order to take responsibility for the well-being of the planet through both the formal and informal system. “This requires, among other things, a firm commitment to increasing the level of environmental literacy through environmental education” (Report of the Environmental Education Advisory Committee, 1989, page 26). This needs to happen for all people and at all age levels in both the formal and informal systems.

Chapter 3

The overall interpretive effort is known as the interpretive program. It includes the personnel, facilities, and all interpretive activities of an organization, agency, or individual area. The interpretive program relates the natural or cultural phenomena of a park or equivalent area to the visitors and utilizes a wide variety of methods to present this subject matter. The interpretive specialist and the media form the link between the phenomena and the visitor.
(Sharpe, 1976, page 6)

3. The Calgary Zoo: Education and Interpretation

This chapter presents a background to the Calgary Zoo and includes a description of the Zoo's mission, and interpretive programme. The Calgary Zoo's Canadian Wilds Northern Forest Section was used as an example in an evaluation of the planning and implementation of natural history interpretation for this project.

3.1 The Zoo Context

3.1.1 Mission

Some of the objectives that modern zoos fulfill are education, conservation, recreation, and opportunities for scientific study. Sharpe (1976) states that organizations such as botanical gardens, zoos, and other related institutions, play an important role in environmental education and natural history interpretation by providing opportunities for personal experiences and hands on learning. For most modern accredited zoos, emphasis has changed from having a wide variety of animals in stark cages for the public to view, to displaying animals in enclosures designed to simulate their natural environment. Ideally, the visitor can enjoy a feeling of immersion in the exhibit, experiencing the different sights, sounds, plants, and animals without the distraction of bars and concrete (Peterkin, Person. Comm.; Rodman, Person. Comm.). Zoos can provide an outdoor experience for an urban population that might otherwise have limited

opportunities to experience nature. In addition to the nature experience, Dun (1991) suggests that

modern zoos [are a] persuasive and powerful means for [the] education of people. Zoos are primarily educational institutions, which can offer knowledge about animals to the scientists and students of natural history. Even casual visitors who come to zoos for pleasure and pastime can absorb a tremendous amount of knowledge with the help of interpretive programmes (page 68).

In a Zoo context, flexibility regarding modular or temporary educational exhibits, as well as media content and design (for example, pamphlets, signs, and displays) can provide a greater variety of learning opportunities and experiences to regular or repeat visitors (Sharpe, 1976). In addition to providing some new information, the zoo public can build on the knowledge, experiences, and insights of previous visits. The personnel and interpretive activities of an organization can employ a wide variety of techniques to allow visitors to have experiences that are both enjoyable and educational.

An organization involved with natural history interpretation would generally have this aspect of their activity covered in a statement of policy or a mission statement (Sharpe, 1976). A mission statement should state three things about an organization or agency:

1. who they are;
2. what they do; and
3. why they do it.

The following, from the Long-Term Strategic Plan of the Calgary Zoo, covers the Zoo's role, mission, and guiding principles:

Cornerstones of Our Governance

The Calgary Zoological Society has established three cornerstones of governance to ensure the fulfillment of our mandate to Calgarians and fellow Albertans. They are:

-
- our role - the fundamental purpose for the Zoo's existence in the community;
 - our mission - what the Calgary Zoo does to accomplish the above Role; and
 - our values and guiding principles - factors which influence the Zoo's actions in achieving the mission.

Our Role

The Role of the Calgary Zoological Society is twofold: to contribute to the conservation of living things in our natural world; and to contribute to the well-being of Calgarians and our visitors.

Our Mission

The Mission of the Calgary Zoological Society, in partnership with the city of Calgary and its citizens, is to develop, operate and promote an integrated zoological, botanical, prehistoric park and conservation centre, for the combined purposes of conservation, education, recreation and scientific study.

Our Values & Guiding Principles

The Society will assess all of its plans and actions in support of the Mission in the context of the following values and guiding principles.

- We value integrity, responsibility and accountability.
- We value ethical behaviour and a professional approach.
- We value open and honest communication.
- We believe that our work must reflect and impart an understanding of the integration of human experience with nature.
- We believe in excellence in the stewardship of all things in our care, and emphasize protecting the dignity and ensuring the physical and psychological health of our animals.
- We believe in conservation and educational work that is scientifically based and impartial.
- We believe in operating as an integral part of our community, working to serve the needs and interests of all, and emphasizing our contribution to education.
- We believe in providing services and hospitality of an excellent standard.
- We believe in providing a safe, happy and productive work environment wherein pride of corporate accomplishment and personal satisfaction are hallmarks of our efforts.

-
- We believe that the Society must work to enhance its self-sufficiency, without compromising its values and guiding principles.

Information from the Docent Training Manual (produced by the Education Department) provides some of the historical background to the Calgary Zoo. Development of a city park on St. George's Island (the site of the Calgary Zoo) began in the early 1900's. The small, unofficial collection of animals housed on the island eventually became an organized, official Zoo in January 1929. At this time, the Calgary Zoological Society was formed, and by October, Tom Baines was hired as the first curator of the Calgary Zoo. The animal collection grew over time, and the area was enjoyed by many Calgarians as a picnic and recreation site. The introduction of a ten year master plan in 1975 signaled a dramatic shift in the direction of the Zoo by advocating a change to "bar-less" habitats for every Zoo inhabitant, and defining the Zoo's role as including education, conservation, recreation, and scientific study. The objectives for education and natural history interpretation were to provide factual information, as well as natural history concepts and principles. The goal was to instill an appreciation and respect for wild spaces and species in Zoo visitors.

3.1.2 Interpretive Programme

As defined by Sharpe in *Interpreting the Environment* (1976), the interpretive programme includes the personnel, facilities, and all interpretive activities of an organization, agency, or individual area. The interpretive programme at the Calgary Zoo is presented below.

- There are full-time, part-time, and seasonal education staff, as well as a large group of trained education docents (a docent is a volunteer or unpaid teacher).
- There are several permanent locations for educational programming consisting of classrooms, an auditorium with audio and visual equipment, and outdoor amphitheatres. Temporary locations for learning activities can be set up anywhere on the zoo grounds.

-
- There are opportunities for first-hand experiences for visitors such as education programmes, special events, and visiting buildings, enclosures, and other areas.
 - Visitors can have personal encounters and interactions with genuine objects including plants, animals, and artifacts.
 - The Zoo has a variety of illustrative media including interpretive signs, graphics, and displays.

This programme furnishes many interpretive opportunities and experiences for Zoo visitors. As Sharpe (1976) states, interpretation provides many benefits:

- it enhances the visitor experience, making it better or richer;
- information through interpretation can broaden the visitor's horizons beyond the context of the park or zoo, making visitors more aware of their place in the context of the total environment, and can promote broader knowledge and understanding of the intricacies and complexities of coexisting within that environment;
- interpretation instructs, inspires, and educates the public, and a knowledgeable public can make informed decisions on matters that relate to the environment; and
- it can motivate and empower the public to take steps to protect the environment in sensible and sustainable ways.

It is mainly docents and interpreters who provide in-person educational and recreational opportunities to those people visiting parks, museums, zoos, historic sites, and other places in the informal education system involved in environmental education. The duties of docents and interpreters vary according to the location and context of the site. As indicated by Dun (1991), some of these duties may include:

- conducting educational activities for school groups;
- taking visitors on guided tours;
- demonstrating skills, and providing hands-on learning opportunities;
- researching the historical aspects, or the plant and animal components of an area;
- researching, writing, and presenting programmes to the general public;
- writing articles for publication, producing scripts for television or radio, and designing slide presentations;
- designing brochures, publications, interpretive exhibits or displays, signs, and trails;
- administering interpretive services in visitor centres; and

- developing fund-raising and other special events.

The following figure illustrates the composition of the Calgary Zoo education department as at June, 1999.

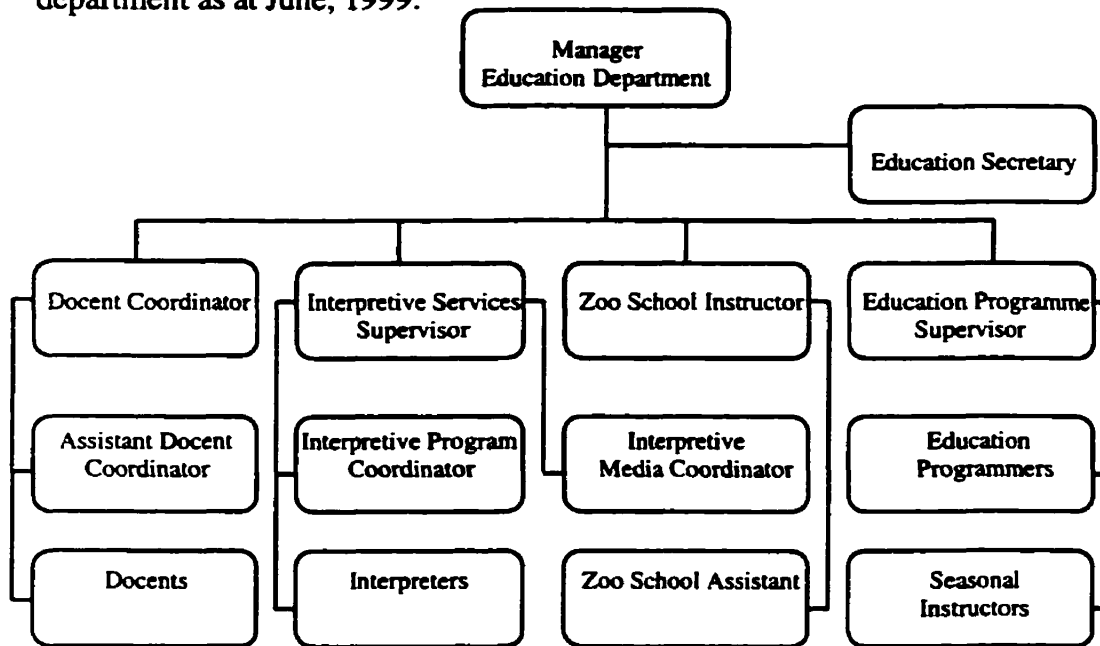


Figure 3-1: The Calgary Zoological Society Education Department (June 1999)

Most of the environmental education and natural history interpretation opportunities occur on the Zoo grounds. Programmes or events generally take place in specific Zoo venues. However, visitors are free to wander the Zoo sections, buildings, and gardens on their own, where they might view plants, spot animals, read interpretive signs, or come upon docent touch tables or animal encounters. Touch tables are mobile exhibits that are planned to combine direct hands-on experiences with a variety of objects, along with interpretive information for the general zoo visitor. The design, theme, and content of each touch table is determined by individual docents and can include: animal biofacts (for example, various animal artifacts including skulls and bones, pelts, bird wings and eggs, fossils, etc.); natural and manmade objects and products; as well as illustrations, posters, and small display objects. Docents are also trained to be

able to provide visitors with close encounters with some of the individual zoo animals. These animals can include rabbits, guinea pigs, ferrets, hedge-hogs, snakes, insects, owls, and others. An example of an off-site programme for the Calgary Zoo is a mini-zoo. This is a situation where docents take a few animals and biofacts from the Zoo to a school, park, hospital, or nursing home.

Examples of school programming cover specific animals (Meet the Monkeys, Gorillas, Giant Animals, Bears, Owls, Dramatic Dinosaurs, etc.) as well as environmental concepts and issues (Life Cycles, and Endangered Species). Individual programmes can also be custom designed to fit specific needs. (See the Calgary Zoo Discovery Courses calendar in Appendix 1.) Most of these school programmes are conducted on-site in one of the Zoo's classrooms, however, there may be arrangements made where the programme is taken into the school classroom.

The 'Chevron Open Minds School Program' is a special educational situation that provides an opportunity for Calgary teachers to move their students from their school classrooms to one of many locations in Calgary including: the Glenbow Museum; the Calgary Science Centre; the Cross Conservation Area; and the Calgary Zoo. It is an example of formal education taking place in an informal, yet relevant context. Through this programme school classes have access to a week of innovative learning, focusing on specific curriculum objectives, and at the same time enhancing students' observation, research, writing, and drawing skills. 'Zoo School' takes place in a classroom located on the Zoo grounds, and promotes the exploration and study of the diversity of living things, endangered species and spaces, conservation issues, the impacts of human activities on the natural environment, as well as specific types of natural areas. The regular school teacher determines the goals and activities of the one week session, with the facilitation and cooperation of the Zoo School coordinator.

Other programmes offered by the Zoo are designed to be unique, entertaining, and informative (the Window on the World Speaker Series, Saviour of Species Speaker Series, Murder Mystery Dinner Theatres, animal theme

breakfast programmes, art and photography courses, and various horticultural programmes), and provide a wide variety of educational opportunities for the general public. These programmes are advertised in the Calgary Zoo Members Newsletter (see Appendix 2). Some of these programmes are one time events, others take place over a period of time (examples include Precious Places Hikes, Junior Zoologist Summer Camps, Zoo Club Camps, and Sleepover programmes). During the summer months, there are regularly scheduled, daily, on-site interpretive programmes known as Nature Tales, for the Zoo public to attend. Because these programmes are researched, designed, and presented by a group of seasonal interpreters, they are different from year to year. They include programmes about animals such as tigers, elephants, gorillas, dinosaurs, seals; and Whooping cranes (see Appendix 3).

The following information is from a Calgary Zoo document (produced by Kevin Strange, Education Department) entitled Outline Plan for Educational Programming (for June 1998 through June 1999).

Overview

There are a number of criteria that are considered in the overall design of educational programming at the Calgary Zoo. These include, but are not limited to, the main criteria listed below.

- While school programming is a critical function, activities shall be aimed at the widest possible variety of audiences and not restricted to school groups.
- Adult programming will be a crucial part of the Zoo's educational activities because adults have the largest influence on their children's values and beliefs and they make the vast majority of societal decisions that affect plants, animals, and habitat.
- Families make up the largest visiting audience. Therefore, daytime programming that is suitable for the whole family is a focus.
- More learning tends to occur in programmes of a longer duration. Such programmes tend to be able to accommodate fewer participants.
- Less learning tends to occur in programmes of a shorter duration. These programmes tend to be able to accommodate larger numbers of participants.
- A balance of longer and shorter programmes is important.

-
- Programmes shall be priced to make them accessible to the intended audience. Children and family programmes will generally be less expensive or free, while adult programmes will generally be more expensive.

The total 'menu' of educational offerings will attempt to satisfy all of the above criteria. With a full-time, seasonal, and volunteer education staff the department is able to produce hundreds of programmes each year. One way that these programmes can be categorized is as follows:

- school programmes - approximately 800 per year on curriculum based topics;
- special events for adults - at least 25 per year presented as lecture series, hiking series, workshops, etc.;
- special events for children - camps, courses, interpretive programmes, sleepovers, etc.;
- special events for families - interpretive programmes (over 750 separate programmes in June, July, and August), innumerable docent encounters, corporate functions, Zoonival (a winter festival), etc.; and
- other programmes - Master Gardener training programme, Docent training programme, horticulture industry conferences, media events, tourism industry functions, etc.

The Zoo offers a abundance of programmes to various audiences. These programmes tend to have a number of themes in common. They present an integrated view of plant and animal interrelationships, as well as the relationship between humans and nature. Individual species or areas in the Zoo are used to introduce and enhance environmental issues or concepts. Plants, animals, natural history, and nature in general all fall within the scope of the Zoo's educational programmes.

Chapter 4

We maintain these preserves so that all the people will have access to the source material of our natural and historic origins, besides having the relaxation and novelty of coming into a world apart from their daily round, and into the presence of beauty, art, the significant moment and the stirring event. But how is this laudable purpose to be translated into a continuing interest that does not end, but really begins when our visitor has left the park, the museum, or the historic place?
(Tilden, 1977, page 100)

4. Key Concepts and Components of the Calgary Zoo's Northern Forest Ecosystem

General information on some Northern Forest ecosystem components are identified in this chapter along with a presentation of particular aspects of Northern Forest ecology. This information is included in order to provide a context for the Calgary Zoo's Canadian Wilds Northern Forest Section. The second part of the chapter details the key concepts and components, as well as the physical setting of the Zoo's Northern Forest re-creation. The Northern Forest exhibit provided the opportunity to explore and evaluate the process of natural history interpretation design used by the Zoo.

4.1 The Northern Forest Ecosystem

Ecosystems are complex, interconnected associations between plants, animals, and non-living components and variables such as soil, rock, water, light, and climate (Cox and Moore, 1993). Ecosystems are self-regulating, dynamic, and ever-changing (Christopherson, 1994). This variation has promoted the evolution of diverse communities of plants and animals specifically adapted to their environments. In turn, diversity provides for a rough equilibrium or stability within an ecosystem, contributing to a balance between "increasing growth toward the potential in a community and decreasing growth caused by resisting factors that force limits in a community" (Christopherson, 1994, page 603).

The Northern or Boreal Forest ecosystem covers an area of approximately twelve to fourteen million square kilometers in an almost unbroken circumpolar band across northern Canada, Alaska, Europe, and Asia (Christopherson, 1994;

Larsen, 1980). About one third of the total Northern Forest is located in Canada, forming the largest natural region both in Canada, and here in Alberta (Alberta Environmental Protection, 1998).

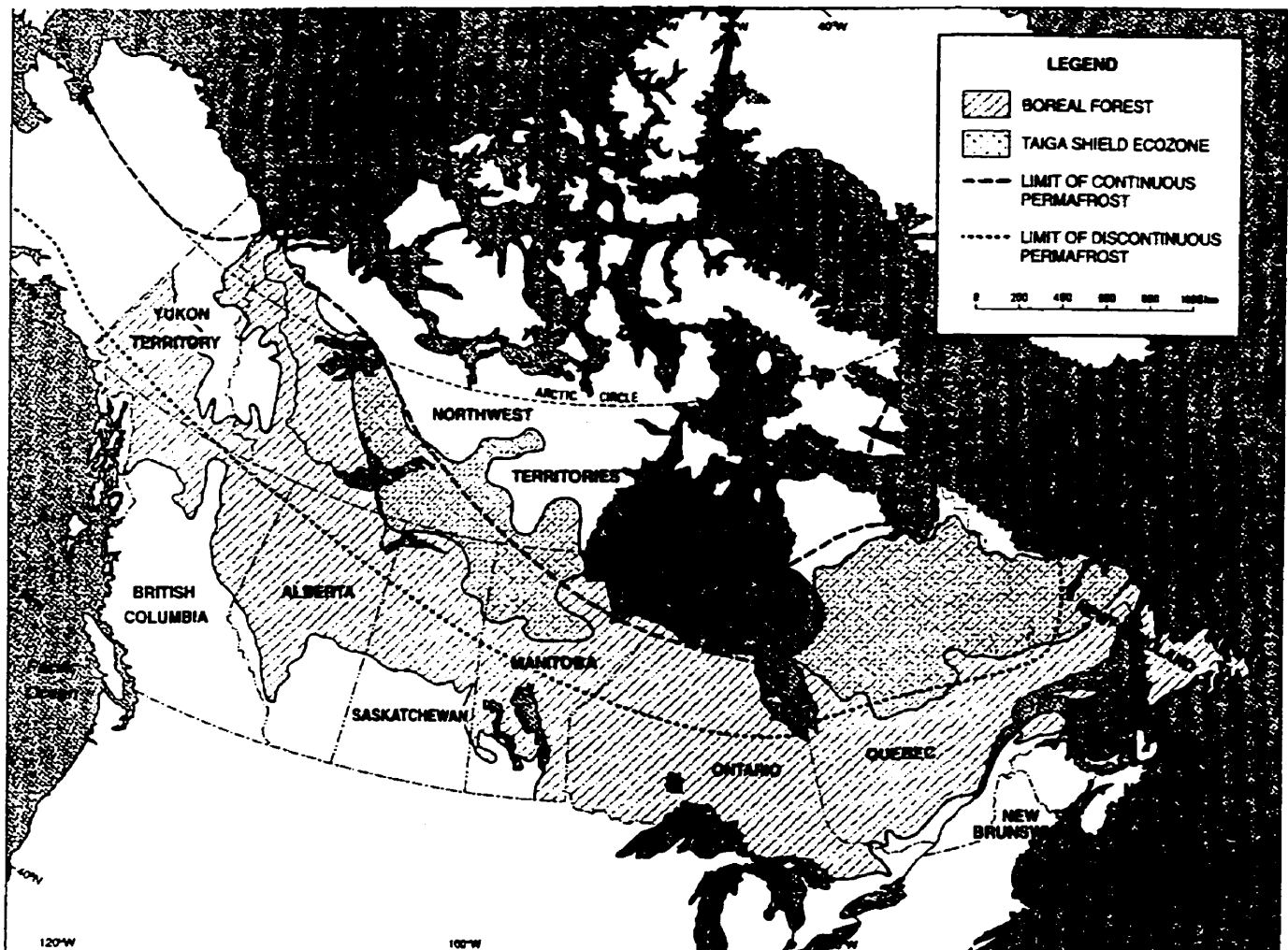


Figure 4-1: Extent of the Canadian Northern Forest (Bastedo, 1994, page 2)

The northern most edge constitutes the transition boundary between Northern Forest and the Arctic Tundra. Coniferous trees predominate in this portion. The southern edge is less defined and grades from a mixed-wood forest into deciduous woodlands (Cox and Moore, 1993; Larsen, 1980). The boreal subarctic climate is typified by severe winters and short, mild summers, with a great range in seasonal temperatures (Bailey, 1996). This range can reach 40 to 60 degrees centigrade between the warmest summer day and the coldest winter temperature (Strahler

and Strahler, 1992). Precipitation is greatest during the short summer season. While levels of precipitation are low during the winter, snow accumulates and covers the frozen ground throughout the long winter.

The Northern Forest is characterized by a mosaic of plant communities and age mixes that are the result of topography (for example, slope, and aspect), elevation, latitude, and disturbance factors. This patch-work composition is largely the result of ecological succession. Succession occurs when one community of plants and animals is replaced by another community. "Each successive community of species modifies the physical environment in a manner suitable for the establishment of a later community of species" (Christopherson, 1994, page 606). The process of succession is often induced by some sort of disturbance, such as fire, wind, snow, and some animal activities including insect or beaver damage. Today, fire is acknowledged as a natural component of most ecosystems, and plays a key role in Northern Forest ecology and community succession (Christopherson, 1994).

Plant species present in the Northern Forest are limited by the severe climate conditions. Coniferous trees are able to photosynthesize throughout the year, and can resist the desiccation usually caused by strong winds and extreme cold (Cox and Moore, 1993; Bastedo, 1994). Representative plants include: coniferous trees such as pine, spruce, fir, and larch; deciduous trees such as aspen, poplar, willow, and birch; shrubs such as gooseberry, raspberry, buffalo-berry, cranberry, and Labrador tea; wild flowers; herbaceous plants; lichens and mosses; grasses; and aquatic plants (Larsen, 1980). Animal species are also limited by the extreme climate. Representative animals include: carnivores such as wolves, lynx, wolverine, marten, otter, and weasels; omnivorous bears; herbivores such as moose, deer, bison, and caribou; numerous rodents including beaver, squirrels, voles, and mice; snowshoe hare; birds (migratory and non-migratory) including hawks, owls, eagles, grouse, and Whooping Crane; a few amphibians; and vast seasonal swarms of insects (Cox and Moore, 1993; Larsen, 1980). These insects are important pollinators as well as a key element in the food chain. The Northern

Forest is an important sanctuary for rich and diverse plant and wildlife populations, and represents a crucial refuge for the last remaining populations of endangered Woodland Caribou and Wood Bison, as well as being the breeding and nesting grounds for the entire wild, migratory population of Whooping Crane (Alberta Environmental Protection, 1998).

Slow moving streams and rivers, and various forms of wetlands comprise about one third of the total Northern Forest area in Alberta (Alberta Environmental Protection, 1998). These water systems create a particularly important resource for waterfowl and other migratory birds. The plants and animals within a wetland ecosystem have become specially adapted to this water regime. Bogs are the most common type of wetland in the Northern Forest. They are formed by the ongoing, slow accumulation of plant matter - especially Sphagnum moss - in basins, eventually forming peat. Peat bogs are acidic, and typically low in oxygen and readily available plant nutrients (Strahler and Strahler, 1992). The principle input of water is through precipitation (either rain or snow). Fens are another common wetland feature of the Northern Forest. While bogs generally have no flowing water, fens "are bathed in a shallow seepage of water that, though sluggish, is sufficient to flush out acids and maintain a relatively healthy supply of nutrients and oxygen" (Bastedo, 1994, page 194). The much less acidic environment of fens is favoured by sedges. A third type of wetland, marshes, are characterized by periodic flooding and drying. Lastly, beaver ponds, formed by dams "placed at some carefully selected hydrological bottleneck" (Bastedo, 1994, page 192), create diverse wetland ecosystems. Besides being complex life support systems, wetlands act as biological water treatment areas, filtering and purifying water. As well, they are able to absorb a tremendous amount of water from rain or snow melt, and allow for the gradual release of these flood waters.

4.2 Calgary Zoo Canadian Wilds Project and the Northern Forest Section



Figure 4-2: *Interpretive Sign: Northern Forest - A Representation of the Boreal Forest Ecosystem*

The areas or sections comprising the Canadian Wilds at the Calgary Zoo are interpreted environments. The Northern Forest section of the Canadian Wilds in particular, is a re-creation of a unique environment that for many people may not otherwise be easily accessed and experienced. Southworth (1992) defines an interpreted environment or landscape such as the Northern Forest exhibit as a “place, natural or urbanized, that is intentionally designed to help users understand something about that place, such as its history, ecology, processes, or culture” (pages 4 - 5). Further, Southworth (1992) points out that

interpreted environments provide a type of experiential learning that has many values. They can help us understand the environment and culture we are in and our place in it. They can also help us use our

environment and can provide a sense of place, or rootedness. It is authentic and relevant to life as lived, since it takes place in a real place with real activities (page 6).

There is an extensive amount of information available for anyone interested in the environment including: books and magazines; a wide variety of nature shows on television; interactive computer programmes about plants, animals, and ecosystems; and vast amounts of environmental information on the internet. However, this information does not usurp the importance of first-hand contact. Nothing compares with actually seeing animals, watching them interact, noticing the smells, listening to the sounds, etc.

That experience is unique and always will be unique. I don't think that you can ever compete with the real thing. To see a moose standing there and realize just how big the antler rack really is, or to look at the water trickling from the beaver dam, or the aspen bloom at this time of year, or the smell of those Christmas tree wood chips in amongst the spruce - it smelled like a spruce forest in the middle of the city. Those are the things that you can't get off the internet, you can't get from a National Geographic show (Peterkin, Person. Comm.; Rodman, Person. Comm.).

In other words, the Northern Forest exhibit and other areas of the Zoo provide a hands on, sensory experience of nature in the middle of the city. Southworth (1992) suggests that there is some danger in over-interpretation which reduces opportunities for individual discovery, exploration, and experiences. Instead, it is very important to "lead people to intriguing features and to suggest options, than to exhaustively explain and lecture" (page 7).

Following is a brief list of some of the components of the Calgary Zoo's Northern Forest exhibit (Information from Russ Rodman, Manager of Planning and Design).

The Northern Forest:

- covers approximately 10 acres;
- has 3,475 trees (50 larch, 1875 aspen, 100 birch, and 1450 spruce);
- has 3250 shrubs;
- includes 100 dead trees;
- contains 30 species of aquatic plants for the wetlands;

-
- provides drainage for all of the Canadian Wilds sections through the wetland systems, which approximate 2.5 acres of natural storm water treatment;
 - has 10 species of grasses;
 - required 5000 m³ of sand and top soil for the pastures in the animal enclosures;
 - needed 115,000 m³ of clay fill arranged around the entire site;
 - provides 1.75 km of main and secondary pathways and trails (the base preparation for the paths was done with recycled concrete and asphalt); and
 - has a “slate” roof on the Northern Forest Visitor Centre made of 100% recycled tire.

The pathways through the Canadian Wilds at the Calgary Zoo are intended to simulate the experience of walking along a nature trail. The idea is to bring visitors closer to “nature” and allow them to experience first-hand the sights, sounds, and even the smells of some of the plants and animals of the particular ecosystem that is being represented. As well, non-traditional barriers were used wherever possible. This design approach is known as landscape immersion. Plant species were selected for the section that are both native to the Northern Forest, and, grow well in Calgary’s climate. The interpretive signs on the pathways are placed to draw the visitors’ attention to animals, features, details of interrelationships between plants, animals, and their environments, as well as the diversity, complexity, and fragility of the natural system. The following photos (figures 4-3, 4-4, and 4-5) illustrate some examples of the Canadian Wilds interpretive signs.

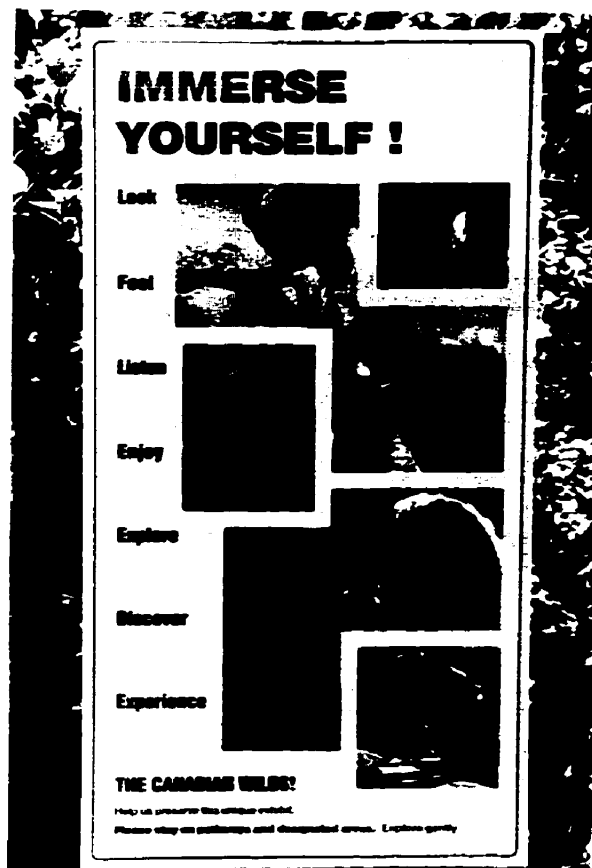


Figure 4-3: Interpretive Signs: Welcome to the Canadian Wilds - A Place of Discovery; and Immerse Yourself



Figure 4-4: Interpretive Sign: Aspen Woodlands; and a Great Horned Owl

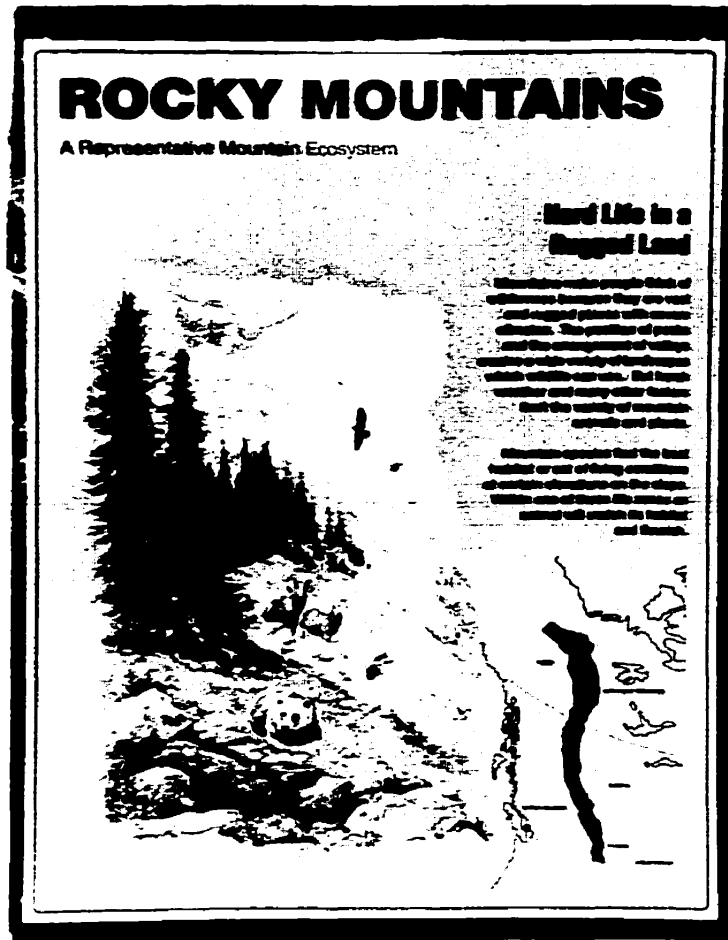


Figure 4-5: Interpretive Sign: Rocky Mountains - Hard Life in a Rugged Land

The routes for the pathways are designed to create the feeling of walking through large natural areas (see site plan on page 81). This is accomplished by having switchbacks and viewpoints that visitors cannot see from other locations on the pathway. Pathway vistas attempt to create the best vantage points “from which beauty may be seen and comprehended...and to do all that discreetly may be done to establish a mood, or sympathetic atmosphere” (Tilden, 1977, page 85). The Canadian Wilds paths lead visitors past animal enclosures, points of interest, specific features, and scenery. Zoo visitors can move through the areas at their own pace, and spend as much or as little time as interests them. The following are some general rules that Veverka (1994) recommends for the design of nature trails, but they can apply equally well to the context of paths through individual Zoo sections.

-
- For visitor comfort and maintaining the interest of the visitor, the ideal trail or path length is between 800 - 1200 meters (1/2 - 3/4 miles).
 - Accessibility is an important consideration, both in relation to where the greatest number of people are, as well as for varying levels of mobility.
 - A total of seven to ten 'stops' is best. Again, visitors are there to enjoy themselves. Too much information may overwhelm, confuse, and discourage learning.
 - A loop design will ensure that visitors end up close to where they started.
 - Provide places for people to stop and enjoy the vista, or rest.
 - Have a recognizable starting point.
 - Plan each of the stops to illustrate some aspect of the main theme.

With regards to these recommendations, the total path system through the Northern Forest exhibit exceeds the length suggested above. The main paths are paved and do provide good access for visitors with strollers, wagons, and wheelchairs. Rather than having information concentrated in predetermined 'stops' as Veverka (1994) suggests, interpretive signs and viewing lookouts in the Northern Forest area are dispersed throughout the section. There are a few benches for visitors to stop and watch the animals or rest, otherwise, they have the option of going into the Northern Forest visitor centre. Comments from many visitors surveyed for this project indicated that *the Canadian Wilds and the Northern Forest section do not have easily recognizable starting points*. Lastly, the interpretive information in all of the Canadian Wilds sections does relate aspects of the main theme for each area. This main theme referred to by Veverka (1994) should be easily summarized in a statement that represents the central or main story best suited to the area or site. A theme may reflect biological, geological, cultural, or historic features. According to Veverka (1994), the importance of the main theme is that it provides a structure, or framework for the development of the interpretation messages, resulting in clarity and continuity. The main theme is typically quite general, whereas the individual stops along a trail, as well as programming subjects, can be much more specific. As Veverka (1994) states, one way of clarifying or assessing the main theme is to determine

the one thing above all others that you want the visitor to remember after leaving the site. While this represents the most important theme, there will be other sub-themes or concepts that illustrate and expand on this point. The main theme for the Calgary Zoo in general is to have the visitor leave with a greater appreciation for the natural world, and instill in them the desire to do something for the natural environment, and for conservation (Peterkin, Person. Comm.; Rodman, Person. Comm.). Specific sections of the Zoo, such as the Northern Forest section in the Canadian Wilds, will have particular sub-themes and concepts reflected in the natural history interpretation.

In the broadest context, the sections in the Canadian Wilds are composed of various exhibits. Exhibits can be effective educational tools that tell a story about the interpretive subject or area and consist of “an array of cues purposely brought together within defined boundaries for a desired effect” (Veverka, 1994, page 124). They can include real objects as well as illustrations, photos, and text. While exhibits are primarily visual in form, they can also incorporate sound, smell, or touch. An exhibit is considered interpretive “if it makes the topic come to life through active visitor involvement and extreme relevance to the everyday life of the viewer” (Veverka, 1994, page 125). Some exhibits reduce broad subjects or themes to a much smaller size, sometimes small enough to be brought indoors, or enlarge the tiny in order to tell the story of the smallest subjects (Dun, 1991). As with all other applications of interpretation, exhibits must provoke the visitor’s interest and curiosity, relate to the lives and experiences of viewers, reveal information, and portray a part of the main theme of the interpretation (Veverka, 1994). In the Zoo context, the following photos illustrate some examples of large-size exhibits in the Northern Forest section of the Canadian Wilds consisting of animal enclosures and re-creations of various northern forest features. Figure 4-6 illustrates the entrance to the Northern Forest section with a depiction of an old growth ‘endless evergreen’ forest. Visitors next encounter the peat bog area and muskeg interpretive sign shown in figures 4-7 and 4-8. Figures 4-9 through 4-12 identify and portray the various forest succession stages that

illustrate the diverse mosaic of the Northern Forest. Here, visitors move from a depiction of a fire disturbed area through re-creations of forest succession stages until they are back in an old growth forest. Animals represented in this part include the Woodland Caribou and Moose (figure 4-13). Beavers are among the few species other than humans that can greatly modify their surrounding environment. An example of their natural activity and dam building can be seen in figure 4-14. Lastly, visitors encounter the Whooping Crane enclosure (figure 4-15), and a riparian forest surrounding a wetland (figure 4-16).



Figure 4-6: Entrance to the Northern Forest Section



Figure 4-7: *Re-creation of a Northern Forest Black Spruce Peat Bog*

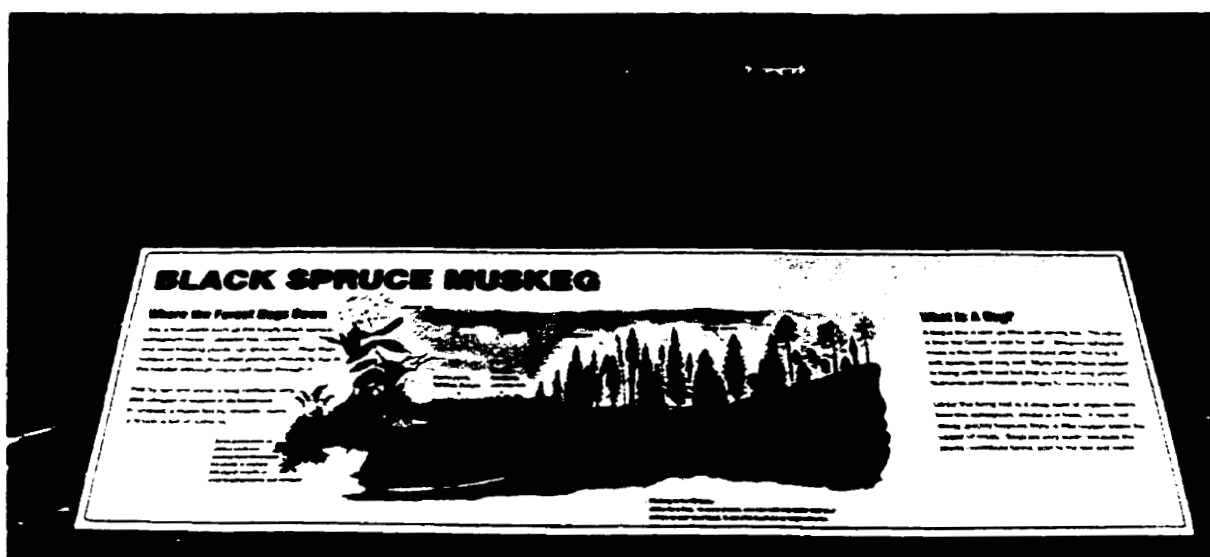


Figure 4-8: *Interpretive Sign: Black Spruce Muskeg*

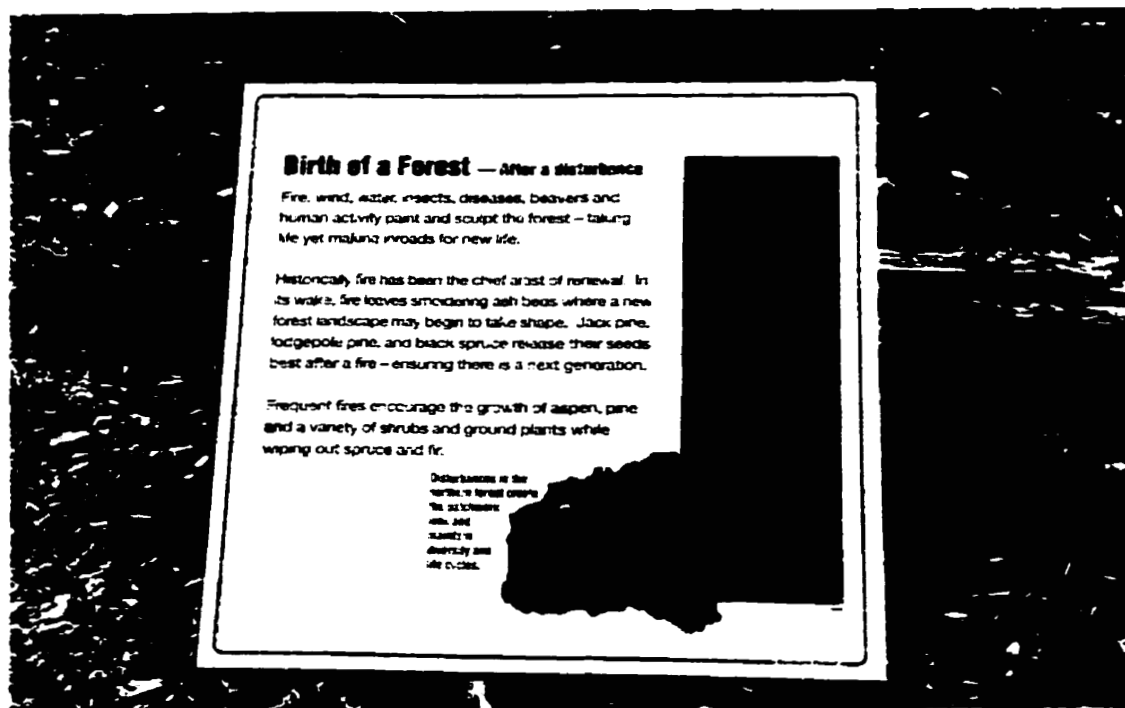


Figure 4-9: Interpretive Sign: Birth of a Forest - After a Disturbance



Figure 4-10: Interpretive Sign: The Rhythm of Life - A Tapestry of Stages

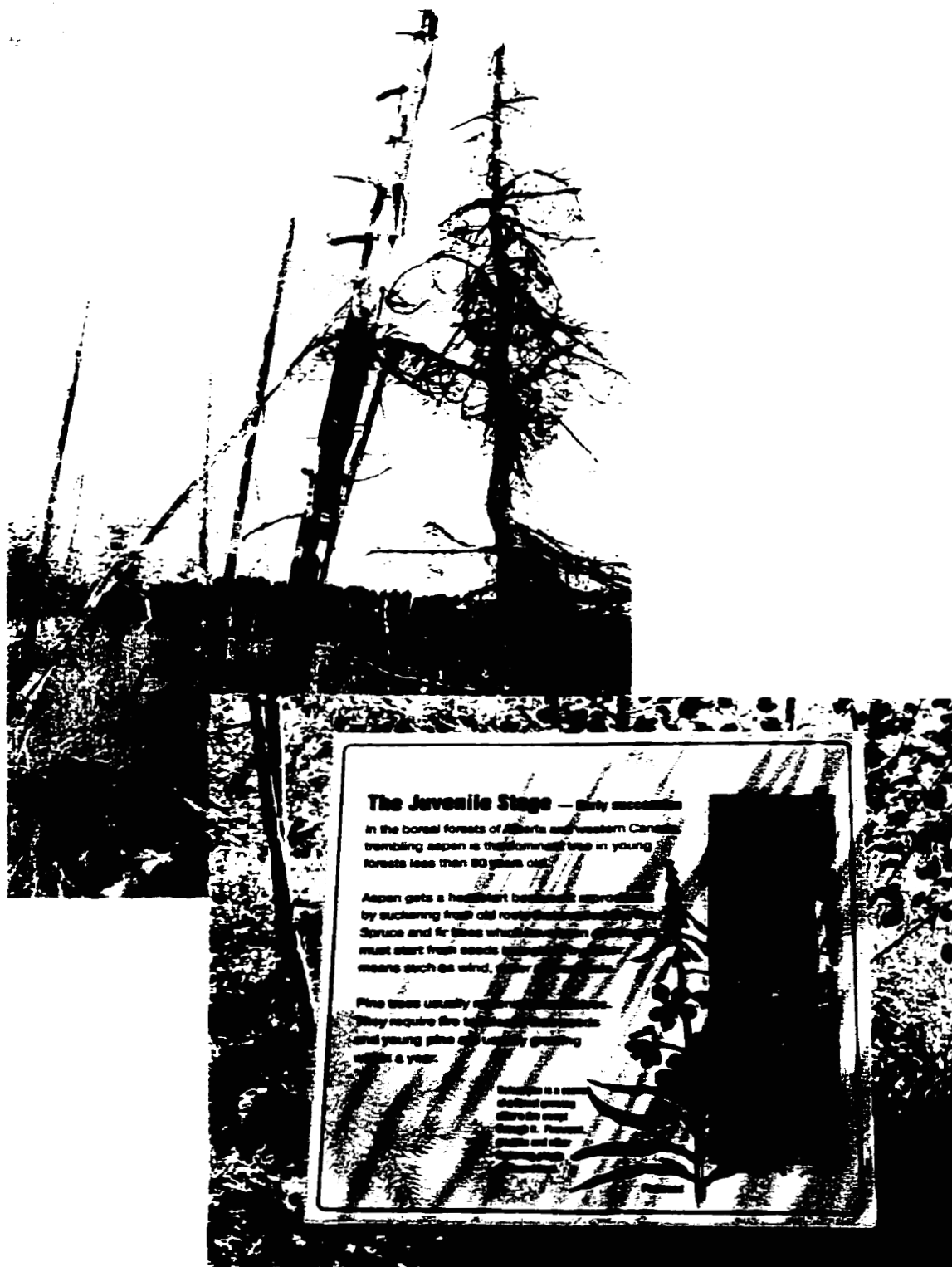


Figure 4-11: Re-creation of a Forest Area After a Disturbance; and Interpretive Sign: The Juvenile Stage - Early Succession

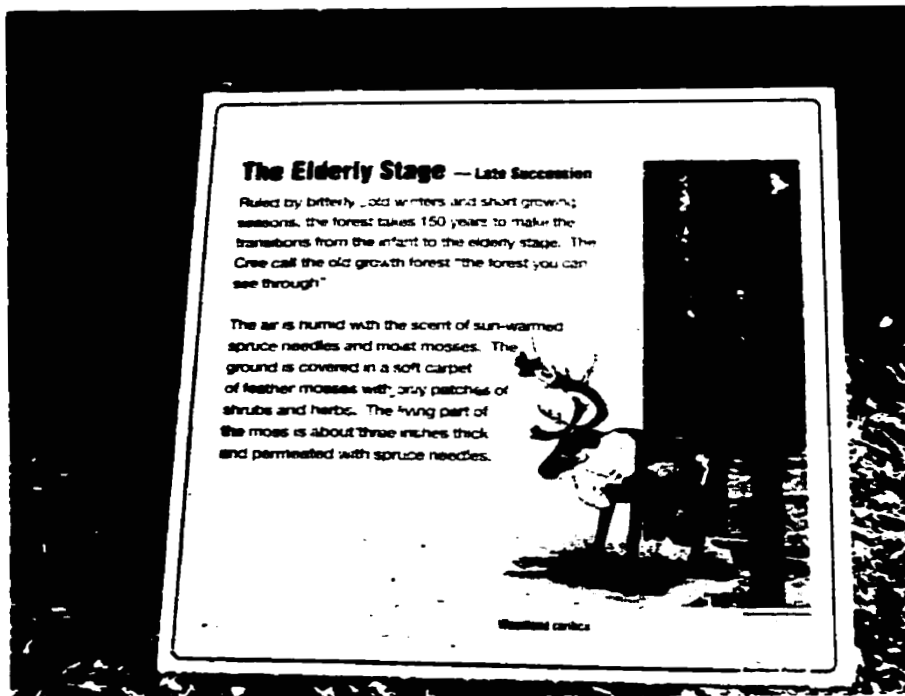
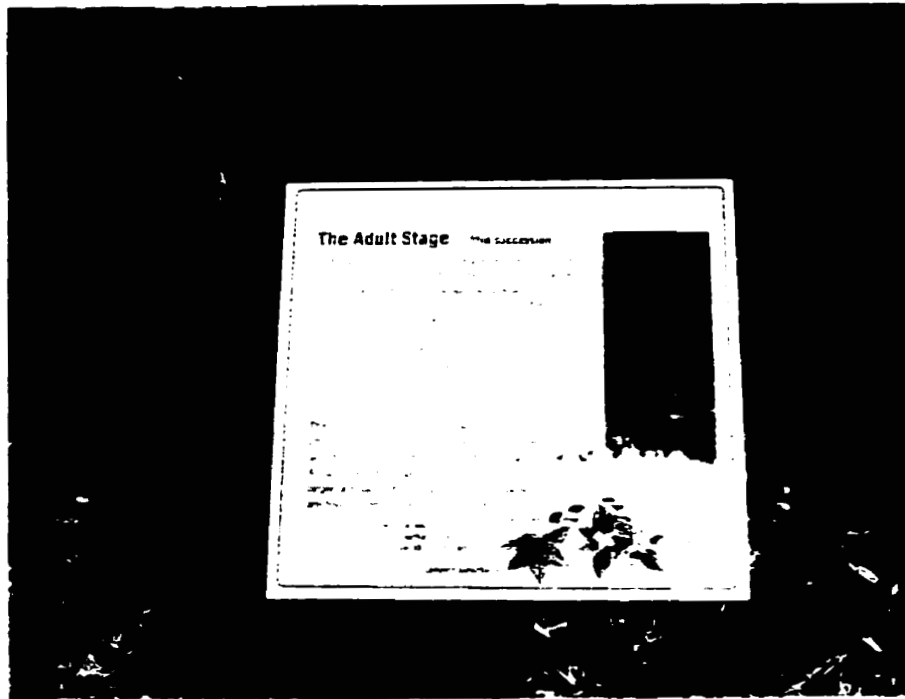


Figure 4-12: Interpretive signs: The Adult Stage - Mid Succession; and The Elderly Stage - Late Succession

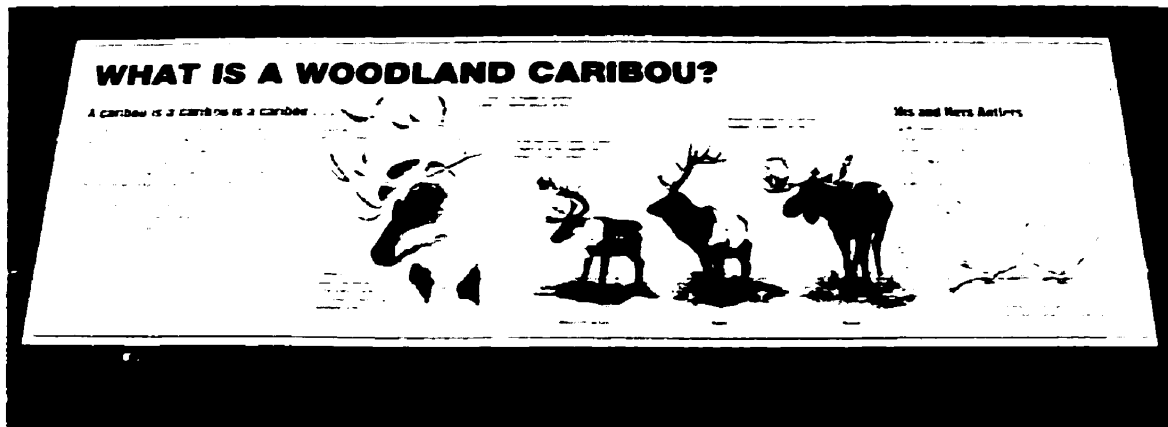


Figure 4-13: Interpretive Signs: What is a Woodland Caribou; and Moose - the Largest Living Deer

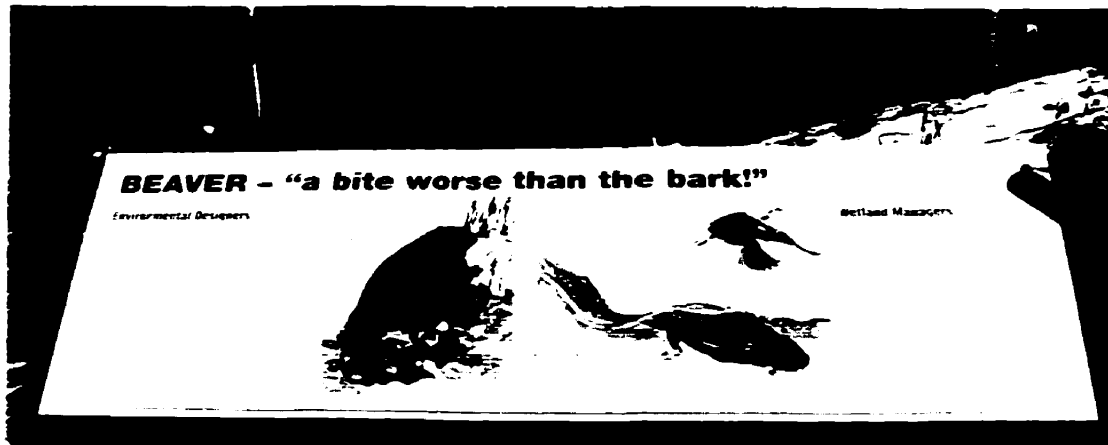


Figure 4-14: *Interpretive Sign: Beaver - A Bite Worse than the Bark; and a view of a Beaver Pond with Dam, showing a Beaver Behaviour Nature Note*

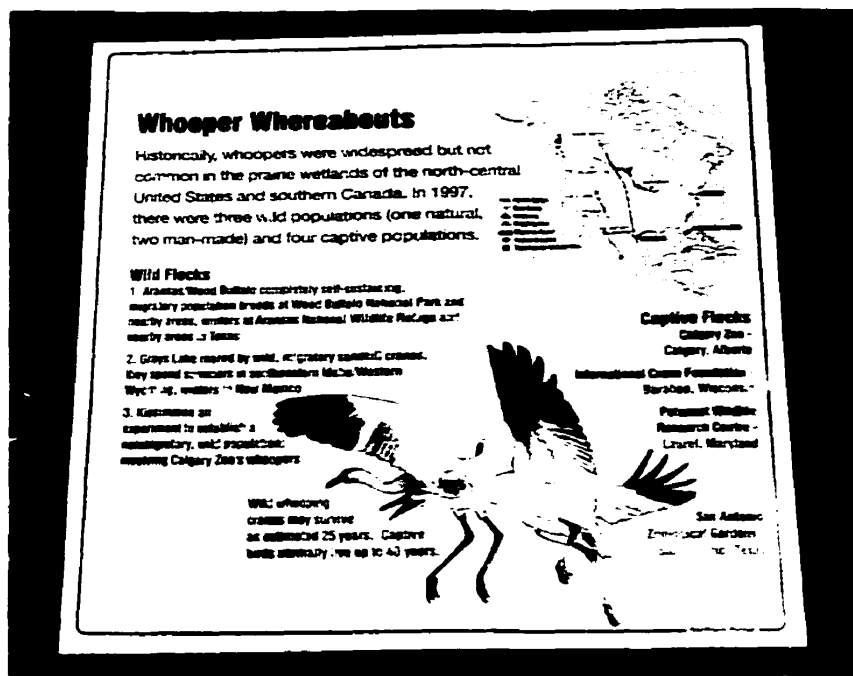


Figure 4-15: Interpretive Signs: Whooping Crane - Something to Whoop About; and Whooper Whereabouts





Figure 4-16: Interpretive Signs: Riparian Forest - Riverside and Streambank Woodlands; Preserving Wetlands; and Wetlands

Small-size exhibits include touch tables set up by individual docents, and displays inside the visitor centre - the Northern Forest Lodge (figure 4-17). The visitor centre in the Northern Forest section has a number of functions. The design was intended to complement the surroundings and outdoor exhibits. At the entrance to the building is an enclosure housing Canada Lynx. Once inside, visitors have above and below-water views of the Canadian Beaver and River Otter enclosures, and a view into another enclosure that can house a Northern Forest bird or animal. The building also provides access to washroom facilities, has indoor and outdoor food services, serves as a refuge from the weather, and is a location for educational programmes and special functions.



Figure 4-17: View of the Northern Forest Lodge

There are two permanent outdoor amphitheatres in the Canadian Wilds, one in the Rocky Mountain section near the Mountain Goat exhibit, and the other in the Northern Forest section at the Whooping Crane exhibit (figure 4-18). These are often used during the summer months for outdoor seasonal interpretive programming. At any other time, these areas can be used by docents, or by the public for animal observation, resting, and, weather permitting, as a picnic site.



Figure 4-18: Outdoor Amphitheatre at Whooping Crane Enclosure

It is often possible for Zoo visitors to view non-Zoo wildlife. Many wild animals (such as: fox; hawks; osprey; bald eagle; song birds; water fowl; mink; hares; and bats) can be seen visiting the Zoo grounds, including this great blue heron (figure 4-19).

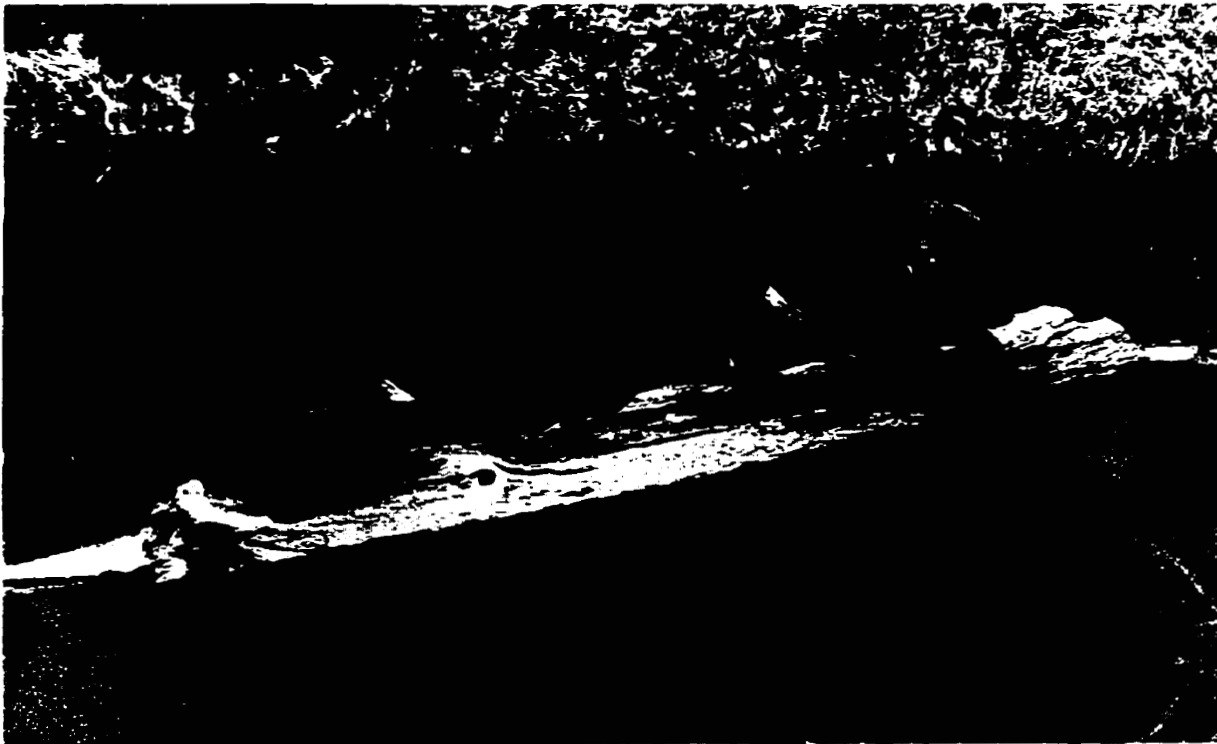


Figure 4-19: Wild Great Blue Heron Fishing in Northern Forest Wetlands

Chapter 5

*It is generally recognized that people retain about
10 percent of what they hear,
30 percent of what they read,
50 percent of what they see, and
90 percent of what they do.
(Lewis, 1994, page 27)*

5. The Process of Interpretation Design

This chapter begins with a general examination of interpretive planning and design principles. The next sections of the chapter focus on the Calgary Zoo and include: identifying the people and departments involved in the planning and design of the Northern Forest Section; a discussion of the Northern Forest Advisory Task force; and a synopsis of the goals, objectives, and expectations developed for the Northern Forest educational story-line. Information from this synopsis was used as the basis for the assessment of the success of the natural history interpretation.

5.1 Interpretive Planning and Design Principles

5.1.1 Interpretive Planning

Determining and defining goals and objectives is a component not only of natural history interpretation planning but of planning in general. It is important to understand the differences between goals and objectives. As Veverka (1994) states, goals are general statements that are not necessarily specific or measurable, while objectives are specific statements that are generally measurable. There are several general goals inherent in natural history interpretation including developing a knowledge and awareness of the environment, as well as a sensitivity to environmental issues and problems.

A goals framework for the development of natural history interpretation programmes that ultimately aim to change attitudes and behaviours towards the environment has been advanced by Knapp, Volk, and Hungerford (Knapp, 1995;

Knapp, Volk, and Hungerford, 1997). They developed and refined their model through a process of: literature reviews; a synthesis of interpretive principles, goals, and objectives; and an analysis of validated learning theories. This model consists of the following three sets or levels of goals.

1. **ENTRY LEVEL GOALS** - Information and experiences that:
 - advance environmental awareness through ecological, natural history, or cultural information;
 - promote understanding through experiences by allowing visitors to conceptualize ecological and human interrelationships;
 - encourage comprehension of current environmental concerns as well as management policies affecting the environment; and
 - aid the development of a sensitivity and appreciation towards the environment that would also serve to enhance the visitors' enjoyment of the site.
2. **OWNERSHIP GOALS** - Information and experiences that:
 - raise an awareness of the environmental effects of human actions and activities, and the consequences or issues that can result from these interactions; and
 - promote the ability to identify, assess, and analyze the social, cultural, economic, and ecological contexts of these and other environmental issues.
3. **EMPOWERMENT GOALS** - Information and experiences that:
 - encourage the aptitudes necessary to become involved in determining options and solutions to environmental issues;
 - help in evaluating the cultural implications of these options and solutions; and
 - promote the use of this information to implement these positive actions to environmental issues.

Knapp (1995, page 22) points out that the “most powerful use of the above model is to offer interpretive experiences that represent all three variable levels in a sequential hierarchical order. Although this may not assure attitude or behavior change in the visitor it does offer opportunities to stimulate this change.”

Veverka (1994) lists three examples of interpretive objectives: learning objectives (i.e. what you want the visitor to learn); behavioural objectives (i.e. what you want the visitor to do); and emotional objectives (i.e. what you want the

visitor to feel). There can be several levels of objectives (Veverka, 1994) beginning with one or more general or overall objectives. An example of this could be the mission statement of an organization like a park, museum, historic site, or zoo. The next level would consist of more specific interpretive objectives, while the final level finishes with individual programme objectives. The following illustrates this hierarchy as it relates to an organization such as the Calgary Zoo.

**MISSION
STATEMENT:**

The Mission of the Calgary Zoological Society, in partnership with the city of Calgary and its citizens, is to develop, operate and promote an integrated zoological, botanical, prehistoric park, and conservation centre, for the combined purposes of conservation, education, recreation and scientific study. With regards to the general Zoo public, most visitors will have enjoyed a multifaceted educational and recreational experience.

**EDUCATION GOALS
AND OBJECTIVES:**

Most visitors will leave the zoo with a greater empathy and appreciation for the natural world, and a greater interest and desire to do something for the natural environment, and for conservation.

**SPECIFIC EDUCATION
GOALS AND OBJECTIVES
FOR THE CANADIAN WILDS:**

Most visitors will develop an awareness of everything that we have in this part of the world (specific species and spaces), and develop a greater understanding of the uniqueness of wild Canada (especially Western Canada) and the urgent necessity for the preservation of these ecosystems.

**NORTHERN FOREST
EXHIBIT GOALS AND
OBJECTIVES:**

Most visitors will see the importance of forest succession, how different animals relate to the forest succession stages, and the need to have all of these different stages (a mosaic) for the system to work properly.

As with all planning processes, including interpretation, there are many factors that affect the implementation of a successful design. For this reason, the approach should be based on the combined efforts of an interdisciplinary planning team, involving various specialists who can bring their professional expertise to the process (Sharpe, 1976; Dun, 1991). A universal planning model tends to be sequential, iterative, and continuous, with the phases leading from one step to another in a progression from the general to more specific, and with a need for input and feedback throughout the process to provide for revision and improvements (Sharpe, 1976). As Sharpe (1976) points out,

no general review of planning can cover all the problems one will undoubtedly be confronted with when developing an interpretive plan. In applying the basic planning concepts there is ample room for latitude in adjusting the process, objectives, and format of information. Each planning context will differ depending on the area, the interpretive theme, the time, staff, available expertise, and of course, funds. By adhering to a systematic planning process the interpretive planner should develop programs which reflect the best knowledge of an area and lead to a quality interpretive experience (page 75).

The following figure (5-1) has been based on the planning model described by Sharpe (1976, pages 66 - 75) and illustrates the steps involved in a general interpretive planning process.

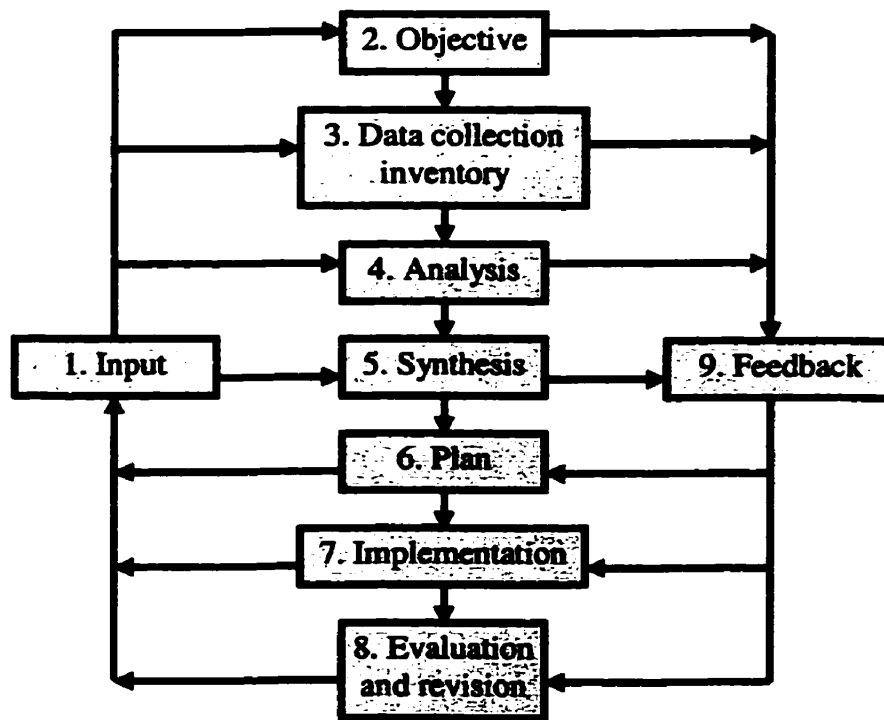


Figure 5-1: Interpretive Planning Process (Sharpe, 1976)

1. Input – Develop a plan and guidelines for the objectives relevant to the interpretation subject. Once this general interpretive plan has been completed, the planning process starts to define and detail the themes and issues for each interpretive objective.
2. Objective – Every objective has an identified purpose, implications, and a suggested course of action for implementation.
3. Data collection inventory – Resources and amenities are identified (these can be manmade or natural), and basic information is compiled for the interpretation component. Prerequisites in terms of management decisions, staff, budget, facilities etc. are compiled. Information at this step would indicate any requirements for more inputs or acquisitions.
4. Analysis – Assembles and integrates the separate descriptions from the inventory step into the context of the whole plan. This step also considers potential interpretive themes and possible media and presentation considerations. Media includes all personal and non-personal methods of communicating with visitors such as pamphlets, maps, signs, talks, presentations, and programmes. At the end of this stage, there should be an accurate concept of the specific area and an understanding of the application expectations for the project.

-
5. **Synthesis** – With the stated project expectations in mind, this step reviews the objectives, inventory, and analysis steps, develops the components of the interpretive programme, and assesses alternative courses of action with possible implications. Ideally, the best course of action would combine the optimum combination of interpretive technologies to deliver the interpretive messages most effectively. A decision-maker would have a selection of plans that conform to the originally stated objectives, and can choose a final course of action.
 6. **Plan** – This step is focused on the chosen course of action, and guides the operations for implementation. Any necessary revisions are made to the interpretive plan, and all required formalities are completed.
 7. **Implementation** – The sequence of actions determined by step 6 is implemented and the necessary funds are allocated. By following the detailed planning process, the implementation effort should be well organized.
 8. **Evaluation and Revision** – Monitoring or assessing the impact of the interpretive programme helps to insure that the desired objectives are being met. Periodic analysis provides information to evaluate, revise, or reinforce the interpretive plan.
 9. **Feedback** – The results of the evaluation and revision at various steps can be used to make improvements or rectify deficiencies in the particular programme and can also be used to revise and improve the planning process for future applications.

Sharpe (1976) recommends that there should be some sort of public involvement during all stages of the planning process as “the plan should not be a surprise to those who are supposed to benefit from it” (page 16). Others in the interpretive planning field have developed models or frameworks that are similar to the one described above. For example, the following figure (5-2), from Veverka (1994, pages 26 - 27), provides an illustration of the components involved in the interpretive planning process.

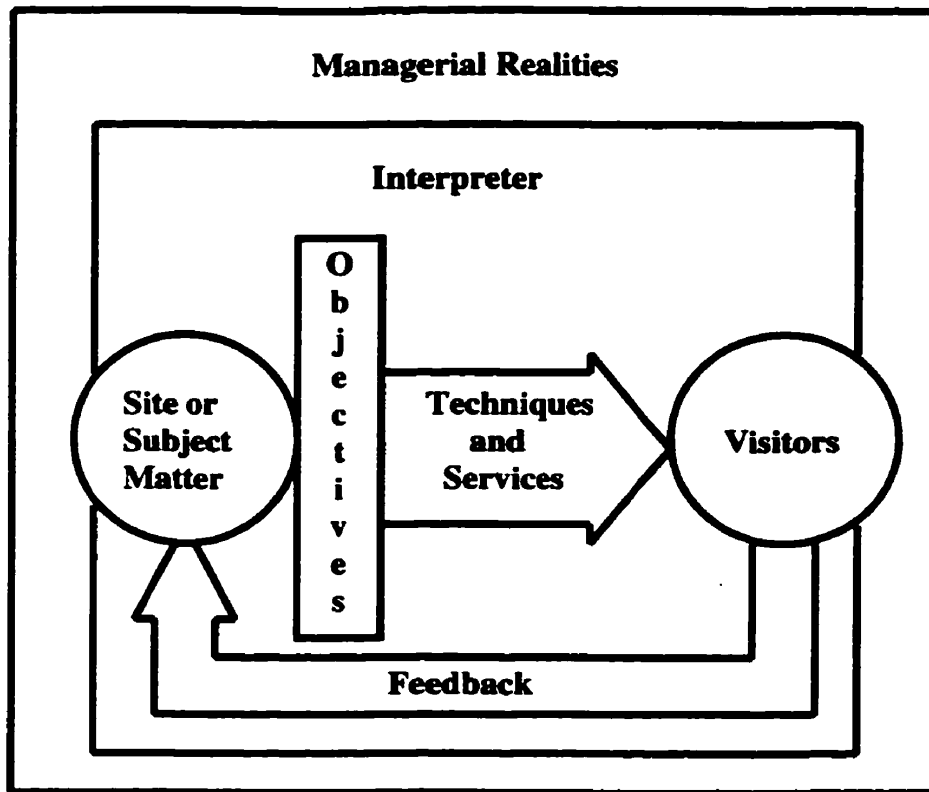


Figure 5-2: Interpretive Planning Process (Veverka, 1994)

- **Site or Subject Matter** - refers to what will be interpreted.
- **Objectives** - list the desired outcomes, or, what the interpretation hopes to accomplish.
- **Techniques and Services** - refer to the possible choices of media and programme presentation.
- **Visitors** - are the audience, and are the very reason for the interpretive effort. Knowing who the visitors are, for example, their background, interests, motives, and expectations, are important considerations.
- **Feedback** - will indicate if the goals established in the objectives stage have been accomplished. Evaluation, revision, and improvement to a programme relies on feedback. If the goals have not been accomplished, the problem could be that the objectives were not realistic or reasonable, or the choices of techniques were inappropriate.

- The first box around all the elements represents the interpreter. Each interpreter brings a unique set of experiences, knowledge, and skills to the process.
- The largest box surrounding all the process elements represents all the circumstances and considerations that affect the planning, design and implementation of an interpretive programme. These Managerial Realities include budget, time constraints, resources, and availability of qualified staff and specialists.
- The final consideration of this process involves the actual implementation and operation of the final programme (Veverka, 1994, pages 26 - 27).

Veverka (1994, pages 32 - 34) has clarified this interpretive process into a planning model (figure 5-3) that appears simple and suitable for a variety of interpretive applications.

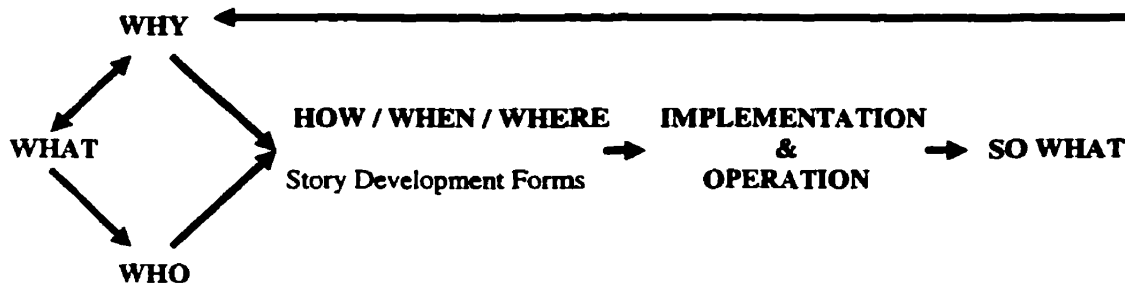


Figure 5-3: Interpretive Planning Model (Veverka, 1994)

- **WHAT** - refers to the subject of the interpretation, as well as the theme and sub-themes.
- **WHY** - is derived by identifying what specific objectives the interpretation should accomplish.
- **WHO** - represents the audience or the visitors to the site.
- **HOW / WHEN / WHERE** - are the practical considerations relating to the presentation of the interpretation and services.
- **IMPLEMENTATION & OPERATION** - includes the constraints of time, resources, budget, and people necessary to implement all of the components of the interpretation plan.
- **SO WHAT** - involves the evaluation of the components of the plan to determine whether or not the desired interpretive objectives are being met.

Interpretive planners should ask themselves what reason a visitor would have to learn the information that is being presented. If the information does not relate to the visitor (i.e. if the visitor has no reason to learn the information), then visitors will not come through the area, and if they do, they will not likely retain the information (Tilden, 1977; Veverka, 1994). Following a detailed and thorough planning process helps to ensure that relevant information is not left out of the natural history design.

Social science research methods can be integrated into a planning model or framework in order to facilitate evaluation or analysis. Some of these are listed below.

- **Front-end analysis (pre-installation, context, feasibility analysis).** This takes place before the programme starts, to provide guidance in its planning and implementation.
- **Evaluability assessment.** This assesses the feasibility of evaluation approaches and methods.
- **Formative evaluation (developmental, process).** This provides information for programme improvement, modification and management prior to implementation.
- **Impact evaluation (summative, outcome, effectiveness).** This determines programme results and effectiveness, especially for deciding about programme continuation, expansion, reduction, and funding.
- **Programme monitoring.** This checks for compliance with policy, tracking of services delivered, and counting of clients.
- **Evaluation of evaluation (secondary evaluation, meta-evaluation, evaluation audit).** This includes critiques of evaluation reports, re-analysis of data, and external reviews of internal evaluations.
(Evaluation Research Society, in Robson, 1993, page 178)

Other, more detailed types of evaluation or analysis can be specific to individual applications. These can include the following items.

- **Awareness evaluation - Who knows about the programme? What do they know?.**
- **Cost-benefit evaluation - relation between programme costs and benefits (benefits expressed in monetary terms).**

-
- Cost-effectiveness evaluation - relation between programme costs and benefits (benefits expressed in non-monetary terms).
 - Criterion-referenced evaluation - extent to which specific objectives have been achieved at the desired level of attainment (i.e. a standard on which a judgment may be based).
 - Quality assurance - are minimum and accepted standards being routinely and systematically provided? How can quality be monitored and demonstrated? (Robson, 1993, page 178)

This project included aspects of both formative evaluation and impact evaluation regarding the Northern Forest section of the Canadian Wilds. The formative or process evaluation was concerned with illustrating the many steps and stages involved in planning and developing the educational content for the natural history interpretation of the Northern Forest exhibit. The impact or outcome evaluation focused on assessing the effectiveness of the planning process by surveying the extent to which the interpretive goals, objectives, and expectations were achieved.

5.1.2 Interpretive Principles

An interpretive programme is an educational programme, usually outside of the context of the formal education system. Visitors are the principal reason for the interpretive programme, therefore, visitor characteristics such as age, education, and cultural background form an important component in establishing the content and information level of an interpretive programme (Sharpe, 1976). Visitors may come to a museum, park, or zoo for recreation or enjoyment, as part of a school field trip, or as tourists. Whatever the reason for the visit, most visitors are interested in having a social and recreational experience. As Veverka (1994) says, "in this light, learning about the environment, animals, history, or any other topic becomes, for the visitor, another recreational opportunity" (page 2). Therefore, the real challenge of interpretation is to educate and enlighten the public in a way that is both entertaining and authoritative (Sharpe, 1976). It is important that the information contained in any interpretation is kept within the time and interest span of the visitor if it is to succeed (Brown, 1971). In order to achieve the desired objectives, the process of interpretive design should answer

the questions who (the visitor or audience); what (the subject or theme); why (education, inspiration, action); where (the area or site being interpreted); and how (information delivery). Several basic interpretation principles have been proposed by Sharpe (1976, pages 45 - 55).

BASIC INTERPRETIVE PRINCIPLES

1. VISITORS AND LEISURE SETTINGS ARE DIVERSE:

The interpretive planning process would be much simpler if all natural history information was directed to the "average visitor". However, as visitors and settings are diverse, there is no such thing in reality as an average visitor. Factors such as age, educational background, personal interests, experiences, and individual objectives differ greatly and need to be considered.

2. THE NEED FOR A RELAXED, ENJOYABLE, AND INFORMAL ATMOSPHERE:

Many visitors simply want to enjoy a recreational or leisure outing. In addition, there will likely be a mix of first-time, and regular or repeat visitors to an area. Visits to parks, historic sites, museums, and zoos are generally voluntary. As well, the visitor is often part of a social or family group. Under these circumstances, visitors expect these settings to promote a relaxed, enjoyable, and informal experience. However, the demands of accommodating larger numbers of people can shift the experience to a more formal feeling through impersonal signs, lectures to large audiences, static displays, or automated audio-visual stations. While these methods of interpretation do play an important role, personal and informal contacts between staff, interpreters, or education volunteers and the public are generally the most rewarding.

3. INTERPRETIVE INFORMATION MUST BE REWARDING TO VISITORS:

It is an accepted aspect of human behaviour that people continue to do the things they receive the most enjoyment and reward from. This fact should not be overlooked in natural history interpretation, or the quality of visitors' experiences as well as the level of knowledge gained can be decreased. Research has indicated that one important interpretive factor that enhances a visitor's interest and experience is participation or involvement. Participation or direct involvement serves to increase the level of information retention. An example would be an exhibit that allows for individual manipulation and participation.

4. INTERPRETIVE INFORMATION MUST BE EASILY UNDERSTOOD:

The choice of words used in interpretation is extremely important. To be effective, information, concepts, and examples must be communicated using a vocabulary that is within the experience and understanding of the visitor. Ideally, the information, concepts, and examples should be based on familiar experiences that the visitor can readily identify with. Interpretation that includes cause and effect relationships, and provides relevant background information assists in the understanding of natural phenomena, environmental concepts, and current issues. The presentation of interpretive material can be directed towards specific groups, for example, elementary school children.

5. FEEDBACK IS INDISPENSABLE:

Feedback is information or signals from visitors that gives an indication of the effectiveness of the interpretation and whether or not the planned objectives are being achieved. Ideally, mechanisms for feedback, evaluation, and improvement should be incorporated into the interpretive design, and emphasized in the planning stages.

Freeman Tilden (1977, pages 9 - 54) developed the following six principles of interpretation that still form the accepted basis for the design and planning of interpretive programming today:

SIX PRINCIPLES OF INTERPRETATION

1. ANY INTERPRETATION THAT DOES NOT SOMEHOW RELATE WHAT IS BEING DISPLAYED OR DESCRIBED TO SOMETHING WITHIN THE PERSONALITY OR EXPERIENCE OF THE VISITOR WILL BE STERILE:

Interpretation must relate to the interests, ideals, concerns, personality, and the experience of the visitor. As Tilden (1977) states, "the visitor ultimately is seeing things through his own eyes, not those of the interpreter, and he is forever and finally translating your words *as best he can* into whatever he can refer to his own intimate knowledge and experience" (page 14).

2. INFORMATION, AS SUCH, IS NOT INTERPRETATION. INTERPRETATION IS REVELATION BASED UPON INFORMATION. BUT THEY ARE ENTIRELY DIFFERENT THINGS. HOWEVER, ALL INTERPRETATION INCLUDES INFORMATION:

The raw material of interpretation is factual information. Facts may form some of the parts, but the whole of interpretation is greater than the sum of the parts.

3. INTERPRETATION IS AN ART, WHICH COMBINES MANY ARTS, WHETHER THE MATERIALS PRESENTED ARE SCIENTIFIC, HISTORICAL OR ARCHITECTURAL. ANY ART IS IN SOME DEGREE TEACHABLE:

Tilden (1977) comments that “the interpreter who uses art, creating a ‘story’ out of his materials, will find himself in the presence of people who have the artistic appreciation to understand him... [The interpreter] should dip into his own artistic appreciation, give form and life to his material, and tell a story rather than recite an inventory... We cannot forget that people are with us mainly seeking enjoyment, not instruction” (pages 28-29).

4. THE CHIEF AIM OF INTERPRETATION IS NOT INSTRUCTION, BUT PROVOCATION:

Visitors to parks, museums, and zoos “frequently desire straight information, which may be called instruction, and a good interpreter will always be able to teach when called upon. But the purpose of interpretation is to stimulate the reader or hearer toward a desire to widen his horizon of interests and knowledge, and to gain an understanding of the greater truths that lie behind any statements of fact” (Tilden, 1977, pages 32-33). With this in mind, “not the least of the fruits of adequate interpretation is the certainty that it leads directly toward the very preservation of the treasure itself... Indeed, such a result may be the most important end of our interpretation, for what we cannot protect we are destined to lose” (Tilden, 1977, pages 37-38).

5. INTERPRETATION SHOULD AIM TO PRESENT A WHOLE RATHER THAN A PART, AND MUST ADDRESS ITSELF TO THE WHOLE MAN RATHER THAN ANY PHASE:

Tilden (1977) notes that a “cardinal purpose of interpretation is to present a whole rather than a part, no matter how interesting the specific part may be... It is far better that the visitor to a preserved area, natural, historic or prehistoric, should leave with one or more whole pictures in his mind, than with a mélange of information that leaves him in doubt as to why the area has been preserved at all” (page 40-41).

6. INTERPRETATION ADDRESSED TO CHILDREN (UP TO THE AGE OF TWELVE) SHOULD NOT BE A DILUTION OF THE PRESENTATION TO ADULTS, BUT SHOULD FOLLOW A FUNDAMENTALLY DIFFERENT APPROACH. TO BE AT ITS BEST IT WILL REQUIRE A SEPARATE PROGRAM:

As Tilden (1977) indicates in this principle, "the selection of an upper age limit of twelve years...sounds arbitrary, and is in fact so by intent" (page 49). While there are some very important factors of interpretation in children's programming that continue to be important factors in programming for older children and adults, Tilden (1977) does explain that it is at the earliest school years where we find children learning things at a phenomenal rate, and this rate is never again matched. "It is the period when we do not tire them by giving them factual information as such. The interpreter who has dealt with both young children and adults will have noted the eagerness for pure information in the one and a slight aversion to it in the other. This difference of itself suggests that interpretation for children implies a fundamentally different approach" (page 49).

The following list (Veverka, 1994, page 9) identifies several learning principles that an interpretive planner should be aware of in the process of interpretive design.

- People learn better when they're actively involved in the learning process.
- People learn better when they're using as many senses as appropriate.
- People prefer to learn that which is of most value to them at the present.
- That which people discover for themselves generates a special and vital excitement and satisfaction.
- Learning requires activity on the part of the learner.
- Friendly competition can stimulate learning.
- Knowing the usefulness of the knowledge being acquired makes learning more effective.
- People learn best from hands-on experiences.
- Questions can be effectively used to help people derive meanings.
- The ways in which people are responded to affects their learning.

Southworth (1992, pages 86 - 90) summarizes several important qualities of successful environmental interpretation from the visitors' perspective.

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- The environment should have some special interest or uniqueness to begin with, such as a meaningful historic or cultural context, a natural significance, or an intrinsic beauty.
 - Learning is an important part of the experience, but enjoyment is equally important.
 - The visitor should not feel remote or removed from the setting. Rather, the setting should somehow involve or immerse the visitor, encouraging active participation and learning).
 - Information is important but should not intrude on the experience. It is important to avoid labeling and to emphasize pictorial representation.
 - Interpreted environments should be rich and varied so that they can be experienced repeatedly and in different ways.
 - Multiple points of view should be represented.
 - The experience should be as flexible as possible so that visitors may choose their own routes and experience the environment at their own pace and style. As well, it is important to note that it should provide access to visitors with varied levels of mobility.
 - All of the senses should be addressed whenever possible, including sight, sound, touch, and smell.
 - Packaged and commercialized experiences should be avoided. Interpretive messages should not intrude, or infringe on the visitor experience. Appropriate interpretation can be accomplished by using suitable media and not over-interpreting.
 - Interpretations should relate to their geographical and cultural context of the subject or setting as much as possible. The setting should give the feeling of being real and living, rather than being a depiction or imitation.

One of the most common interpretive methods or mediums used to inform and direct visitors with is signs (Dun, 1991). Interpretive signs are most effectively used to draw attention to something, explain or illustrate a feature, or communicate a conservation message (Dun, 1991). In a natural history context such as the Zoo, signs usually interpret the natural processes or physical features of an area, “providing visitors with a feeling of participation and personal discovery unstructured by interpretive personnel” (Sharpe, 1976, page 215). Visitors can go through an area at their own pace and read or browse only as much as they are interested in. Signs that are permanently placed provide information and interpretation at all times. However, reading signs requires some mental

effort on the part of the visitor, and they can only provide one-way communication to the visitor. Therefore, there is no opportunity for personal feedback (Sharpe, 1976).

With regards to learning, visitors retain about ten percent of what they hear, thirty percent of what they read, fifty percent of what they see, and ninety percent of what they do (Veverka, 1994, page 10). The implications of this information for learning are important. With reference to signs for example, if the emphasis is on text alone, then a visitor may be able to recall thirty percent of the information. The addition of some sort of graphic may increase information recall to fifty percent. As Veverka (1994, page 10) recommends, “by planning and designing-in behaviors to encourage interaction (doing) with each [sign] panel, you may be able to increase information retention to ninety percent!” It is generally best to have a standard sign design, for example material, colour, and lettering to provide for visual continuity (Dun, 1991; Veverka, 1994). The following list (Dun, 1991, page 30) summarizes some tips for interpretive signs.

- Do not set the text in a solid block form.
- Keep adequate margins.
- Do not capitalize the entire text. Use upper and lower case lettering.
- Use **bold** or *italic* letters to emphasize words.
- Keep adequate regular spacing between words in a sentence.
- Leave an extra space at the end of a sentence.
- Leave extra space between paragraphs.

The text must be designed to appeal as much as possible to a range of interests, ages, and educational levels. According to Sharpe (1976, page 218), the sign text, or interpretive message, has several functions. It must:

- attract the interest of the visitors;
- hold their attention;
- provide information so visitors can understand and develop an appreciation of the subject; and, in some instances,
- provoke a behavioural response.

In addition to these tips, Veverka (1994, pages 109 - 112) has a number of other recommendations.

- Keep the text to one or two fifty word paragraphs, using the largest text point size possible. Few visitors may spend the time to read any more than this. Again, adding some sort of graphic can greatly increase the amount of information retained.
- Design the content to provoke, relate, and reveal the subject. Provocative words serve to get the visitors' attention and stimulate interest. Relate the information in such a way that visitors can identify with it. Once you have attracted their attention, and held it, more information can be revealed.
- Stay away from technical words or jargon. Use appropriate vocabulary.
- Use the text to promote learning-by-doing. This is accomplished by directing them to do something (look for..., listen for..., feel the..., etc.).
- Choose graphics that best illustrate the theme or concept, rather than illustrating what visitors can see in reality
- Use the same colours and materials for all of the signs. This allows for easy recognition, has attraction power, and provides a visual continuity.
- Position signs so they can be easily seen and read without interfering with the view itself. Use the largest appropriate size of sign. Veverka (1994, page 113) suggests 50 by 80 centimeters (20 by 30 inches) or larger.

The grammar and spelling on signs must be correct and the information presented in a concise and appealing format. Errors will distract from the interpretive message, and as a result, visitors may lose confidence in the authority of the message (Sharpe, 1976). One of the most important components of signs is the headline or title. This is the first thing visitors see, and provides a hint of the content, promoting further reading (Sharpe, 1976).

As mentioned, another important design consideration for interpretive signs is the use of graphics (Sharpe, 1976). Graphics can include everything from simple drawings, to full colour illustrations or landscapes, as well as photos. The old adage 'a picture is worth a thousand words' is particularly true for interpretive signs. Graphics on interpretive signs help to attract the interest of visitors as well

as hold their attention, and can convey a great deal of information in an appealing way. In addition, graphics reduce the need for words to convey a message or a concept (Sharpe, 1976). They can illustrate complex relationships and associations between environmental communities of plants and animals as well as influences of inanimate factors such as geology, soils, and weather conditions. Sharpe (1976) notes that graphics are often not language specific and can therefore be understood by foreign visitors.

Examples of Canadian Wilds and Northern Forest exhibit signs were shown in Chapter 4. For the most part, the Zoo's signs conform to the tips and recommendations listed above. The interpretive signs in the Northern Forest exhibit have a standard format. They are designed to combine text with graphics in a visually appealing way. Signs draw the visitors' attention to specific features or animals. The text relates the educational story line that was determined during the Zoo's Northern Forest planning stage. However, *there are no examples of using the signs to promote learning-by-doing as recommended by Veverka (1994).*

5.2 Composition and Duties of Calgary Zoo's Design Planning Team

The general process or format the Calgary Zoo currently follows for all long-term and short-term planning and decision making is based on:

- a Long-Term Strategic Plan covering a 20 year period;
- a 5 year business plan covering more immediate time lines, responsibilities, and goals; and
- an annual plan covering measurable activities, and budgets.

Together, these provide the general planning framework for the Zoo. Each category has an increasing level of detail. Formal in-house planning and design teams are pulled together to finalize design and execution plans on individual projects.

In the case of the Canadian Wilds Project, planning started in 1989 with the general idea of determining what the Zoo wanted to accomplish with the project. An in-house planning and design team was put together and developed the idea for five ecosystems (Aspen Woodlands, Rocky Mountains, Northern

Forest, Grasslands, and Arctic Shores), a species list, and a concept for an interconnecting series of pathways through the whole site. The planning and design team was inter-departmental, representing the key stakeholders: education; plants; animals; planning; and facilities; and was kept intact throughout the process (Peterkin, Person. Comm.; Rodman, Person. Comm.).

After the first two phases of the Canadian Wilds Project were completed (Aspen Woodlands in 1992, and Rocky Mountains in 1995), the in-house team began the planning and design of the Northern Forest. For this section, there were some unique site features and limitations the Zoo had to deal with due to the location of an old City of Calgary land fill, and flood plains along the Bow River. The Zoo developed the initial site plan and after this the Steering Committee for the Northern Forest came together. The following list summarizes the steps of the Northern Forest planning process.

1. Site investigation and conceptual design from the in-house team
2. Negotiations through regulatory bodies due to unique site limitations
3. Interpretive advisory task force to assist in finalizing of general physical layout and confirming exhibit story line
4. Design development with consultant team by tender
5. Three stage construction process:
 - site work and utilities;
 - building construction; and
 - in-house completion of exhibits, landscaping, and signs(Peterkin, Person. Comm.; Rodman, Person. Comm.).

Aside from their existing general planning process identified earlier (page 74), the Zoo has not followed any specific planning model for natural history interpretation, such as those described earlier in this chapter (Peterkin, Person. Comm.; Rodman, Person. Comm.).

5.3 Calgary Zoo Northern Forest Advisory Task Force

Planning for the Northern Forest section had the benefit of experience gained from the first two phases in the Canadian Wilds Project, the Aspen Woodlands and the Rocky Mountains. With the Northern Forest section, the Zoo decided to experiment with a new approach to their planning process by including input from a multi-disciplinary committee in addition to the in-house design team. This committee was known as the Northern Forest Advisory Task Force (Steering Committee). There were some unique features to the Northern Forest section that made the Steering Committee experiment 'make sense.' According to the Zoo's Director of Planning and Development, and the Manager of Planning and Design, the Northern Forest is neither exotic nor home grown. It is an ecosystem close enough to Calgary that there were a number of people within the province that had intimate knowledge of it and could contribute to the Steering Committee. However, it is remote enough from Calgary that the Zoo's internal group did not necessarily have as strong an understanding as they needed and wanted (Peterkin, Person. Comm.; Rodman, Person. Comm.).

The Steering Committee provided an opportunity to have individuals with a wide range of experience and backgrounds take part in critiquing the plans for the Northern Forest Section. The Zoo wanted the participants of this Steering Committee to represent a good cross section of experience, skills, and knowledge, without overbalancing in any direction. Using this criteria, the Zoo decided the group should contain two people from the forestry industry, two members from environmental groups, an organization representing environmental education such as the education department of Alberta Environmental Protection, a group involved in field conservation, and representatives from various Zoo departments. Based on suggestions and recommendations, they identified people that they believed would come to the table with the desire to make the process work. The participants needed to have credibility, good standing, and respect within their own peer group, as well as a reputation of being unbiased, and be willing group participants. As the Zoo's interpretive mandate for the Canadian Wilds focused

on aspects of natural history, one area of knowledge that was not represented in this committee concerned the human historical and cultural context in the Northern Forest. Once all possible participants agreed on the group composition, the Steering Committee was formalized (Peterkin, Person. Comm.; Rodman, Person. Comm.).

Attending all of the Steering Committee meetings, and making notes during the process were important components of the research for this project. The meetings provided a valuable learning experience, and an opportunity for direct observation of this aspect of the Zoo's natural history interpretation design process for the Northern Forest. The Committee met four times, with each meeting lasting several hours.

1. November 20th, 1996 at the Calgary Zoo
2. December 18th, 1996 at the Calgary Zoo
3. January 22nd, 1997 in Edmonton
4. February 12th, 1998 at the Calgary Zoo

Following are excerpts from a draft (provided by Don Peterkin, Director of Planning and Development, Calgary Zoo), dated October 4, 1996, outlining the terms of reference for the Steering Committee.

GENERAL

The Northern Forest Advisory Task Force (NFATF) is an advisory group to the Calgary Zoo's design team for the Northern Forest phase of the Canadian Wilds project.

ROLE

NFATF will provide input to the design process of the Northern Forest exhibit and critique plans as they are developed. This involvement will be directed towards ensuring the accurate representation of boreal forest systems within the limitations of the available budget and physical space. In addition, NFATF will provide input to the development of the interpretive messages, signage and educational programmes relevant to the Northern forests project.

RESPONSIBILITIES

NFAFT shall be responsible for:

- reviewing the conceptual plans for the Northern Forest project to provide input to the Zoo's design team relating to key thematic messages, physical components that should be considered for inclusion in the final plans and the species relationships that are critical to accurate ecosystem understanding;
- offering critique to the detailed plans, as they are developed by the Zoo, to maximize the educational and interpretive value of the exhibit;
- providing input into the development of educational and interpretive packages for the Northern forest project;
- reviewing all components of the Northern Forest to provide objective advice to the Zoo with a goal of achieving a bias-balanced presentation of the Boreal Forest ecosystem (Peterkin, Person. Comm.; Rodman, Person. Comm.).

As mentioned, the final composition of the Steering Committee included individuals from the forestry industry, provincial government, conservation organizations, and Calgary Zoo education, planning, and botanical collections departments. Areas of expertise also included wildlife biology, public affairs, and forest ecology. This multi-stakeholder or interdisciplinary arrangement allowed for information and input from the participants based on a broad range of personal knowledge and experience. It was hoped that this approach would lead to a more accurate, complete, and balanced-bias method of determining appropriate natural history interpretation messages.

The following information represents a synopsis of the input from the Steering Committee regarding the educational and interpretive goals, objectives, and expectations developed for the Northern Forest. This information was compiled by reviewing notes and meeting minutes from Steering Committee meetings, as well as from key informant interviews. Information from this synopsis formed the basis for developing the questions in the visitor survey, as well as the key word answer categories that were used in the analysis of the survey information (see chapter 6).

Overall messages about the Northern Forests to present to the visitor.

- The Northern Forest is naturally in a dynamic state, going through periods of constant successional changes. The major changes are:
 - early succession (juvenile) that occurs post disturbance (e.g. from fire, insect, wind, and snow damage) that includes aspen whips, fire weed, standing and fallen dead wood, fungal growth, grasses and flowers;
 - mid succession (adult) that include tall aspen, small spruce, bunch berry, well decayed fallen dead wood, and less evidence of standing dead wood; and
 - late succession (old growth, or elderly) where spruce predominate, aspen trees are dying off, and there are lots of mosses and lichens.
- The Northern Forest in Alberta is a vast ecosystem, covering about 31 million hectares.
- A large and important portion of this ecosystem (approximately 1/3) is made up of water and wetlands (streams, rivers, lakes, marshes, bogs, fens, etc.).
- Each successional forest type and each variety of wetland has its own, sometimes unique, set of flora and fauna.
- It has a great diversity of plant and animal species, in other words, it is like a mosaic rather than a uniform 'Christmas Tree' ecosystem. Only about 50% of the trees in the Alberta Northern Forest are conifers.
- Fire and animal disturbances are an important part of the natural system, creating variety.

It was recommended that the physical design should begin with a representation of the Northern Forest as the general public frequently perceives it, the principle being to start with people's common perceptions and then convey information to fill the knowledge gaps. Therefore, the initial view at the entrance to the section is of a late succession (uniform 'Christmas Tree', or unending evergreen) forest. As visitors move along the pathway, they come to a black spruce bog and a post disturbance, fire damaged area. As they progress from the bog and disturbed areas, they move from post disturbance, through early

succession, and into mid succession forest, eventually melding into another late succession forest. Enclosures for specific animals are positioned within these different representations. Situated near a mixed wood riverine area, there is a stream with a beaver pond and dam that provide for visual continuity from the beaver and otter enclosures that can be viewed from inside and outside of the Northern Forest Visitor Centre. The following figure (5-4) shows a design plan for the Northern Forest section.



Figure 5-4: Northern Forest Landscape Plan (IMC Consulting, Aug. 1996)

Information the Zoo visitor (adult and child) should come away with after going through the exhibit include:

- an understanding of the value of the Northern Forest;
- a recognition of the relationships and interconnectedness between ecosystem components, the Northern Forest and other ecosystems, and between humans and the ecosystem;
- an appreciation of wild places and wild species; and
- a desire for further learning.

A sign package containing draft copies of the scripts for the Northern Forest signs was handed out to the Committee members for comment and a review of accuracy. There were to be three sizes of signs: Vista - 48 by 152 centimeters (19 by 60 inches); Information - 48 by 60 centimeters (19 by 24 inches); and Nature Notes - 21 by 28 centimeters (8 ½ by 11 inches). The material selected for the permanent signs in the Northern Forest section is known as 'Enamel-tec', which is baked enamel on metal backing. They have a life span of approximately twenty years. While they are susceptible to some damage from chipping, they tend to weather and hold their colours very well (Peterkin, Person. Comm.). Vista and Information signs are permanent, while Nature Notes can be updated and changed as frequently as needed. The following is an example of one of the Zoo's Nature Notes.

CONSERVATION AND YOUR ZOO



At the Calgary Zoo, conservation begins with the experience and learning opportunities we provide to Zoo visitors through habitat displays, programs and exhibits. Outreach programs deliver environmental education to schools, community groups, seniors' homes, business associations and the media.

Species Survival Plan (SSP) programs designed for many endangered species continue the effort. SSPs are cooperative, coordinated breeding programs for captive species throughout the world. We often call them computer-dating services for animals.

The public rarely sees some of our most important contributions to conservation. The Devonian Wildlife Conservation Centre (DWCC) is the Calgary Zoo's off-exhibit wildlife refuge south of the City. There, captive breeding and study of Canada's only managed flock of whooping cranes takes place.

The Conservation Fund of the Calgary Zoological Society supports the whooping crane recovery program that includes studies of pair-bonding in cranes and potential reintroduction sites. This Fund also supports all other conservation efforts beyond our gates.

Michael M. M. M.

Figure 5-5: Example of a Calgary Zoo Nature Note: Conservation and Your Zoo

Although the Zoo did not follow a specific *interpretive planning* model, they did make every effort to create an effective communication link between visitors and the diversity and complexity of the Northern Forest ecosystem. Inherent in this communication link are the interpretive principles and qualities described earlier in this chapter. While many of these principles and qualities were touched on during the Northern Forest Steering Committee meetings, they were not explicitly stated or discussed as a part of a planning framework. The Zoo's in-house design team certainly has the benefit of extensive past interpretive planning experience, however, it had been indicated that formal assessment of the success of interpretation goals, objectives, and expectations had been largely overlooked. The Northern Forest exhibit afforded an opportunity to evaluate the success of the Zoo's design and planning process by directly observing the existing process, and by evaluating the finished interpretation product using a visitor survey. A background to social science research, along with the development, implementation, and analysis of the visitor survey are detailed in the following chapter.

Chapter 6

A survey is a system for collecting information to describe, compare, or explain knowledge, attitudes, and behavior. Surveys involve setting objectives for information collection, designing research, preparing a reliable and valid data collection instrument, administering and scoring the instrument, analyzing data, and reporting the results.
(Fink, 1995a, page 1)

6. Social Science Research and the Northern Forest Visitor Survey

This chapter is dedicated to an explanation of the steps taken in the research, development, and implementation of the visitor survey for this project, and the criteria used for the assessment of the information. Included is a report on the analysis of this survey information. An important aspect of this Master's Degree Project was to determine what effect the natural history interpretation on the Northern Forest exhibit interpretive signs had on visitors' knowledge and attitudes relating to the Northern Forest.

6.1 Purpose and Objectives of the Visitor Survey

Surveys are a very common technique for information-gathering. They can produce valuable data and can be used to explain or explore a research topic (Fink, 1995a). The term survey "commonly refers to the collection of standardized information from a specific population, or some sample from one, usually but not necessarily by means of questionnaire or interview.... There is normally no attempt made to manipulate variables, or control conditions, as would be the case in experimentation" (Robson, 1993, page 49). As Neuman (1994, page 222) states, surveys can be used to collect or compile information in a number of different categories or classes including:

- behaviour;
- personal attitudes, beliefs, and opinions;
- individual characteristics;

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- future plans or expectations;
 - self-classification; and
 - knowledge.

The purpose of the visitor survey in this project was to measure the effectiveness the Northern Forest interpretation had in communicating the educational and interpretive goals, objectives, and expectations developed during the Zoo's planning process. A summary of these goals, objectives, and expectations was listed in Chapter 5 (see pages 79 - 82). The visitor survey questions as well as the response categories used in the analysis were designed with these in mind. The objectives of this information-gathering process were to:

1. devise a system for the collection of information regarding visitors' knowledge and attitudes after visiting the Northern Forest Section;
2. conduct the visitor survey during the peak summer season in the Northern Forest Section;
3. identify criteria for the assessment of the information from the survey;
4. interpret the survey results by comparing the survey information to the natural history interpretation goals, objectives, and expectations that were developed during the Zoo's design process; and
5. provide feedback regarding the interpretive planning and design process used by the Zoo.

For this project, general quantitative and qualitative information regarding Zoo visitors was obtained from a prior Zoo survey (prepared for the Zoo by Street Smart Strategic Planning Inc., 1999). The purpose of the Street Smart survey was to provide a peak season report on visitor information during the summer of 1998. It did not evaluate any natural history interpretation at the Zoo. Information in the study included: a profile of Calgary Zoo visitors; party configuration and visit characteristics; visitor demographics (such as: gender; age; family status; income; education; and occupations); value perceptions; spending patterns; exhibit preferences; education values; and positive and negative experiences. The survey

showed that the Northern Forest section was one of the top exhibit preferences indicated by visitors (along with Primates and Large Mammals) during the summer of 1998. Further, most respondents specified that they: enjoyed watching and experiencing the animals; valued their Zoo visit as a relaxing escape; and appreciated the opportunity to learn something new (Street Smart Strategic Planning Inc., page 17). Signs and individual observation were listed as the top two learning sources, followed by Zoo programmes (Street Smart Strategic Planning Inc., page 20).

6.2 Survey Methodology

Robson (1993) points out that “many real world studies are evaluations. They try to provide information about how some intervention, procedure, system, or whatever, is functioning; and how it might be improved” (page xi). Most social science research follows a sequence of several steps. As described by Neuman (1994, pages 10 - 13) in *Social Research Methods*, these steps are:

1. choose a topic;
2. focus the research question;
3. design the study;
4. collect the data;
5. analyze the data;
6. interpret the results; and
7. inform others.

This series is not rigid or fixed, instead, it forms a framework in which the individual steps can be re-visited and re-worked as the process goes on. The starting point is the topic. The topic constitutes the general subject or theme of the information-gathering research. For example, in this project, the topic was an evaluation of the planning process involved in the design of natural history interpretation. In order to evaluate this process, there needed to be a general understanding of environmental education and natural history interpretation, as well as an understanding of the context of natural history interpretation. This was accomplished through literature reviews and key informant interviews.

As the topic is usually too broad to conduct meaningful information-gathering experiments, surveys, or observations in the field, it must be narrowed or focused into a specific research question. It is this question that can then be specifically addressed (Neuman, 1994). The research question in this project - based on a real example of natural history interpretation planning at the Calgary Zoo - was to determine what effect the natural history interpretation had on visitors' knowledge and attitudes relating to the Northern Forest. The interpretation to be evaluated was in the form of educational signs. The educational story line for these signs was determined during the Zoo's planning process (see Chapter 5).

After the development of the research question has been accomplished, the practical details of the information-gathering process can be designed. Some methods can include surveys, focus groups, observations, and experiments. The choice of method depends on the nature of the research question. The method of choice for this project was a visitor survey. Once these practical decisions have been made and the information-gathering procedure designed, the data collection can begin. After the data collection process is completed, the information must be examined and analyzed for any patterns. These patterns are used to interpret and explain the data. The research process and the results can then be documented, and, ideally, contribute to the existing body of knowledge.

The steps involved in survey design and implementation are:

DESIGN AND PLANNING PHASE

1. Decide on type of survey (e.g. mail, telephone interview) and type of respondent.
2. Develop the survey instrument / questionnaire:
 - write questions to measure variables;
 - decide on response categories;
 - organize question sequence; and
 - design questionnaire layout.
3. Plan a system for recording answers.
4. Pilot test the instrument and train interviewers if necessary.
5. Draw the sample:

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- define population;
 - decide on type of sample;
 - develop sampling frame;
 - decide on sample size; and
 - select sample.

DATA COLLECTION PHASE

1. Locate and contact the respondents.
2. Make introductory statements or provide instructions.
3. Ask questions and record answers.
4. Thank respondent and continue to next respondent.
5. End data collection and organize data. (Neuman 1994, page 225)

A good survey or questionnaire design requires the questions to be clear, relevant and meaningful. The following list (Neuman, 1994, pages 226 - 230) covers the ten most common things to avoid when planning questions.

1. Do not use jargon, slang, and abbreviations.
2. Avoid ambiguity, confusion, and vagueness. Questions that are subject to more than one interpretation create inconsistencies in the way people determine meanings and answers.
3. Avoid language that is emotional and prestige bias. The use of words that have these connotations can affect how the question is interpreted and answered.
4. Avoid double-barreled questions. Each question must have only one concept, issue, or meaning.
5. Avoid leading questions. A question is loaded, or leading if it influences a participant to respond with one answer over another through its wording.
6. Avoid asking questions that are outside of the participant's knowledge or ability. Information gained from such questions can be unreliable or meaningless.
7. Avoid false premises. This would involve a question that begins with a premise - a statement that is based on fact or supposition - and choices about the premise. Respondents who disagree with the premise or the choices will not have a meaningful option.
8. Avoid asking about future intentions based on an hypothetical or abstract situation. This involves asking what someone would do if The situation is out of the participant's immediate experience and the response can be an unreliable indication of their behaviour.

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9. Avoid double negatives. Besides being grammatically awkward, they are usually confusing.
 10. Avoid overlapping response categories. Categories or choices should be clearly or obviously different from each other. Categories or choices that do overlap can be vague and misleading. Unbalanced response categories leave out or do not address information or options.

The choice of open or closed questions in a survey depends on the specific purpose and any limitations of the research. The following figure (Neuman, 1994, page 233) describes open and closed questions, and identifies some of the advantages and disadvantages of both.

<u>ADVANTAGES OF CLOSED</u> • It is easier and quicker for respondents to answer • The answers of different respondents are easier to compare • Answers are easier to code and statistically analyze • The response choices can clarify question meaning for respondents • Respondents are more likely to answer about sensitive topics • There are fewer irrelevant or confused answers to questions • Less articulate or less literate respondents are not at a disadvantage • Replication is easier	<u>DISADVANTAGES OF CLOSED</u> • They can suggest ideas that the respondent would not otherwise have • Respondents with no opinion or no knowledge can answer a question anyway • Respondents are frustrated because their desired answer is not a choice • It is confusing if many (e.g. 20) response choices are offered • Misinterpretation of a question can go unnoticed • Distinctions between respondent answers may be blurred • Clerical mistakes or marking the wrong response is possible • They focus respondents to give simplistic responses to complex issues; • They force people to make choices they would not make in the real world.
<u>ADVANTAGES OF OPEN</u> • They permit an unlimited number of possible answers • Respondents can answer in detail and can qualify and clarify responses • Unanticipated findings can be discovered • They permit adequate answers to complex issues • They permit creativity, self-expression, and richness of detail • They reveal a respondent's logic, thinking process, and frame of reference	<u>DISADVANTAGES OF OPEN</u> • Different respondents give different degrees of detail in answers • Responses may be irrelevant or buried in useless detail • Comparisons and statistical analysis become very difficult • Coding responses is difficult • Articulate and highly literate respondents have an advantage • Questions may be too general for respondents who lose direction • Responses are written verbatim, which is difficult for interviewers • A greater amount of respondent time, thought, and effort is necessary • Respondents can be intimidated by questions • Answers take up a lot of space in the questionnaire

Figure 6-1: Open versus Closed Questions

Evaluating the effectiveness of interpretation can lead to better interpretation, however, Sharpe (1976) notes that because attitudes can be difficult to measure, evaluations should concentrate on objective information wherever possible. In order to obtain valid and reliable information relating to visitors' knowledge and attitudes after going through the Northern Forest section, both open and closed questions were incorporated into the survey. In this way, some of the disadvantages of open and closed questions could be avoided (Fink, 1995a). With one exception (see visitor survey question 8 listed in section 6.3 below), closed questions were used to obtain quantitative information, and open questions were used to acquire qualitative information. Open questions did not run the risk of suggesting responses to the participants, instead, respondents were able to answer in their own words. The wording of the questions was carefully selected to avoid ambiguity. By design, the survey was kept short (one page) to facilitate visitor participation.

Measuring and evaluating the effectiveness of interpretation requires a researcher to observe and question visitors (Sharpe, 1976). As this survey focused on the impact of the Northern Forest exhibit interpretive signs, visitors were approached as they exited the section and were asked to participate. It is important to note that two possible problems inherent in many visitor surveys are: that the sample can be skewed by visitors especially receptive to interpretation; and that visitors may be too polite to criticize shortcomings (Sharpe, 1976).

Although the information collected through the Northern Forest visitor surveys was principally qualitative data, the information-gathering process did combine elements from both quantitative and qualitative methods. However, the focus was on capturing aspects of the learning experience and subjective feelings towards the Zoo section, rather than on assigning quantifiable measures. As Neuman (1994) states, "the logic of qualitative research does not forbid the use of numbers, statistics, and precise quantitative measurement; such quantitative data can be a source of information, which supplements or complements qualitative

data” (page 324). The following figure (6-2), based on Neuman, (1994, page 317) illustrates some of the differences between qualitative and quantitative methods.

<u>QUANTITATIVE</u>	<u>QUALITATIVE</u>
• Test hypothesis that the researcher begins with • Concepts are in the form of distinct variables • Measures are systematically created before data collection and are standardized • Data are in the form of numbers from precise measurement • Theory is largely causal and is deductive • Procedures are standard, and replication is assumed • Analysis proceeds by using statistics, tables, or charts and discussing how what they show relates to hypotheses	• Capture and discover meaning once the researcher becomes immersed in the data • Concepts are in the form of themes, motifs, generalization, taxonomies • Measures are created in an ad hoc manner and are often specific to the individual setting or researcher • Data are in the form of words from documents, observation, transcripts • Theory can be causal or non causal and is often inductive • Research procedures are particular, and replication is very rare • Analysis proceeds by extracting themes or generalizations from evidence and organizing data to present a coherent, consistent picture

Figure 6-2: Differences Between Qualitative and Quantitative Research

As Neuman (1994, page 404) notes, “qualitative data are in the form of text, written words, phrases, or symbols describing or representing people, actions, and events in social life.” There are four main differences between quantitative and qualitative data analysis (Neuman, 1994, page 405).

1. Quantitative analysis is based on a standardized set of techniques, using applied mathematics. Qualitative analysis is less standardized, and uses a variety of approaches.
2. Analysis of quantitative data starts after the information has been acquired and condensed into a numeric form. Both quantitative and qualitative analysis looks for patterns or relationships, however, the criteria for qualitative analysis can be developed and refined during the information-gathering process.

-
3. In quantitative research, empirical data is inspected and manipulated in order to test the researcher's hypotheses. Qualitative research can lead to theories, generalizations, new concepts, or plausible interpretations by combining empirical information and hypothetical ideas or concepts.
 4. Quantitative research examines the statistical relationships between variables in an attempt to illustrate or debate causal relationships. Qualitative research is more context-based. The results can be in the form of explanations or generalizations, and can lead to a better understanding of a specific social context.

As mentioned, the visitor survey in this project contained some closed questions as well as some open questions with the intention of collecting both quantitative and qualitative information. The analysis of this data followed a qualitative analysis method, as described above. The assessment of the information in the open question responses involved sorting the data into a number of answer categories that could allow for examination and evaluation. As Robson (1993) states, "the main purpose is to simplify many individual responses by classifying them into a smaller number of groups, each including responses that are similar in content" (page 253).

Although the key word answer categories were generated both before and during the data collection process, finalizing the ultimate coding categories was done after the surveying was completed, and was based on an examination of a substantial portion of the total responses (Robson, 1993). All of the answers to a particular question were grouped together and the categories were refined, based on the nature, themes, and dimension of the responses (Robson, 1993). Sorting the information into these groups effectively translated open question responses to a defined or fixed set of standard responses, which was an important step in facilitating the process of analysis. (Robson, 1993). The criteria for analysis that were applied to the visitor surveys used quantitative information to provide a numerical context, and organized the qualitative data on the basis of themes, concepts, and other similar features. This involved making several passes through the qualitative data searching for patterns and relationships in the information in

order to identify categories or divisions. The information from both the quantitative and qualitative responses were compared, examined, interpreted, and generalized. Using an assessment of interpretive planning indicators in conjunction with the basic finding from the visitor survey analysis, feedback and recommendations were then made with regards to the Zoo's interpretive planning and design process.

6.3 Survey Results and Discussion

Neuman (1994, page 254) identified ten items to include when reporting survey research.

1. The sampling frame used.
2. The dates on which the survey was conducted.
3. The population that the sample represents.
4. The size of the sample for which information was collected.
5. The sampling method.
6. The exact wording of the questions asked.
7. The method of the survey.
8. The organizations who sponsored the survey.
9. The response rate or percentage of those contacted who actually completed the questionnaire.
10. Any missing information or "don't know" responses when results on specific questions are reported.

In this study, the research population consisted of the total number of Zoo visitors on any particular day. The sampling frame contained only those visitors who had gone through the Northern Forest section. The survey sample included those adults (approximately 16 years and over) who had gone through the section between certain hours on particular days. As the total number of Zoo visitors on any day was not known in advance, there was no way to pre-determine a sampling ratio (i.e. the ratio of the size of the sample to the size of the target population). While the Zoo can count the number of visitors each day through gate admissions, the Zoo generally can not track the total number of visitors through a particular area, therefore, it was not possible to determine how many Zoo visitors went through the Northern Forest section.

Based on information from the previous Zoo survey which profiled visitors during the peak season in 1998 (i.e. July and August), the best time slots for conducting a survey were considered to be between 12:00 p.m. and 6:00 p.m. The busiest days were indicated as being Friday, Saturday, and Sunday. However, the survey for this project was conducted over various time slots, and on different days of the week in order to take advantage of the greatest variety in Zoo visitors and party configuration. The following tracking record provides the dates and times that the survey was conducted, as well as relevant details, and numbers.

DATE	TIME SLOT	DETAILS	NUMBER of RESPONDENTS	REFUSED MISSED
Tuesday August 17 th , 1999	11:00 - 1:00	Sunny, warm, calm	55	47
	2:00 - 4:30			23
Wednesday August 18 th , 1999	10:00 - 2:30	Sunny, warm, calm	60	33
				14
Saturday August 21 st , 1999	11:30 - 2:45	Sunny, warm, light breeze	45	27
		2:35-storm clouds, windy 3:00-heavy rain		20
Thursday August 26 th , 1999	10:00 - 2:00	Sunny, warm, light breeze	66	35
				23
Friday Sept. 3 rd , 1999	12:00 - 2:00	Sunny, warm, calm	30	23
				5
Sunday Sept. 5 th , 1999	1:15 - 2:45	Sunny, cloudy periods, calm	49	40
				43
Monday Sept. 6 th , 1999	2:00 - 4:00	Cloudy, sunny periods, cool breeze, rain showers	18	5
				8
TOTALS			323	210 136

Figure 6-3: Tracking Record for Visitor Survey

Generally, it is not an entire population that is surveyed, but a specific portion or sample of that group. However, it is important that this sample should be representative of the population (Robson, 1993; Newman, 1994). This visitor survey sample population consisted of adult visitors (those who appeared to be 16 years or older) who had just gone through the Northern Forest section. The total sample size over the course of the survey for which information was collected came to 669 (total number of respondents + refused + missed).

Because it was not possible to specify the probability that any particular person would be included in this survey sample - as is the case in probability sampling - the sampling plan for this project was non-probability. Robson (1993) notes that “small-scale surveys commonly employ non-probability samples. They are usually less complicated to set up and are acceptable when there is no intention or need to make a statistical generalization to any population beyond the sample surveyed” (page 140).

The survey style was a short (one page), self-administered questionnaire. The following are the questions and format that were developed for use in this Northern Forest visitor survey.

My name is Valerie Barnes, and I am a graduate student in the Faculty of Environmental Design at the University of Calgary. I am doing research at the Calgary Zoo regarding environmental education. You were chosen to participate in this study because you have visited the Northern Forest exhibit of the Canadian Wilds. By participating in this study you will help to determine visitor opinions and attitudes concerning this Zoo exhibit. You will not be identified in any way, and your participation in this study is voluntary.

Thank you for your time.

Please place a check mark ☒ in the box, circle an appropriate number, or use your own words in answering the following questions (use the back of this page if you require more space)

- 1) Are you a Calgary resident ? ☐
or a tourist to Calgary ? ☐
- 2) Is this your first visit to the Calgary Zoo ?
Yes ☐
No ☐ How many times per year (average) do you visit the Zoo ? _____
- 3) Is this your first visit to the Northern Forest exhibit ?
Yes ☐
No ☐ How many times have you visited the Northern Forest exhibit ? _____
- 4) Are you a Calgary Zoo member ? Yes ☐
No ☐
- 5) What three things do you remember most about the Northern Forest exhibit ?
1. _____
2. _____
3. _____

6) What three things did you like the best about the Northern Forest exhibit ?

1. _____
2. _____
3. _____

7) What, if anything, did you dislike about the Northern Forest exhibit ?

1. _____
2. _____
3. _____

8) Overall, how would you rate your Northern Forest experience ?

Please circle only one number

very poor	poor	average	good	very good
1	2	3	4	5

9) Please note any other comments you have about the Northern Forest:

Thank you, and enjoy the rest of your visit.

There were a number of possible questions that could have been included in the questionnaire. However, as mentioned earlier, consideration was given to total survey length, appropriate vocabulary level, reliability, and content validity. An informal test was done to check for grammar, spelling, readability (e.g. type size and vocabulary), survey length, reliability, and validity. Other surveys can and should be done that include different styles and question formats.

With regard to the survey method, whenever possible, every Northern Forest visitor who appeared to be over the age of sixteen was asked to participate. When this was not possible, a systematic sampling approach was used, where every 5th visitor, or every 2nd group was selected. The interception site for the survey was located in a shaded area on the pathway near the Whooping Crane exhibit (see map below). This is one of two possible pathways visitors can use to leave the Northern Forest section.

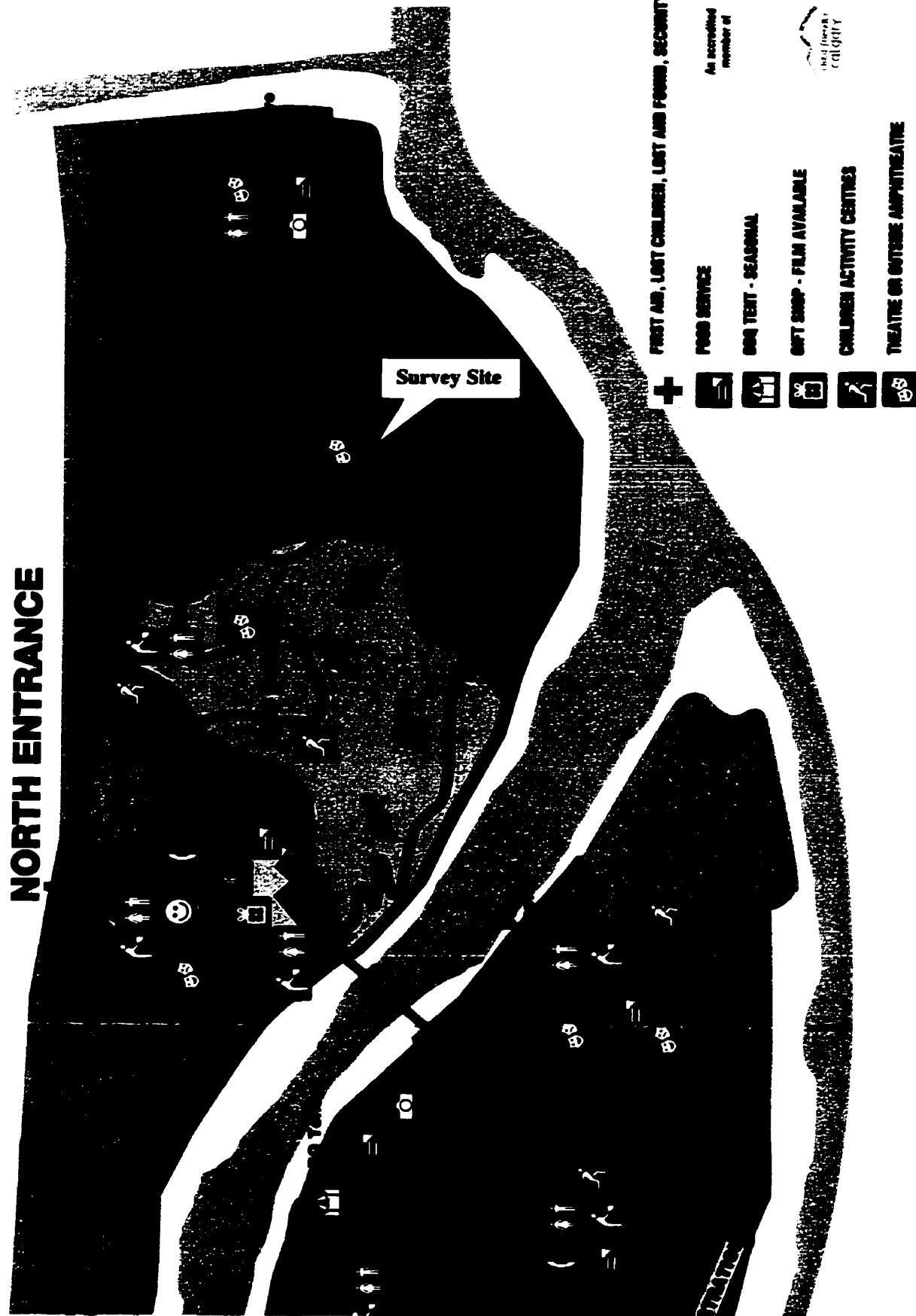


Figure 6-4: Calgary Zoo Map Showing Survey Location

Many Zoo visitors who come north over the main bridge from the Zoo island enter the Canadian Wilds from the south side (opposite the wolf enclosure). Otherwise, visitors can enter from the *intended beginning* of the Canadian Wilds, near the Zoo north entrance. Visitors entering this way would start at the Aspen Woodlands exhibit, continue through the Rocky Mountain section, and can then move through the Northern Forest site. Most of the interpretive signs in the Canadian Wilds are physically oriented towards those visitors entering from this direction. Those visitors traveling out of the Northern Forest section were approached as they passed by and were given a brief introduction that included: the researcher's name and affiliation; a short explanation of the purpose and subject of the study; an assurance of anonymity; and information that their participation was voluntary. If they consented, they were given a copy of the survey to complete. This introductory information was also included at the top of each survey. A record was kept, using a counting device, of the number of visitors who refused to participate, as well as the number who were missed, for all those visitors moving out of the Northern Forest section past the survey interception location. Of all those approached, a total of 60.6% (323 out of 533) completed the questionnaire. The number of people who declined to participate was 210. Refusal to participate was most often associated with having small children 'on the go'. However, there were many people with children who were able to participate in the survey, and it did appear that adults with children formed the largest visiting group. In a few instances, there were language barriers that precluded a visitor from participating in the survey. The total number of people missed was 136.

The survey was not designed to include "don't know" response choices to any of the questions. However, there was one question (survey question 9) that allowed visitors to add additional information and comments if they wanted. If this question was left blank, the survey was not considered incomplete. Out of 323 questionnaires, 6.8% (22 out of 323) were incomplete and were not considered in the analysis.

The quantitative and qualitative information on all of the visitor surveys was coded according to the final response categories (see reports below). All of the codes were then entered into a database programme (Microsoft Access version 7.0) to facilitate examination and analysis. A total of 109 queries were run on this database information.

Quantitative Component

The following information was presented to the members of the Northern Forest Steering Committee. Based on the Zoo's experience:

- adults with their children are the largest visiting group to the Zoo, with the average visit lasting two to three hours;
- the purpose for the visit is recreational;
- socio-economic status influences Zoo membership and visit frequency;
- older adult visits are on the increase, perhaps because grandparents are visiting the Zoo with their grandchildren; and
- some visitors spend less than one minute in front of a display, therefore, many visitors miss some details or more subtle elements of a display.

The following report summarizes the quantitative information from the visitor survey.

QUANTITATIVE DETAILS		Number	Percent
Number of Northern Forest Visitors missed at interception location		136	
Number of refusals		210	
Number of respondents		323	
Total: Respondents + Refused		533	
Total: Respondents + Refused + Missed		669	
Total number of surveys categorized as incomplete		22	
Total number of surveys categorized as complete		301	100 %
How many visitors surveyed were Calgarians		163	54 %
How many visitors surveyed were tourists		138	46 %
How many visitors had never been to the Zoo before		67	22 %
How many visitors had been to the Zoo before		234	78 %
For <u>repeat visitors</u> , what was the average number of Zoo visits per year:			
Less than once per year		30	13 %
One to five times per year		144	62 %
Six to ten times per year		24	10 %
More than ten times per year		24	10 %
Number of previous Zoo visits not indicated		12	5 %
How many visitors had never been to the Northern Forest exhibit		169	56 %
How many visitors had been to the Northern Forest exhibit before		132	44 %
For <u>repeat visitors</u> , how many times had they been through the exhibit:			
One to three times		69	52 %
Four to six times		27	21 %
Seven to ten times		16	12 %
More than ten times		13	10 %
Number of previous Northern Forest visits not indicated		7	5 %
How many visitors surveyed were Calgary Zoo members		63	21 %
How many visitors surveyed were not Calgary Zoo members		238	79 %
Visitor rating of their Northern Forest experience:			
very poor		0	0 %
poor		0	0 %
average		27	9 %
good		146	48 %
very good		128	43 %

Figure 6-5: Visitor Survey: Quantitative Report

There were a few respondents who lived in areas outside of the city of Calgary but described themselves as Calgarians in this survey. This included some people from Cochrane, Airdrie, and Okotoks. This survey question could

have been more specific and clear by asking people to identify their home town or city, rather than choose between '*Calgarian*' and '*Tourist*'. While a total of 54% of respondents indicated that they were Calgarians and 46% indicated they were tourists, the majority of respondents (78%) had visited the Calgary Zoo before. Many people who made regular visits to Calgary also made regular visits to the Zoo while they were here. For repeat Zoo visitors, the majority (62%) managed an average of one to five visits per year. A good number (10%) visited the Zoo more than ten times per year. At the time of this survey, the Northern Forest exhibit had been open to the public for just over one year. A total of 44% of respondents indicated that they had been through the Northern Forest exhibit previously. For these repeat Northern Forest exhibit visitors, 52% indicated that they had been through one to three times before, with 10% of these repeat visitors having been through the exhibit more than ten times. Finally, a large number of participants (79%) indicated that they were not Calgary Zoo members. A total of 48% of respondents rated their Northern Forest experience as '*good*', while 43% chose '*very good*'. The remainder selected '*average*', and there were no responses for '*poor*' or '*very poor*'

Qualitative Component

The qualitative component of the visitor survey consisted of open-ended questions that asked respondents to identify up to three things that they remembered most (survey question 5), and to list up to three things that they liked the best (survey question 6) about the Northern Forest Exhibit. Another question asked them to list what, if anything, that they disliked (survey question 7). The last question on the survey (survey question 9) provided respondents with an opportunity to add any additional information or comments. Following are a few examples of the type and variety of responses to the open ended survey questions.

What three things do you remember most about the Northern Forest exhibit?

Moose
Caribou
Birds
The Northern Forest Lodge
Otters
Beaver
Very much liked their natural habitat
Large areas for the animals
Trees
The baby moose (Teslin)
Cool forest setting
Open spaces for animals
Forest facts
Changing forest growth over time
The realistic habitat with trees and bushes
Discovering that female moose haven't got antlers

What three things did you like the best about the Northern Forest exhibit?

Wilderness environment
The animals
The sense of the North
The smells
The muskeg environment
The information available about the different stages of the Boreal forest
Whooping crane
Very organized, clean, and well maintained
We like comparing notes with what we see and learn at the Zoo with what
we see hiking in the mountains
Watching the river otters play
Watching the show to learn about the Whooping crane
Explanation of the habitats and animals
We felt like we were in a real forest
The 'invisible' lynx
The marsh
The value of our forests and animals

What, if anything, did you dislike about the Northern Forest exhibit?

Things are nice but the directions are very confusing
Couldn't see the lynx
Empty displays or hiding animals
Could see some areas of construction
Mosquitoes

Moose and caribou need more shade
Not enough animal species
People's garbage

Please note any other comments.

It's hard to compete with monkeys, elephants, and tigers
Peaceful, apart from aircraft flying overhead
Even though these are animals we encounter everyday at home, they are
presented so the kids can see them up close
Great for New Zealanders
Would be great for school groups
I was happy that the Zoo is "preserving" our special environments for
everyone to see
As a native Calgarian, I can remember the "bad old days" when the
animals went insane because the conditions were inhumane. The
Northern Forest area symbolizes the respect we now have for our
environment

The following reports summarize the qualitative information from the visitor survey, beginning with the Remembered Most (figure 6-6) and Liked the Best (figure 6-7) categories. The key word answer categories in the reports below have been listed in descending order according to the number of occurrences in the survey responses. As mentioned, the response categories were derived from the educational goals, objectives, and expectations developed during the planning stages for the Northern Forest exhibit (see Chapter 5, pages 79 - 82). These key concepts formed the basis for the development of the natural history interpretation story line. The number of occurrences in the visitor surveys of key words in each of the categories can serve to indicate the success of the planning process in communicating these goals, objectives, and expectations. However, it is just as important to note any situations where there were very few or no occurrences of key words in the survey responses. The *Total Number of Occurrences* column in the reports represents the number of times key words in the categories appeared in each of the 301 surveys analyzed for this project.

KEY WORDS / CATEGORIES Remembered Most	TOTAL # of Occurrences
animals birds / caribou / moose / lynx / beaver / otter / (Whooping) crane	284 out of 301
realistic / natural / open (setting, display, enclosure, habitat, landscape)	87 out of 301
plants spruce / pine / conifer / Christmas tree aspen / deciduous flowers / fire weed / grass moss / lichen / fungus / mushroom shrub / brush / bush	43 out of 301
(different / forest) succession / stages / changes late / elderly / old growth early / juvenile mid / adult	20 out of 301
learning / information / signs / education programme	15 out of 301
water wetlands / stream / river / marsh / bog (peat bog) / muskeg	14 out of 301
visitor centre / restaurant / visitor services	7 out of 301
felt like... / smelled like... / looked like... / sounded like...	6 out of 301
peaceful / relaxing / quiet / not crowded	5 out of 301
disturbance / damage / fire / insect / wind / snow	4 out of 301
diversity / biodiversity / variety / mosaic / interconnected / relationships	3 out of 301
miscellaneous: Zoo conservation; 'all of it'; weather; cleanliness	3 out of 301
value / importance	1 out of 301
change / dynamic (biome / ecosystem)	0 out of 301
large / vast / big (biome / ecosystem)	0 out of 301
dead wood / burned wood	0 out of 301

Figure 6-6: Visitor Survey: Report of Key Words / Categories for Things Remembered Most

KEY WORDS / CATEGORIES Liked the Best	TOTAL # of Occurrences
animals birds / caribou / moose / lynx / beaver / otter / (Whooping) crane	230 out of 301
realistic / natural / open (setting, display, enclosure, habitat, landscape)	149 out of 301
plants spruce / pine / conifer / Christmas tree aspen / deciduous flowers / fire weed / grass moss / lichen / fungus / mushroom shrub / brush / bush	40 out of 301
learning / information / signs / education programme	31 out of 301
visitor centre / restaurant / visitor services	23 out of 301
water wetlands / stream / river / marsh / bog (peat bog) / muskeg	15 out of 301
miscellaneous: Zoo conservation; 'all of it'; weather; cleanliness	15 out of 301
felt like... / smelled like... / looked like... / sounded like...	14 out of 301
(different / forest) succession / stages / changes late / elderly / old growth early / juvenile mid / adult	13 out of 301
peaceful / relaxing / quiet / not crowded	9 out of 301
diversity / biodiversity / variety / mosaic / interconnected / relationships	8 out of 301
value / importance	1 out of 301
disturbance / damage / fire / insect / wind / snow	1 out of 301
large / vast / big (biome / ecosystem)	0 out of 301
dead wood / burned wood	0 out of 301
change / dynamic (biome / ecosystem)	0 out of 301

Figure 6-7: Visitor Survey: Report of Key Words / Categories for Things Liked the Best

There does appear to be a pattern to the responses in the visitor surveys. By far, the greatest number of key word occurrences in both Remembered Most and Liked the Best was in the '*animals*' category with occurrences in 284 out of the 301 surveys in Remembered Most, and occurrences in 230 out of the 301 surveys in Liked the Best. This was certainly due in part to the fact that there was a new moose calf in the Northern Forest section at the time of the visitor survey. The popularity of the '*animals*' category was followed by '*realistic / natural / open*' in both the Remembered Most and Liked the Best questions with totals of 87 and 149 occurrences respectively. The third most common response category

was '*plants*' with 43 and 40 occurrences. The '*learning*' opportunities category was fifth in number of occurrences for the Remembered Most question, and fourth in the Liked the Best question. While many people did note '*learning*' opportunities as well as specific Northern Forest educational information and concepts (e.g. '*forest succession*', and '*wetlands*') in their survey responses, it is apparent that the recreational and aesthetic benefits of viewing animals and plants in a realistic and natural setting was an important purpose of their Zoo visit and experience. Key words in the remaining response categories occurred in fewer than 5% of the surveys. Therefore, the natural history interpretation appears to have been less effective in communicating these Northern Forest concepts. There were some occurrences of key words in all the concept categories with the exception of '*change / dynamic / transition*', '*dead wood / burned wood*', and '*large / vast / big*'. However, there may be some overlap between the general concepts in '*change / dynamic / transition*' and those in '*forest succession*', as well as between the '*dead wood / burned wood*' and '*disturbance*' categories. The fact there were no occurrences at all in the category '*large / vast / big*' in this survey indicates the information that the Northern Forest forms the largest natural region both in Canada, and here in Alberta does not appear to have been communicated to visitors. The differences in information communication may be explained in part by the fact that some visitors pay little attention to the interpretive signs, others spend a short time examining the main details of the interpretive messages, while a few do take the time to study all of the educational components of the signs (Peterkin, Person. Comm.; Rodman, Person. Comm.). The Zoo may be able to address some of these knowledge gaps by adding additional Nature Notes that focus on these key concepts. Educational and learning opportunities are not limited to the information contained in the interpretive signs. Visitors can also pick up information through individual observation, discovery, and exploration (Southworth, 1992).

The report below (figure 6-8) represents the Things Disliked responses indicated by participants in the survey. Again, the categories have been listed in

descending order according to the number of occurrences, with the *Total Number* column in the report indicating the number of times they appeared in each of the 301 surveys.

KEY WORDS / CATEGORIES <i>Things Disliked</i>	TOTAL Number
animals: not enough species; appear to be alone; not visible; off display	63 out of 301
did not dislike anything	45 out of 301
enclosures / spaces: too small; not enough shade / cover / water	27 out of 301
trail / path: poor / no directions; confusing; no obvious starting point or entrance; too far / long; not enough sheltered benches	19 out of 301
miscellaneous: wait at cafeteria; ice-cream cones too big; bugs; weather	6 out of 301
smells / litter	5 out of 301
site: non-relevant buildings visible; evidence of construction; still new	4 out of 301
need more: animal interaction opportunities; information	3 out of 301
signs / information: grammar; exhibits / information seem contrived	3 out of 301

Figure 6-8: Visitor Survey: Report of Key Words / Categories for Things Disliked

The responses to survey question seven shown in the report above produced useful comments relating to general visitor perceptions. Zoo visitors had clearly indicated their interest in seeing animals. There were 63 survey respondents who suggested that: there were not enough species represented in the section; that animals appeared to be alone in their enclosures; or that animals were not visible or appeared to be off display. As well, there were 27 visitors who indicated concerns about the animal enclosures. These would be important issues for Zoo docents and interpreters to address in their educational programming. The responses to this survey question also provided important information related to the physical design of the Canadian Wilds Sections. Some examples were: the Zoo maps are not detailed enough, and there are not enough direction signs which leads to some confusion about where visitors are and where they want to go; there is no obvious or recognizable starting point for the Canadian Wilds; and that there are not enough places for people to stop and enjoy the vista, or just rest. These are issues that the Zoo may want to address both in making improvements to this existing section and in the planning for future sections. Many participants (45

respondents) specifically noted that they did not dislike anything about the Northern Forest exhibit. For this reason, a response category for this was added.

Information in the report below (figure 6-9) summarizes Additional Comments noted by survey respondents.

KEY WORDS / CATEGORIES Additional Comments	TOTAL #
well done / good job / enjoyed visit / beautiful / favorite part	44 out of 301
good for tourists; good for school groups	4 out of 301
enjoy seeing: Western Canadian animals up close; emphasis on local environments	3 out of 301
hard to compete with other Zoo sections	3 out of 301
aircraft flying overhead disrupt peaceful atmosphere	2 out of 301
symbolizes respect we have for our environment	1 out of 301
enjoy the baby animals (especially Moose calf Teslin)	1 out of 301
building / facility: well spaced; fits in with exhibit	1 out of 301
recommend a display illustrating human component (historical, cultural)	1 out of 301

Figure 6-9: Visitor Survey: Report of Key Words / Categories for Additional Comments

The last question on the survey (question 9) allowed visitors to make any additional comments if they desired. This proved valuable in picking up additional items they liked or disliked, and these were then coded accordingly. The answer categories in the report above were then developed for general visitor remarks and observations.

Additional database queries were run that compared Remembered Most and Liked the Best responses between: Calgarians and tourists; Zoo members and non-members; and first-time and repeat Northern Forest exhibit visitors. The purpose of these queries was to determine whether or not there were any patterns apparent in the responses among these particular groups. There were 163 Calgary participants and 138 tourists. The responses in the top three key word categories ('animals', 'realistic / natural / open', and 'plants') were similar for these two groups. Of all the participants, 63 were Calgary Zoo members, and 238 were non-members (a ratio of almost 1 : 4). Taking this ratio into consideration, the number of occurrences in the top three key word categories was also similar. Lastly, there

were 169 first-time visitors, and 132 repeat visitors to the Northern Forest exhibit. Again, the pattern of responses between these groups was similar. These results indicate that there does not appear to be a notable or informative difference in the natural history interpretation information being communicated among these different groups. In other words, there did not seem to be additional information picked up by Members over non-members, Calgarians over tourists, or repeat over first-time Northern Forest visitors.

Indicators of Successful Interpretive Planning

There are several qualities or characteristics identified by Southworth (1992, pages 87 - 88) that can be used as indicators of successful interpretive planning. These indicators were applied in conjunction with the results of the visitor survey to assess the effectiveness of the natural history interpretation in the Northern Forest section. The following describes these interpretive indicators.

1. VISIBLE, TRANSPARENT, AND INFORMATIVE

Visitors are able to enjoy first-hand experiences in the context of the area through the senses of sight, sound, touch, and smell. The visitor can learn not only by reading signs, but also by reading the landscape directly.

2. INTERACTIVE

The visitor should feel that they are a part of the setting, rather than removed or isolated from it. Ideally, there should be some opportunity for interactive participation.

3. ACCESSIBLE, OPEN, AND EXPLORABLE

Individual experiences and discoveries are encouraged when visitors are free to explore an area at their own speed rather than being confined to a predetermined pace and route. Access must be open to people with different levels of mobility.

4. DIVERSE

The dynamic nature of the environment should be reflected in the interpretation and setting. This provides possibilities for a variety of learning experiences and insights to repeat visitors.

5. DELIGHTFUL

The whole experience should be intriguing, refreshing, and fun. This can be accomplished by appealing to visitors' curiosity, involving different senses, and provoking thinking, feeling, and imagination.

6. AUTHENTIC

The setting should be genuine and living so the visitor sees it as something real.

7. NON-INTRUSIVE, CONTEXTUAL

The appropriate type and amount of interpretive media are used such that the visitor is not distracted or overwhelmed by the interpretation.

8. MEANINGFUL

The interpretation must be relevant to the natural significance, aesthetic beauty, and the cultural or historic context of the subject in order to be meaningful to the visitor.

An analysis of information gained through the visitor survey indicated the Northern Forest exhibit allowed visitors to use most of their senses (including sight, hearing, and smell) to experience the landscape. Interpretive signs and opportunities for individual observation and discovery enhanced the learning experience (VISIBLE, TRANSPARENT, AND INFORMATIVE). Visitors obviously felt immersed in the forest setting, with many survey respondents commenting that the exhibit looked and felt natural and realistic. However, there were some visitor remarks from the survey that indicated the need for more learning-by-doing opportunities for interactive participation (INTERACTIVE). The Northern Forest section is accessible to people with strollers, wagons, and wheelchairs. All visitors can spend as much or as little time as they want

exploring the area. While there is no set or predetermined route through the Canadian Wilds or the Northern Forest section, the interpretive signs are oriented toward those visitors entering from the intended beginning of the Canadian Wilds, near the Zoo north entrance (ACCESSIBLE, OPEN, AND EXPLORABLE). The design of the exhibit was intended to re-create the complex and diverse nature of the Northern Forest. The different ecosystem components represented in the exhibit will grow and change naturally through different seasons and through time, providing repeat visitors with a variable landscape to explore. With the exception of Nature Notes, the information in interpretive signs is fixed and permanent. However, different interpretive information and insights can be provided by changing Nature Notes (DIVERSE). The Northern Forest section of the Canadian Wilds is a re-creation of a unique environment. The exhibit provides access and experiences to many people who may not otherwise be able to experience the real thing. According to information from the survey, the section not only appealed to visitors' curiosity, but often promoted an enjoyable and peaceful experience (DELIGHTFUL). Animals, the realistic landscape, and the plants of the Northern Forest exhibit constituted the top three answer categories identified for things remembered most and things liked the best in the survey. This suggested that visitors saw the setting as genuine and real (AUTHENTIC). Information and learning - through interpretive signs and an educational programme on the Northern Forest (presented daily by seasonal interpreters), was the forth most frequent answer category. Still, there were a few respondents who indicated that they would have liked more interpretive information. Visitors did not appear to be distracted or overwhelmed by the amount and type of interpretive information (NON-INTRUSIVE, CONTEXTUAL). One survey participant suggested incorporating a display illustrating the human historical and cultural component in the Northern Forest. While there may be little information in the interpretive signs relating to the human context, most visitors did show an appreciation and awareness of the natural aesthetics and significance of the

Northern Forest communicated through the natural history interpretation
(MEANINGFUL).

Chapter 7

There are as many possibilities for interpretation as imagination allows in both natural environments and man-made environments.

(Southworth, 1992, page 89)

7. Conclusions and Recommendations

This chapter represents the synthesis of the information, concepts and principles presented in this Masters Degree Project. It provides the conclusions of this project, and furnishes feedback and recommendations on the natural history interpretation planning process used by the Calgary Zoo in the design of the Northern Forest Section. The recommendations can be applied to other projects at the Zoo, or to other natural history sites.

7.1 Conclusions

This project involved an examination of environmental education and natural history interpretation, and used the Calgary Zoo as an example. The case study provided an opportunity to evaluate the planning and implementation of the natural history interpretation for the educational signs in the Northern Forest section of the Calgary Zoo's Canadian Wilds Project. This MDP addressed the following objectives as set out in chapter 1:

- furnish background information on environmental education and natural history interpretation;
- introduce the Calgary Zoo, describe the elements of their interpretive programme, identify the key concepts and components of the Zoo's Northern Forest exhibit, and describe the natural history interpretation planning process the Zoo followed for the educational signs;
- investigate aspects of interpretation design;

-
- research, develop, and implement a visitor survey designed to determine what Northern Forest information or knowledge the Zoo public came away with after visiting the new section;
 - analyze the success of the design process by comparing the survey information with the natural history interpretation goals, objectives, and expectations developed during the planning phase;
 - evaluate indicators of successful interpretation in conjunction with the results of the visitor survey to assess the overall effectiveness of the natural history interpretation in the Northern Forest section; and
 - provide conclusions and recommendations on the Zoo's natural history interpretation planning and design process.

Through personal observation opportunities and educational experiences, Zoo visitors are exposed to some of the variety and diversity of species and spaces on this earth. It is environmental education and natural history interpretation that provide the communication link between visitors and these opportunities and experiences. This link is necessary to promote the Zoo's goals of environmental understanding and appreciation, and to encourage a greater interest and desire to do something for the natural environment, and for conservation. In this project, the evaluation of the natural history interpretation in the Zoo's Northern Forest section was intended to assess the planning process used in the interpretation design. As Robson (1993) states, "evaluation is primarily concerned with describing and finding the effects of a particular approach, policy or programme" (page 171).

Information from the visitor survey analysis in this project (chapter 6) indicated the natural history interpretation was reasonably effective in communicating many of the key Northern Forest concepts that were identified during the Zoo's planning process. However, other factors need to be taken into consideration. For example, people often enjoy a Zoo visit simply because they can slow down, relax, and escape their normal urban pace. Comments from

visitors showed they value the fact they can go where they want during their visit to the Zoo and the Northern Forest exhibit. They also looked forward to spending as much or as little time as they wanted doing things like: listening to the birds in the trees; watching the caribou graze; relaxing and feeling the sun in their face; smelling the smell of the wood chips; and experiencing the spongy feel of the trail in the bog.

It puts visitors into nature, and they are surrounded by nature, and it's a very rewarding, refreshing, renewing experience. And so that's a part of the whole [visit]. That's what makes measuring the interpretive value, or the educational value of an exhibit so difficult.... But if at the end of a walk through the Canadian Wilds they begin to appreciate that there is a lot more to this part of the world than a bunch of grass and a few trees, then we have started to develop some of that empathy that's important (Peterkin, Person. Comm.; Rodman, Person. Comm.).

In conclusion, based on the analysis of the visitor survey information in conjunction with the indicators of successful interpretation, the Zoo was reasonably successful and effective in providing natural history interpretation relating to the Northern Forest in an engaging, entertaining, and appealing way. The result was to promote a general awareness, understanding, and an appreciation of the interpretive subject among visitors to the Northern Forest section.

7.2 Recommendations

As noted in chapter 5, the Zoo does follow a general framework for all long-term and short-term planning and decision making that incorporates formal in-house planning and design teams for individual projects. However, they do not currently use any specific planning model for their natural history interpretation design. Although the natural history interpretation in the Northern Forest exhibit succeeded in communicating many of the desired educational goals, objectives, and expectations, the interpretive design process could benefit from consideration of the following feedback and recommendations.

-
- It is important that the Zoo devise and adhere to a specific planning model for designing educational and interpretive goals, and incorporate this into their general planning process. This model can be based on the frameworks described in chapter 5. The model should continue to include an in-house interdisciplinary planning team, and it should allow for input and feedback throughout the process to provide for revision and improvements (Sharpe, 1976). Following a detailed and thorough interpretive planning model will help to ensure that relevant information is not left out of the interpretation design.
 - It is crucial to develop clearly defined and explicitly stated interpretive objectives during the interpretation planning process. While many key concepts were identified for the Northern Forest educational story line during the planning process, they were not explicitly stated or defined as interpretive objectives. The main themes for specific areas are derived from these interpretive objectives (Veverka 1994). The importance of having a main theme is that it provides a structure, or framework for the development of the interpretation messages, resulting in clarity and continuity.
 - Another important reason for having clearly stated themes is for the purpose of evaluating the interpretive product (Veverka, 1994). The Zoo currently uses surveys for obtaining general information about Zoo visitors. There has been very little in the way of surveys and evaluations of the Zoo's natural history interpretation. Evaluation, revision, and improvement relies on feedback. As Sharpe (1976) states, mechanisms for feedback, evaluation, and improvement should be incorporated into the interpretive design, and emphasized in the planning stages. The Zoo should practice ongoing assessments for the measurement and evaluation of educational and interpretive opportunities in order to determine the impacts on the Zoo visitor. These instruments for measurement and evaluation should include both quantitative and qualitative

components. Research methods that would be useful in the Zoo context include visitor surveys, focus groups, in-depth interviews or questionnaires, and naturalistic observation - the study of behaviour in natural settings (Neuman, 1994). Again, regular assessment will provide important feedback information to evaluate, revise, or reinforce the interpretive plan.

- To accomplish the tasks of designing effective natural history interpretation, and in particular, practicing ongoing assessments for the measurement and evaluation of educational and interpretive opportunities, the Calgary Zoo should incorporate many types of social science research methods, especially formative and impact information-gathering and evaluation procedures, into an interpretive planning process. An example of a formative evaluation method the Zoo did experiment with in the Northern Forest case was the Northern Forest Advisory Task Force (Steering Committee). The Zoo acknowledged that there is an important role for public input into design and planning, especially in the context of a re-evaluation of what already exists. One of the reasons given as to why it would be easier to use in a redevelopment is that overall, the task is more manageable (Peterkin, Person. Comm.; Rodman, Person. Comm.). The Steering Committee proved to be a successful and useful strategy in providing a balanced-bias input into developing the educational and interpretive goals, objectives, and expectations for the Northern Forest. In other Zoo planning situations (both in the redevelopment of existing areas, as well as the design of new areas), it would be helpful to bring different multi-stakeholder groups together, in addition to in-house planning and design teams, provided these multi-stakeholder groups were given a manageable scope and explicit parameters to work with.
- As people learn and remember best through participation (learning-by-doing), emphasis should be placed on incorporating some sort of action or activity in all educational and interpretive opportunities to reinforce interpretive points.

In other words, visitors should be directed or prompted to do something. Most of the programmes presented through the education department are good examples of applying a learning-by-doing approach. As mentioned in chapter 5, signs can also encourage people to participate in the learning process with such prompts as: Look for the ...; See if you can find the ...; Can you see the ...; Touch the ...; and therefore help visitors to “REMEMBER activities, concepts, and experience” (Veverka, 1994, page 50). However, there are no examples of using the signs in the Northern Forest section to promote learning-by-doing as recommended by Veverka (1994). Natural history interpretation signs for future sections, and redevelopment plans involving signs in existing areas should incorporate this learning-by-doing approach.

None of the above recommendations present an overwhelming or dramatic change to the process of natural history interpretation design at the Zoo. The greatest challenge would be integrating the suggested social science methods and a formalized interpretive planning model into their existing general planning approach. Although the Zoo has had a lot of experience in interpretive planning and design, consideration and incorporation of these recommendations should: lead to improved natural history interpretation; provide more learning opportunities for visitors; and, perhaps most importantly, result in an improved system for monitoring and assessing the outcome and impact of interpretation at the Zoo.

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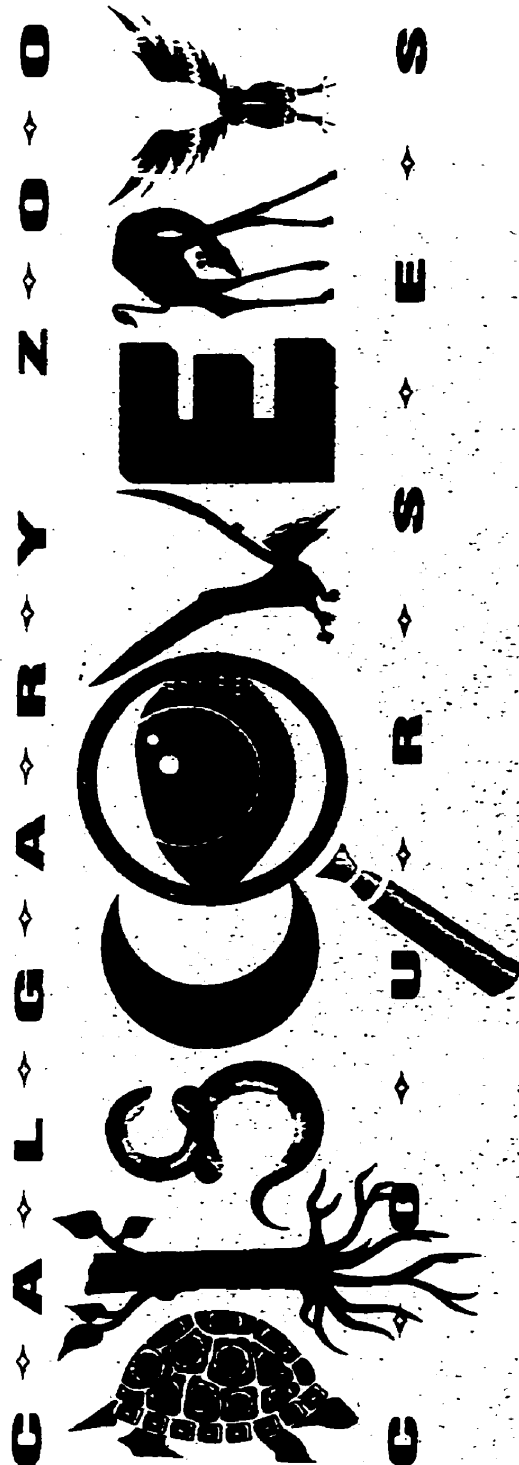
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Appendix 1: Calgary Zoo Discovery Courses

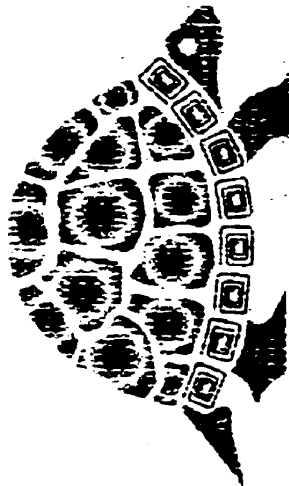
CALGARY ZOO SCOX CURSES




1998-99

Education Programs

2.



*There is so much
to discover at
the Zoo!*

1. All Zoo programs consist of both a classroom and four component. In the classroom, Docents (education volunteers) will use animal artifacts and activities to encourage learning. This will be followed by a visit to relevant exhibits or habitat areas. In order that the four component of the program be utilised effectively, please wait for program completion before visiting the habitat relevant to your program with your students.
2. Teachers will receive a letter of confirmation after booking a program. You must bring this confirmation with you to the Zoo to facilitate your group's admission. You will also receive a guide containing pre-visit and post-visit activities.
3. Programs are offered year round in the Karsten Discovery centre classrooms at the North entrance to the Zoo. Non school organizations are welcome to book weekend and evening programs.
4. Most of the programs offered at the Zoo can be adapted for your classroom during September, October, November and March.
5. Maximum class size for all programs is 35 students. PLEASE DO NOT COMBINE CLASSES.
6. Programs are 60 minutes in length unless noted otherwise.

MEET THE MONKEYS

GRADE LEVEL: ECS

There are big differences between monkeys and apes. Students will learn the different ways that monkeys use their tails, how to move like a gorilla and much more in this interactive program.

MARINE CREATURES

GRADE LEVEL: ECS-2

Explore marine eco-systems and undersea life. Students will learn basic sizes and shapes of intriguing sea creatures.

GIANT ANIMALS

GRADE LEVEL: ECS-2

Your class will compare the sizes of Zoo animals to learn which is the heaviest and which is the tallest among the world's animal giants.

NEW! OFFERED BEGINNING OCTOBER 19, 1998

FIRE AND WATER: THE BOREAL FOREST

GRADE LEVEL: 7-9, 10-12

Students will investigate issues pertaining to the diverse species inhabiting the world's largest biome. We will then explore this new habitat which opened in June 1998.

ZOO CAREERS

GRADE LEVEL: 9-12

What do zoo professionals do? Learn about the various roles, skills and responsibilities of the dedicated individuals who work at the Calgary Zoo. You will see some tools of the trade you've never seen before!

GORILLAS

GRADE LEVEL: 4-6

Your class will investigate similarities and differences between human and gorilla behaviour. Learn how the Calgary Zoo simulates gorilla habitat with a hands-on activity.

*75 minutes

GRADE LEVEL: 7-9, 10-12

Students will work in groups to determine how research has impacted gorilla survival in the wild.

*75 minutes

BEAVER TALES

GRADE LEVEL: 1-3

Learn about beaver lodges, beaver lore and the special adaptations required to live in the wetland habitat of the beaver. Then see the new Northern Forest Habitat, opened June 1998.

LIFE CYCLES

GRADE LEVEL: 3

Students will compare the life cycles of three familiar animals (your choice of insects, birds, reptiles, amphibians or mammals) to observe and describe changes in appearance and activity through their development.

CREEPY CRAWLIES

GRADE LEVEL: 1-3, 4-6

Learn what makes insects special and vital to our world. Focus on butterflies or other creepy crawlies and compare characteristics of common arthropods.

BEARS

GRADE LEVEL: 1-3, 4-6

Let's compare a bear, students will investigate polar, black and grizzly bears and learn how these bears are adapted to their habitats.

OWLS

GRADE LEVEL: 3-6

Is your class reading Owls in the Family? Learn what owls eat, when they live and their special features and habits. Optional: Students will be introduced to basic vertebrate anatomy by examining owl pellets.

In order that the enclosure visit component of the program be utilized effectively, please wait for program completion before visiting the respective enclosures.

ENDANGERED SPECIES

GRADE LEVEL: 4-6, 7-9, 10-12

How do changes to a habitat affect the creatures living within it? Examine the earth-wide crisis facing many species of plants and animals today. Discover how the Calgary Zoo helps preserve endangered species.

Note: When looking, please state the area of emphasis, Canadian endangered species or world wide endangered species.

UNDERSTANDING THE RAINFOREST

GRADE LEVEL: 7-9

Explore a rainforest ecosystem and the interactions between plants, animals and abiotic factors.

MINI ZOO

Available only to groups physically unable to visit the Zoo. Small animals and artifacts are taken to hospitals and nursing homes for the learning experience.

*45 to 60 minutes

ECO-ARCHITECTS

GRADE LEVEL: 7-9, 10-12

Your class will learn how zoos must consider animal adaptations, social and psychological needs while planning new Zoo habitats. We will work in groups to plan, design and evaluate a new Zoo enclosure.

*75 minutes



PREHISTORIC PROGRAMS



TIME TREK

GRADE LEVEL: 7-9, 10-12

This tour through the prehistoric park will explore diverse habitats and the plants and animals that land marked western Canada's past.

DINOSAUR SHAPES AND SIZES

GRADE LEVEL: ECS

Dinosaurs bigger than a school bus? A dinosaur that would fit in your pocket? Activities, demonstrations and fossils will emphasize the diversity of dinosaur shapes and sizes.

DRAMATIC DINOSAURS

GRADE LEVEL: 1-2

Your students will be transformed into amazing dinosaurs in a lively, short play where they will mimic the behaviours and adaptations of horned, duck-billed and meat eating dinosaurs.

DINOSAURS ALIVE

GRADE LEVEL: 3-6

Fossils, skin impressions and footprints offer vital clues to the puzzle of dinosaur life. Students become dinosaur detectives to reconstruct a mystery skeleton and determine information about its adaptations and habitat.

In order that the Prehistoric Park visit component of the program be utilised effectively, please wait for program completion before visiting the Prehistoric Park with your students.

IMAX THEATRE CALGARY

Double the learning with a two-part field trip:
Visit the Calgary Zoo and IMAX Theatre.

All IMAX films start at 11:00 a.m. at the IMAX Theatre at Esplanade Market. The films last approximately 40 minutes, and may be viewed either before or after the Zoo programs. Zoo programs consist of an in-class part and a visit to the corresponding exhibit (elephants, Prehistoric Park or rainforest).

ELEPHANT IMAX CO-OP PROGRAM

THURSDAYS: OCTOBER 2, 9, 16, 23, 30

Meet the earth's largest land animal in Africa's Elephant Kingdom. A family-oriented adaptation of the IMAX film Elephant.

DINOSAUR IMAX CO-OP PROGRAM

WEDNESDAYS: JANUARY 3, 10, 17, 24, 31

Combine the IMAX film T-Rex with the Prehistoric Park program (Dinosaur Shapes and Sizes, Dramatic Dinosaurs, Dinosaurs Alive or Tired Trek).

RAINFOREST IMAX CO-OP PROGRAM

TUESDAYS: MARCH 2, 9, 16 AND 23

Students will appreciate rainforests better after experiencing the IMAX film Tropical Rainforest and learning about the plants, animals, and their interactions in this precious ecosystem.



Remember to include a number of chairs to ensure them a seat at IMAX Theatre. Film numbers must be confirmed 2 hours prior to your attendance.

TO REGISTER Call the Zoo at 233-7336.

Watch for other exciting co-op programs in the future. **IMAX THEATRE**

6.



HOW TO REGISTER

1. Programs fill quickly so please book early, at least two weeks in advance.
2. Please fill out the following form. You will be asked for this information when you request a program.

◆ Name of Program _____

◆ School Name and Full Mailing Address _____

◆ _____

◆ Date of Visit _____

◆ School Telephone Number _____ School Fax Number _____

◆ Number and Grade Level of Students _____

◆ Number of Supervisors _____

3. Call the Calgary Zoo's Group Sales Department at 232-9386.

A letter of confirmation will be sent to you after registration. This will direct you to the proper facility for your program. Please bring this confirmation to the Zoo to facilitate your group's admission.



Zoo provide an important link to global wildlife issues. Through captive breeding programs for endangered species and sophisticated methods of exhibiting animals in natural settings, zoos are forerunners in the field of conservation.

FEES AND PAYMENT

ADMISSION

All pre-registered schools/groups (minimum number of 10 paying individuals, members-included) will receive a 10% discount on regular Zoo admission. The discounted rates are as follows:

GROUP RATE:

AGE CATEGORY	OCTOBER 1 TO APRIL 30*	MAY 1 TO SEPTEMBER 30*
Child (ages 2 to 17)	\$3.60 each	\$4.27 each
Adult (ages 18 to 64)	\$7.20 each	\$8.55 each

One free adult supervisor is permitted for every four students (under 18 years of age). Additional adults pay the adult group rate.

*Dates refer to dates of visit to the Zoo, not date of booking.

PROGRAM FEES:

All rates and charges will be reflected on your invoice and include GST. These rates are in effect for the 1998-99 school year only. Prices are subject to change without notice.

Programs conducted at the Zoo: \$25.00. Please have the funds collected in advance to make only one total payment by cash, cheque or credit card to the entrance cashier. Cheques should be made payable to **The Calgary Zoological Society**. If your school is arriving at two different times, admission and program costs must be paid with separate cheques.

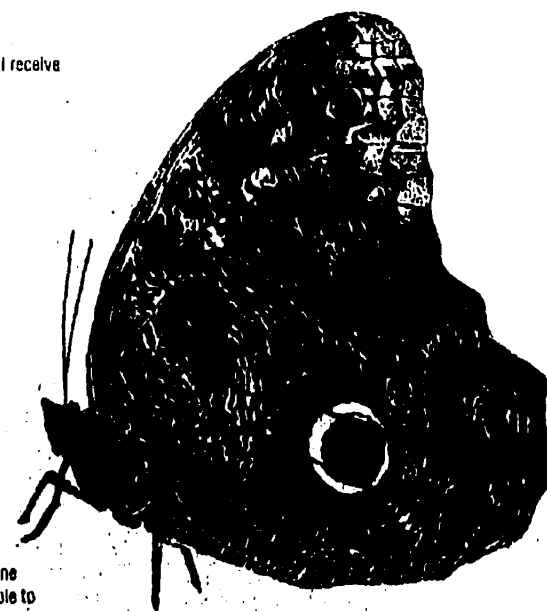
Programs conducted at your location: \$35.00. Mileage will be charged for programs conducted outside the city limits. Payment may be made by cash or cheque made payable to **The Calgary Zoological Society**. Payment should be made to the person delivering the program at your location.

CANCELLATIONS

Two weeks notice in writing is required for any Discovery Course program cancellation.

You may fax cancellation notices to the Dozent Coordinators at 261-9091.

Failure to notify the Zoo two weeks in advance requires that the program fee be paid.



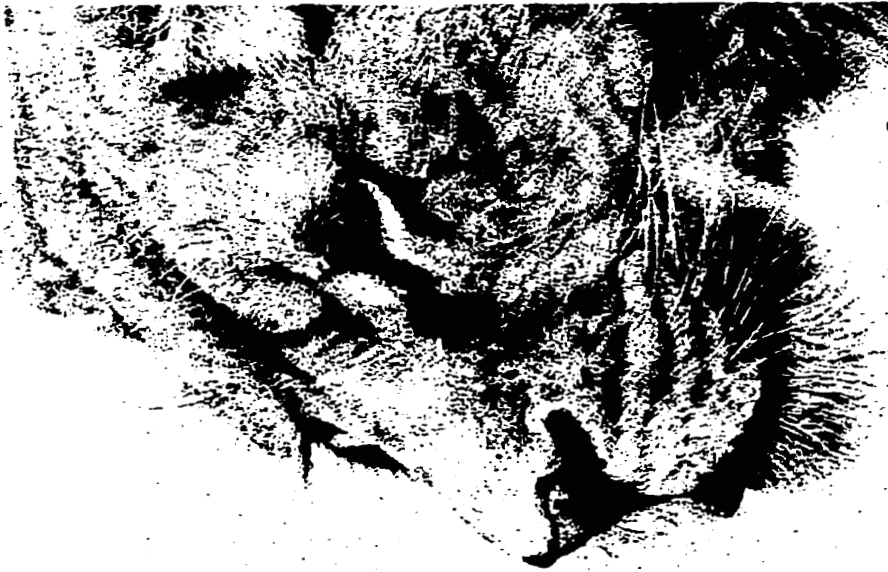
ON YOUR OWN...

If your Zoo visit is on your own, with no program given, it is no longer necessary to preregister. However, to qualify for a discount, a minimum of 10 paying individuals must enter as a group and be paid for in one lump sum.

REGISTRATION

OUR MISSION...

The mission of The Calgary Zoological Society, in partnership with the City of Calgary and its citizens, is to develop, operate and promote an integrated zoological, botanical and prehistoric park, and a conservation centre for the combined purposes of conservation, education, recreation and scientific study.



Appendix 2: Calgary Zoo Newsletter

WHAT'S *New* AT THE

ZOO

The newsletter of The Calgary Zoological Society

A BLOOMIN' GOOD TIME!

Plan on joining us for a bloomin' good time at the Golden Acre Bloomfest at the Calgary Zoo! This is our fourth annual festival celebrating gardens and gardening. It will feature the Dorothy Harvie Gardens in pure spring splendor and you can expect everything from guest speakers, how-to programs, hands-on activities for all ages, garden tours and more. There will be horticulture industry booths, craft tables, garden societies, Master Gardener displays, the Zoo's very own garden staff and various other exhibitor booths. Here's your chance to chat with the folks in the know! Kids are definitely not forgotten at this event, be prepared to paint some pots or make animals out of leaves. Golden Acre Bloomfest will provide a fun, entertaining, learning opportunity for couch potato gardeners and green thumbs alike.

When is this fantastic event happening, you ask? Golden Acre Bloomfest is May 28 - 30, 1999 from 11:00 a.m. until 5:00 p.m. daily, (Friday 11:00 a.m. - 4:00 p.m.). Last year over 18,000 visitors passed through our gates for this colourful event. If you are interested in becoming an exhibitor, please call Olivia at 232-9306 for more information.

We are pleased to announce The Calgary Herald, CFCN and QRT77 as sponsors, along with Golden Acre Garden Society as our title sponsor!

KOALA MAGIC

The Calgary Zoo is hosting two very special guests this summer! From May 22nd until September 12th, 1999, we will have two koalas on loan from the San Diego Zoo. We are currently renovating the Australia/Nocturnal building to create a comfortable home for them. Because of the renovations, however, some areas of the building may shut down for short periods. We apologize for the inconvenience.



We are planning some exciting, fun activities to enhance the exhibit and will tell you all about them in the next newsletter. Stayed tuned!



INSIDE THIS APRIL '99 ISSUE...

Volunteers with Verve
Hort Happenings
Animal Updates
Anything Goes!

ANIMAL UPDATES

To learn how to care for our visiting koalas, one of our keepers will help the koalas settle in and provide us with more training. The koalas will be escorted to Calgary by our keeper as well as a keeper from the San Diego Zoo. The San Diego Zoo keeper will help the koalas settle in and provide us with more training.

Albino and albino, our 6-year-old gorillas, will be heading to a new home at the Kansas City Zoo sometime this spring. We will certainly miss them here but our ever-expanding troop needs more space and Albino and Albino will benefit from a new social group.

Albino and Albino, our 6-year-old gorillas, will be heading to a new home at the Kansas City Zoo sometime this spring. We will certainly miss them here but our ever-expanding troop needs more space and Albino and Albino will benefit from a new social group.

Building before they leave for their new home. The weather can be very tricky. Be sure to visit the Primate City. Co-ordinating the shipping with the permit process and Louis for a quarantine period before they continue to Kansas. The gorillas will have to stop at St. Louis for a quarantine period before they continue to Kansas.

Another long-time resident, Lashie, our 5-year-old Siberian tiger, will be going to the Valley Zoo in Edmonton. This move will also help to create some of the space needed to allow us to bring in a new female to breed with Khasan. Lashie will be trucked to Edmonton by our staff who will also pick up three yearling elk at Elk Island National Park. After their quarantine, the elk will reside in the Aspen Woodlands.

In April, the Calgary Zoo will be hosting a conference for the Bear Tacon Advisory Group (TAG). Bear keepers, field researchers, conservationists and enthusiasts will gather to exchange ideas and news on topics such as conservation, field studies and nutrition. We will have two days of papers as well as a zoo tour and final dinner with a silent auction. We are excited to be involved in this active group, especially as there is so much interest in the Eastern Slopes Grizzly Bear Project locally. Dr. Ulysses Seal, Chairman of the Conservation Breeding Specialist Group (CBSG), was in Calgary and area in January to conduct a Population Habitat Viability Assessment for that group. These studies try to mesh animal and human needs to create win-win solutions for conservation. Sometimes this spring, we also expect to receive a cotton-top tamarin, a golden-headed lion tamarin, a Mexican red-legged

2

MORT MAPPINGS

Iranian, emperor scorpions, a hooded turtle, Egyptian geese, Eurasian wild boar, wild turkeys as well as the return of Pzewalski horses to the Zoo island. More information will be forthcoming.

Master Gardeners

Is your garden full of mysteries? Come to the Zoo's Conservatory on the third Sunday of every month between 12:00 p.m. and 3:00 p.m. Our Master Gardeners will do their best to answer all your gardening questions.

Grants for Change

In December, the Zoo was awarded one grant from the federal government's Ecosystem 2000 Program, and another from the Shell Environmental Fund for our Schoolyard Naturalization Program. This generous support from our sponsors means we can provide some material support for the school projects. Currently, the pilot schools are in various phases of the site design process, with a couple of schools ready to plant this spring. We've been busy with teacher workshops and working closely with parent councils and naturalization committees to ensure each project will enjoy long term success. Stay tuned.

FURTHER DEVELOPMENTS

Don't be a part of the regular herd. Join the Zoo Pride For Easter, Mother's Day, Father's Day, or a spring birthday give a WILD gift — Be creative! Give the gift of Zoocare.

Is there a bear in your household that seems to move at the same speed as a two-toed sloth?

Or a little one that's just ape over (hyraxes or thropops?)

Give Mom a little spring, sponsor an entire garden or floral collection in the Zoo's Botanical Garden! These aren't cut flowers that wither in a few days - sponsor the butterfly garden, its collection, or rose collection.

How about a bird eagle for the dad that's not-so-healthy on top? Or maybe he reminds you of a grizzly bear first thing in the morning?

For more information on Zoocare sponsorships call the Zoo Development Office at 232-9334.

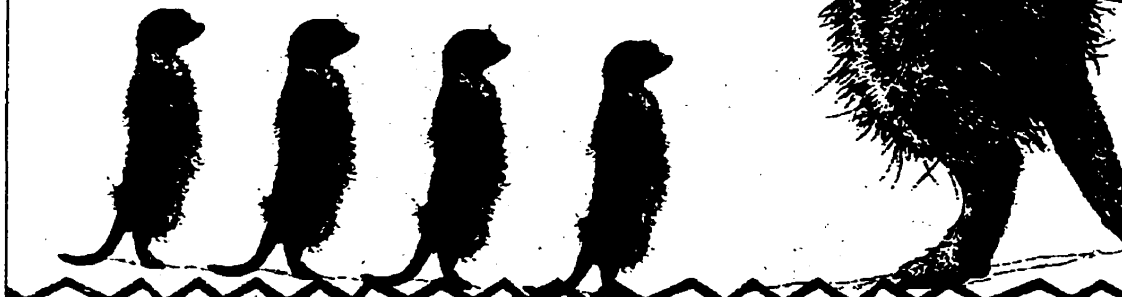
VOLUNTEERS WITH VERVE!

A group of dedicated volunteers have started the program to help the community. They are the ones who make the difference.

Ophelia Abaka
Desmond Allen
Jean Barlow
Dusty Becker
Elaine Bearbach
Diane Bell
Heather Berg
Beryl Braun
Bobbie Bunn
Betsy Bywater
Toni Carey
Sarah Carnegie
Danny Carson
Kwong Chow
Pat Chow
Jean Clark
Carroll Clarke
Nancy Craig
Sharon Davis
Wayne Deborne
Ruth Dickau
Sharon Dougan
Laura Dunford
Corinne Duus
Denise Endicott
Dave Erskine
Doreen Erskine
Joseph Fabian
Jack Fellner

Pat Findlay
Cheryl Fisher
Cedric Gerrard
Marilyn Gillett
Alayna Goughly
Diane Gunter
Donna Hagerman
Sandy Hannigan
Henry Hoffmann
Sharyn Honeywell
Ivy Houchen
Gloria Hubale
Catherine Jankerson
Anne Johnson
Audrey Kopas
Gerry Kurtz
Ann Kus
Michel Lacasse
Frances Laidlaw
Kathleen Lamb
Kim Landry
Linda Leschuk
Cindy Laung
David Linton
Pat McGuire
Joanne Macollus
Scott McCall
Trevor Michael
Joanne Molesty

Nicole Muchowski
May Musters
Bruce Nighswander
Judy Paddington
Carol Peterson-Malo
Dave Powell
Margaret Prior
Bill Quayle
Deanne Reger
Heather Riach
Patricia Rickards
Kathryn Romanchuk
Suzanne Sanders
Karl Schiemann
Gudrun Schuke Ebbinghoff
Mario Scifano
Doris Simmons
Mark Stewart
Nancy Todd
Melinda Tracey
Sue Vestre
Bela Vinsome
Karen Volk
Rhonda Walsh
Christie Wayde
Jerry Weber
Leslie Webster
Marilyn Wellens
Julie Westgate
Donal Whelan
Gerda White
B.J. Williams
Matthew Wort
Sheena Yates
Katherine Yitako
Tracy Young



ZOO Animal and Plant P.R.O.G.R.A.M.S



Reef's Preschool Area
Children aged 3 to 5 years and their chaperone will enjoy this light-hearted look at animals through puppetry, songs, activities and crafts. This program will be led by children's educational entertainer and Zoo volunteer Gail Gregory, of "Tales, Tunes and Puppetry."

Reef's Preschool Area

Reptiles, Snakes and Dinosaurs
Saturdays, April 17 or 24
Primates
Saturdays, May 8 or 15
Birds
Saturdays, June 5 or 12
11:00 a.m. - 12:00 p.m. or
1:30 p.m. - 2:30 p.m.

Tom Barnes Classroom
Child: \$15.00 each program
20% discount for members
10% discount for winter/spring series
Price includes program and Zoo admission for child and one chaperone - maximum of four children per chaperone.

TO REGISTER FOR ALL PROGRAMS

Summer Camps at the Zoo
Kids, curiosity and animals are an exciting combination. Children explore the Zoo in our week-long day camp programs. Animal visitors, fun-filled activities, hands-on items and crafts are used to help budding zoologists discover the natural world.

Discover the Zoo: For children who have completed Grades 1, 2, or 3 only

Junior Zoologists: For children who have completed Grades 4, 5, or 6 only

Monday to Friday

Session 1: July 5 - July 9
Session 2: July 12 - 16
Session 3: July 18 - 23
Session 4: July 25 - 30
Session 5: August 2 - 6
Session 6: August 9 - 13
Session 7: August 16 - 20
Session 8: August 23 - 27
8:30 a.m. - 4:30 p.m.

Meet at the Karsten Discovery Centre
Child: \$156.00
20% discount for members
Registration begins Monday, May 3 at 9:00 a.m. PHONE IN ONLY

Reef's Middle Camp

Children ages 4 to 6 years old will enjoy this light-hearted look at animals through puppetry, songs, activities and crafts. Led by children's educational entertainer and Zoo docent Gail Gregory, of "Tales, Tunes and Puppetry." Chaperones welcome but not required.

Session A: Tales and Songs

July 12 - 16

Session B: Animals in The Dark

July 18 - 23

Session C: Water and Animals

July 25 - 30

Session D: Adventure

August 2 - 6

Session E: Continuation

August 9 - 13

Session F: Animals A to Z

August 16 - 20

Session G: The 5 Senses

August 23 - 27

Monday to Friday

8:30 a.m. - 12:30 p.m. OR

1:30 p.m. - 5:30 p.m.

Tom Barnes Classroom
Child: \$90.00
20% discount for members
Registration begins Monday, May 3 at 9:00 a.m. PHONE IN ONLY



Teens Wildlife Workshop

This is a hands-on workshop for teenagers interested in animals and nature. Learn what captive and wild animal conservation is all about. This program includes an in-depth introduction to the Zoo, the chance to meet working Zoo keepers and participate in Zoo projects, and a Bear Ecology fieldtrip.

Workshops

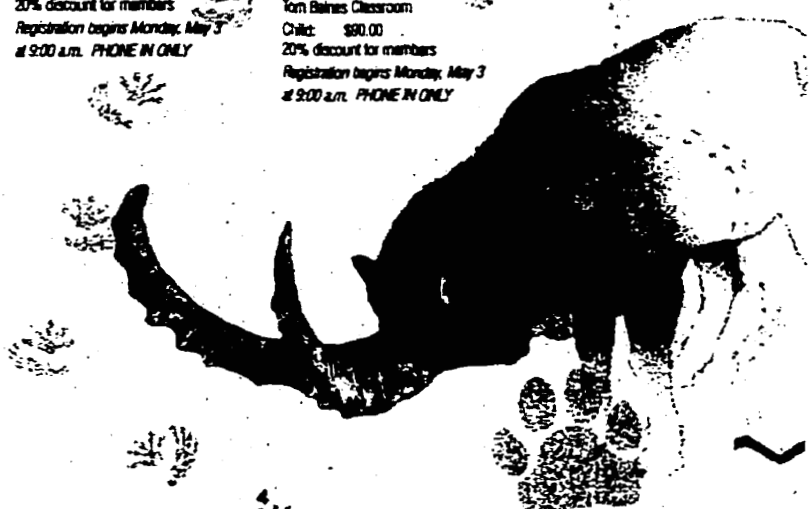
Saturdays and Sundays
Or 7-8: April 17 and April 18
Or 10-12: April 24 and April 25
8:30 a.m. - 4:30 p.m.

Fieldtrips

Or 7-8: Saturday, May 1
Or 10-12: Sunday, May 2
8:30 a.m. - 4:30 p.m.

Realistic

Or 7-12: Thursday, May 6
7:30 p.m. - 9:30 p.m.
Karsten Discovery Centre
Youth: \$110.00
20% discount for members





Wildflower Photography Workshop
Join Zoo photographer and horticulture volunteer Bill Quilty for a three part flower photography course. He has honed his photographic skills around Alberta and around the world, most recently, in Southern Africa. Bill's spectacular photography is used all around the Zoo and this workshop will introduce some of his tips and tricks for capturing a quality image.

Introductory Lecture

Tuesday, June 8
7:00 p.m.

Karsten Discovery Centre/Esso Auditorium
Workshop in Kamloops, Canada

Sunday, June 13
9:00 a.m. - 4:00 p.m.

Circle Walk

Tuesday, June 22
7:00 p.m.

Karsten Discovery Centre/Esso Auditorium
Adults: \$80.00

20% discount for members
Pre-requisite: working knowledge of your own 35mm camera. Transportation for Kamloops holding not provided, but car-pooling possible.

Watercolour Adventure Workshop

Pack your bags, we're heading to the mountains to get creative!! Join Donna Jo Macle, Cammore watercolour artist and teacher, for a weekend getaway in the Lake Louise area. This first-time program includes an introductory evening, basic watercolour demonstrations, field workshops (weather permitting) and all art supplies required. Also included are two nights at the newly built Canadian Alpine Centre and International Hotel at Lake Louise and the most scrumptious food in town (two breakfasts, two lunches, and one dinner). Sign up early, this program is likely to sell out quickly!!

Friday, July 10, 7:00 p.m. -
Sunday, July 12, 4:00 p.m.

Adult: \$225.00
20% discount for members
Transportation to Lake Louise is not provided, but car-pooling is possible



Animal Health Week

Come celebrate Animal Health Week by attending Open House tours of the Animal Health Centre. Get a behind-the-scenes look at how the veterinary staff care for all the different sizes and shapes of animals that make up the Zoo collection.

Sunday, May 2

1:00 p.m. - 4:00 p.m.

Meet at Karsten Discovery Centre
Free with Zoo admission (\$10.00)

Bathhouse with the Elephants

Imagine this... two elephants, thousands of gallons of bathwater to play in and a bunch of eager onlookers hoping not to get wet. Join us for a pancake breakfast, elephant tales and of course, the elephants' bath. Best enjoyed by children ages five and up.

Sundays,

May 10, June 13, July 25,
August 22 or September 28

Friday, August 13

Conservatory
Adults: \$18.00
Child: \$9.00
20% discount for members

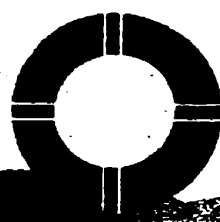
505 - Savours of Species!

Experts in wildlife, wild spaces and their protection
Join us for a new slide show lecture series this spring.

Protecting the Provinces: Conservation and Birds

The conservation of regional birds in Western Canada is a big job, just ask Gordon Court, Wildlife Status Assessment Specialist with Alberta Environment Protection. He'll discuss the past, present and future of the peregrine falcon and some of the conservation challenges of other birds of prey such as the burrowing owl and Ferruginous hawks. Gordon's background in avian field research and his role in the Alberta Endangered Species Conservation Committee is guaranteed to lead into many entertaining, interesting and inspiring stories.

Thursday, April 15



Wilderness to Yukon: Conservation Initiative

Protection of key species (bears and wolves) habitat greatly increases the survival of thousands of other smaller plant and animal species. The "Y2Y" initiative is a network of over 100 conservation organizations, scientists and communities working together to protect wildlife habitat along 3200 kilometers of the Rocky Mountains. Join us as we discuss where, why and how this system of protected areas, linkage zones and multiple-use buffers will be established while getting a visual picture of the species and spaces this project is working to protect.

Thursday, May 13

All programs:

7:30 - 9:30 p.m.

Karsten Discovery Centre,
Esso Auditorium

Per Program: \$10.00

20% discount for members

East Meets West

Come on down, Mate! Fill up on a hot pancake "breakie" at the Oasis and listen up to some "cool" stuff about Kootenai. Take a short walk-about over to the Australian Nocturnal building to have a gander at our visitors from San Diego. You will get a private viewing of these non-bears while the keeper is doing her morning routine. Best enjoyed by ages five and up.

Saturdays, June 12, July 10 or
August 21

7:45 a.m. - 9:15 a.m.

Conservatory
Adult: \$18.00
Child: \$9.00
20% discount for members

Safari Showdown

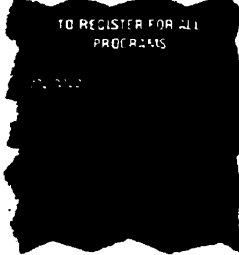
Join us for a unique African adventure for the whole family. Your guide will lead a walking safari through the Zoo and entertain you while you fill up on a carnivore supper. Strike camp amongst the elephants, giraffes, hippos and warthogs for an exciting evening. Please bring your sleeping bag, pillow and dinersware. Cols, supper and a pancake breakfast will be provided. Best enjoyed by ages five and up.

Friday, July 16 and

Saturdays, August 7 or August 14

6:00 p.m. sharp! - 8:00 a.m.

Per Person: \$35.00
20% discount for members
One chaperone required for every four children



ZOOARI FUNDRAISERS 1998-2000

Interested in a profound natural history opportunity? Join us on a unique natural history adventure, led by experienced Zoo staff!

THE GREEN CHARLOTTE ISLANDS

May 16 - 24, 1999 Cost \$3070CAD from Sandspit
Sail the "Canadian Galapagos" among islands incredibly rich in birds, marine life and fabulous native Haida sites - including Sgan Gwaif, the UNESCO World Heritage Site. "Old-growth" forest walks, beach excursions, low-tide explorations on a beautiful and remote wilderness area. Leader: Diane Ramsay (on a return sailing with the Island Roamer). Phone: 205-4120.

Navigating the Tatabanahini River

June 23 - July 4, 1999 Cost \$3087CAD from Whitehorse
On large, comfortable rafts, you'll float quietly through one of the most pristine and dramatic areas of North America. The Tatabanahini Park and adjoining protected wilderness form the largest internationally protected area in the world (25 million acres). Opportunities to observe eagles, grizzly bears, moose, goats, northern birds and more! Lots of time for exploration; fully catered; you don't even have to paddle! Leader: Garth Irvine, Zookeeper (a return journey). Phone 205-4120 or 287-0346.

THE ZIMBABWEAN COAST BY SAFARI

Sept. 8 - 27, 1999 Cost \$10,128CAD from Calgary
A fantastic combination of culture, history and wildlife viewing. Explore some of the best parks and stay in some of the most beautiful lodges in Africa: Visit the Great Zimbabwe Ruins, game-view by open land rover (day and night), canoe on the shores of Lake Kariba and enjoy walking safaris. Leader: Coral Thew, Calgary Zoo. Phone 232-9338.

WENDE: THE HEART OF EAST AFRICA

Sept. 17 - Oct. 4, 1999 Cost \$8241CAD from Calgary
Immerse yourself in the best of East Africa. Secluded luxury tented camps, no long drives, (we fly), knowledgeable guides, walking, open vehicles, wildlife viewing blinds, opportunities to meet the tribal people. Leader: Dr. Bob Cooper, Head of Veterinary Services. Phone 205-4120.

BORNEO: LAND OF MYTH AND MYSTERY

Oct. 11 - 28, 1999 Cost \$4775CAD from Calgary
Orangutans, ancient cultures, carnivorous plants, and a walk high in the jungle canopy! Borneo offers outstanding value for Canadians. Leader: Barb Campbell, Zookeeper. Phone 205-4120.

Southern Thailand & Malaysia Tall Ship Voyage:
Nov. 18 - Dec 3 Cost starts at \$4650

Pets & Escapes: Andes, Galapagos, Jungle & Culture:
Jan. 21 - Feb. 12 Cost \$8847

Kenya & Tanzania Jan: 2000 Cost: Jan. 2000

India & Nepal: Feb. 2000 Cost: Feb. 2000

For more information phone 205-4120.

ANYTHING GOES!

Thank you to everyone who collected and donated items for the Anything Goes Factory at the 1998 *Would Like's/Don't Need's* at the Calgary Zoo. We were overwhelmed by how much was collected during the spring and fall drop off dates. We still have a storage room full of various items that will be saved and used for this year's event.

Again, we are asking you for your help to collect recyclables that can be reused at this fun and educational activity area. Here is a list of some items we would really like you to start saving and also a list of what we really don't need:

Would Like: Plastic or dried flowers, small Christmas decorations (balls), Christmas garlands (not lit), bread bag tags, buttons/beads, scotch tape middles, creamers (cleaned and dried only) - very popular this year, cotton ball/quilt stuffing, and cds of course - always a hit, old computer disks, metal lids from frozen juice cans, fruit baskets (the green plastic mesh ones you get from the grocery store), leather scraps, chocolate box inserts (clean only), straws (clean), vinyl lettering (ends from print runs), window screen, factory samples (eg. Venetian blinds, tile), and clean craft leathers, wire (fine gauge, flexible eg: phone wire), styrofoam craft shapes (balls, cones, etc.).

Don't Need: toilet paper/paper towel rolls, plastic containers, egg cartons, Christmas cards and paper, construction paper, cardboard, fabric, yarn, stickers, newspaper/magazines, tin cans/glass containers, meat/chicken trays, plastic bags, pop can rings (eg. 6 pack), carpet, wallpaper, styrofoam chips and flat pieces from packing.

The Would Like list is certainly not exhaustive. If you think of something particularly innovative, let us know and we can add it to our list. Also if you know of a company that could give us any of the items in the Would Like column or any other unique items that children could build crafts with, please call Sandra Kam at 232-9385.

This year's Anything Goes Factory Recyclables Collection will take place on September 25th and 26th from 11:00 a.m. to 3:00 p.m. at Flag Plaza in the North Parking Lot of the Calgary Zoo. We ask that you hold onto your items until that date, as storage space at the Zoo is at a premium.

Thank you for your support!

Precious Places Day Trips 1999

Rails Nest Camp

Join us for a day of bird watching and nature appreciation at the Rails Nest Camp. Located on the banks of the Bow River, this camp is a beautiful setting for bird watching and nature appreciation. The camp is located on the banks of the Bow River, and is a beautiful setting for bird watching and nature appreciation. The camp is located on the banks of the Bow River, and is a beautiful setting for bird watching and nature appreciation.

Introductory Evening

Wednesday, May 26, 7:30 p.m.

Hike

Saturday, May 29, 8:00 a.m. or
Sunday, May 30, 8:00 a.m.

Elkhorn Stock Ranch

Join us for a day of bird watching and nature appreciation at the Elkhorn Stock Ranch. Located on the banks of the Bow River, this camp is a beautiful setting for bird watching and nature appreciation. The camp is located on the banks of the Bow River, and is a beautiful setting for bird watching and nature appreciation.

Introductory Evening

Wednesday, June 23, 7:30 p.m.

Hike

Saturday, June 26, 7:30 a.m. or
Sunday, June 27, 7:30 a.m.

The Bow River - Carleton Place

Join us for a day of bird watching and nature appreciation at the Bow River - Carleton Place. Located on the banks of the Bow River, this camp is a beautiful setting for bird watching and nature appreciation. The camp is located on the banks of the Bow River, and is a beautiful setting for bird watching and nature appreciation.

Introductory Evening

Wednesday, August 25, 7:30 p.m.

Hike

Saturday, August 28, 8:30 a.m. or
Sunday, August 29, 8:30 a.m.

Stanley Glacier Basin

Join us for a day of bird watching and nature appreciation at the Stanley Glacier Basin. Located on the banks of the Bow River, this camp is a beautiful setting for bird watching and nature appreciation. The camp is located on the banks of the Bow River, and is a beautiful setting for bird watching and nature appreciation.

Introductory Evening

Wednesday, September 29, 7:30 p.m.

Hike

Saturday, October 2, 8:00 a.m. or
Sunday, October 3, 8:00 a.m.

All Introductory Evenings are in the
Kesteven Discovery Centre, Calgary
Zoo. Detailed program information
will be given with ticket purchase.

Adult: \$42.00

20% discount for members

10% discount for seniors



Waterfowl Week-end 1999

Watch for this special weekend trip to Waterton National Park and area. Several ranchers and property owners around the park are committed to provide conservancy with the Nature Conservancy of Canada. We will have members of Parks Canada, Nature Conservancy, and the land owners themselves, take us on walks, tours and talks. Meals will be included. Transportation and accommodation will be responsibility of participant. Detailed information in next newsletter.

Friday, September 10 (evening) to Monday, Sunday, September 12.

For more information, call 232-9345.



FAREWELL

Earlier this month, Ian Gray resigned from his position as Executive Director of the Calgary Zoo. At the request of the Society's Board of Trustees, Greg Tarry, Director of Conservation Operations, has assumed the position of Acting Executive Director while a replacement for Ian is found. We thank Ian for his significant contribution to the Zoo over the past five years, and wish him well in his future endeavours.



IMPORTANT ZOO PHONE NUMBERS

Special Events 232-9353
 Development 232-9334
 General Information 232-9372
 Membership 232-9328
 Zoo Tickets 232-9322
 Group Sales 232-9300
 Web Site www.calgaryzoo.ab.ca



Printed on environmentally responsible paper.

Mark Your Calendars!!

Easter Egg-stravaganza
 April 2, 1999

Mother's Day Brunch
 May 9, 1999

Koolha!
 May 22, 1999

Bloomfest '99
 May 28, 29, 30, 1999

CALGARY ZOO
 Botanical Garden and Prohibitants Park
 P.O. Box 3836, Station "B"
 Calgary, Alberta, Canada T2M 4B8
 Telephone (403) 232-9300 Fax (403) 237-7682



Appendix 3: Nature Tales Interpretive Schedule

NATURE TALES

Daily May 28 - September 6, 1999
Free with zoo admission!

11:00 am TIGER TRIBUTE

Tiger Habitat (South side, backchairs)
Discover the death of these great feline predators.

11:30 am ELEPHANT ENCOUNTER

Large Mammal Building (Outside, south doors)
Weather dependent
Get up close and personal with over 3000 kgs of Asian elephants.

12:00 pm GORILLA LORE

Outside Gorilla Habitat (Indoors if raining or cold)
Get the scoop on gorilla troops in the wild and at the Zoo.

12:30 pm DINOSAURS IN OUR BACKYARD

Prehistoric Park Amphitheatre
Find out the latest dirt on dinosaurs.

1:00 pm TRUNK TALES

Large Mammal Building (Outside, south benches)
Weather dependent
Explore the life and times of Asian elephants.

1:30 pm COME CHALK WITH US!

Outside Seal Amphitheatre
Sea-world inspired art project with seals.

2:30 pm WHO'S IT UP?

Northern Forest Amphitheatre
We present some of the wildest things that happen under the midnight sun.

Don't miss our Kiosk - located near our Restaurant - open throughout the day to let you in on the action and programs.

Designed for visitors of all ages, our interactive programs are fun and interactive. Look for Zoo interpreters on site throughout to answer your natural history questions.

Watch for Docents and other education staff to provide touch tables, events and animal contact opportunities throughout the summer.



