Designing for Multiple Clients: Locals, Visitors and Snakes!

A Master Plan/Design Study of Ecotourism Development
in the Narcisse Inwood Area of Manitoba.

This Practicum is submitted to the
Faculty of Graduate Studies in partial fulfilment for
the degree of Landscape Architecture

Robert T. Zonneveld, BRS., MA (Recreation)

Department of Landscape Architecture
University of Manitoba
Winnipeg, Manitoba
April 2005.

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FACULTY OF GRADUATE STUDIES

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A Master Plan/Design Study of Ecotourism Development in the Narcisse Inwood Area of Manitoba.

BY

ROBERT T. ZONNEVELD

A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfillment of the requirements of the degree

of

Master of Landscape Architecture

Acknowledgements

I bow deeply to those who made this possible:

Dr. D. Nuttall (Committee chair)
Dr. M. Eaton (Reader)
Dr. M. Benbow (External, Dept. of Geography)
D. Robert (External, Manitoba Conservation)

A. Strict (Inwood quarry enthusiast)
The people of the R.M. of Armstrong (funding support)
B. Bailey (Manitoba Mines Branch)
Snake Mortality Group
Field Researchers
NSD staff and visitors

Friends and Faculty in the Dept. of Landscape Architecture, University of Manitoba
Those who shared their site visits with me

My family

And the snakes and serpents for stirring our imagination and reconnecting us to our place in nature

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Introduction

Travel and tourism are among the world's largest and fastest growing industries and are the major source of foreign exchange earnings for many countries including those in the developing world (Wood, 2002; Aronsson, 2000). Within the larger travel industry, ecotourism is an increasingly popular niche market, and is also considered a potentially important tool for achieving sustainable development (Wood, 2002). People have struggled with defining the term *ecotourism* since the early 1990s, and the term continues to suffer from multiple meanings and disagreement among 'experts' and various disciplines. Currently the term refers to: 1) concepts of sustainability with a set of principles, 2) a contribution to the economic and social well being of local people, 3) providing an interpretive/education experience, and 4) involving responsible action on the part of tourists and the tourist industry (Wood, 2002). The marketing of ecotourism is aimed at traveler growing interests in experiencing wildlife, culture, adventure and responsible tourism. However the term is often used as 'green washing' to market travel while having little resemblance to the concepts and implementation of 'real ecotourism'. Ecotourism operates quite differently from other segments of tourism as defined by its "sustainable development results: conserving natural areas, educating visitors about sustainability and benefiting local people" (Wood, 2002 p. 7). The United Nations declaration of 2002 as 'the Year of Ecotourism' identifies the significance of understanding this form of tourism and sustainable development.

In Canada, the term *ecotourism* is used to sell 'nature' or 'cultural heritage' tourism. Canada is "perceived to have an enormous ecotourism potential owing to expanses of relatively undisturbed land, a wide variety of biomes and individual infrastructure, an international reputation as a clean, wholesome country, and proximity to the large American market" (Weaver *et al.*, 1995 p.7). Since the term *ecotourism* is still used in a variety of ways it is difficult to understand what is actually occurring in Canada. Anecdotal evidence suggests the ecotourism sector includes activities as varied as: bird watching at Point Pelee, seal pup observation in the Gulf of St. Lawrence, opportunities to experience Inuit culture and Arctic natural history, Haida culture and Queen Charlotte Islands natural history, and the wildlife viewing of polar bears in Churchill, Manitoba (Weaver *et al.*, 1995). Significant ecotourism destinations have been identified based on specific species and/or landform features. Weaver *et al.* (1995) identifies that, except for the Rocky Mountains and Churchill, the three Prairie Provinces have yet to attain a regional reputation for offering significant ecotourism opportunities. "Tourism Canada did not identify any destination marketing regions for the grasslands or parklands" (Weaver *et al.*, 1995 p.9).

It is suggested that the reason for this is attributable to "the subtlety of the landscape, which lacks the drama of ocean, mountain or temperate rain forest, and in part because the native wildlife lacks the level of public appeal and concern accorded to whales, polar bears or seal pups" (Weaver *et al.*, 1995 p.9).

As mentioned above, ecotourism in Manitoba is associated primarily with the Churchill region and its opportunities to view polar bears, beluga whales and birds (The Tourism Company, 2002). However, Manitoba also has a large concentration of other internationally significant wildlife such as: shorebirds, Ross' gulls, Canada geese, Sandhill cranes, peregrine falcons, and gyrfalcons (Weaver *et al.*, 1995). A study by Matrix Management (1991) has identified other potential wildlife (species not identified) viewing areas in Manitoba that have special merit due to their special features and/or visual impact. These include: "the Nelson River, Duck Mountain, Riding Mountain, Oak Lake/Broomhill, Pembina Valley, Spruce Woods/Carberry, Hecla Park, Oak Hammock and Whiteshell" (Weaver *et al.*, 1995 p.12). Again these wildlife-viewing areas may not necessarily be considered true *ecotourism* since they may not meet the requirements of sustainability, education and benefiting local people. A more recent study by the Tourism Company (2002) identifies nationally and internationally significant product development opportunities that include: activities such as unusual wildlife viewing; wilderness river regions; the 10 choice wildlife viewing areas as mentioned above; special areas with dramatic settings such as the coastal tundra and boreal forest; the 5 ecozones present in Manitoba; and Manitoba's protected areas. The Tourism Company's report does not identify specific species for wildlife viewing or specific sites to develop as ecotourism areas other than the viewing areas already mentioned.

One species that is noticeably missing in the national and regional ecotourism discussions is *Thamnophis sirtalis parietalis* or the Red-sided garter snakes (hereafter referred to as garter snakes or snakes) found in the Interlake region of Manitoba. These snakes, concentrated near denning sites, have attracted international attention as "the world's largest-known snake gathering" (Chliboyko, 2002 p.26) from researchers and nature enthusiasts. Denning sites have provided opportunities for snake viewing and research for scientists from the United States and Australia, conducting long-term field studies on the snake populations.

The international attention given these garter snakes is matched by local and regional interest. Thousands of snakes emerging from winter dens are observed by hundreds of

people. Snake viewing has become a popular activity for local communities, school groups and residents of Winnipeg. Increased attention to the garter snakes has evolved from novelty 'interest' into management and sustainability concerns. Residents, and local and provincial government departments, have identified the need to improve existing facilities and opportunities to view the snakes. To date, their efforts have resulted in providing simple interpretive programs, basic facilities (picnic tables, outdoor toilets) and a number of measures to protect snakes such as fencing to protect den sites and a unique system of highway tunnels (protecting migrating snakes from vehicle traffic) for the provincially managed snake dens near the community of Narcisse. The provincial government designated in May 2002 an additional fifty thousand dollars to upgrade and improve the infrastructure at the Narcisse snake dens. In addition to the well-publicized Narcisse snake dens, the Interlake region has other den sites that could provide opportunities for engagement with the snakes. For example, a representative of the town of Inwood has identified a wildlife viewing opportunity in a nearby limestone quarry. The Inwood quarry, as it is known, is a decommissioned limestone quarry located two kilometers north of the Inwood town site. While two of six quarry pits are potentially still in aggregate production according to demand for road building materials, one pit has been the home to two, or possibility more, snake hibernacula. The decommissioned pits have been recently set aside and given protection status by Manitoba Conservation (Manitoba Mines Branch document, 2001) in order to protect these unique dens. One den, located under a road-ramp into the quarry, provides shelter for thousands of snakes, and is currently observed by international scientists undertaking snake research. Unlike the Narcisse snake dens, where the dens are surrounded by grass and parkland that provide camouflage and physical protection for the snakes, the Inwood quarry location provides the opportunity to view thousands of wild snakes set against the remains of the old quarry. The starkness of the quarry provides unique opportunities to engage the animals at close range while also giving broad views of the migrating snakes. The industrial influence on this landscape also gives the opportunity to introduce issues associated with nature and culture.

The Inwood Quarry site in particular, and to a lesser extent the existing Narcisse Snake Dens, presents new issues in the development of an ecotourism site. The first issue relates to the definition of or what is considered *ecotourism*. Traditionally ecotourism occurs in pristine or relatively undisturbed (by humans), often quite large, natural areas. In most cases, ecotourism takes place in a protected area, often designated as *wilderness*. This practicum questions these existing assumptions by presenting the need and benefits for providing ecotourism in a non-wilderness setting. The second issue

looks at land designation. Not unlike the definitional issue, protected area designation assists land managers by defining categories and subsequent policies to manage these lands. For instance, wilderness areas, to be designated as such, require limited human modifications, must have a certain size or ecological area, and will be managed to restrict certain human activities such as motorized vehicle use. The quarry does not meet the usual *protected area* requirements and therefore would not normally be considered for protection designation. This practicum challenges this reasoning and suggests new thinking is required to meet current requirements of nature protection, sustainability and human engagement. The third issue looks at the current practices of quarry rehabilitation in Manitoba.

The three issues or concerns, mentioned above, relating to ecotourism, protected areas and quarry rehabilitation are reflections of our human–nature relationship. How we, as humans, manage (designate, develop, access, etc) our natural areas will be based on how we perceive and value the land and its inhabitants. For this reason, this practicum will review, in chapter four, the human-nature relationship. This will also include an attempt to explain the human-snake relationship as formed through biological and cultural factors. Part one of this practicum will review these four areas: ecotourism, protected areas, quarry rehabilitation and the human-nature relationship to provide the necessary background when planning and designing an area for snake ecotourism.

The second part of this practicum will look at the unique situation of having three clients while planning and designing for ecotourism. The three clients - locals, visitors and snakes - are equally important in the planning and design of an ecotourism area. The removal or reduction of the recognition of the importance of any one of these clients would most likely reduce or eliminate the success of the development. This section will identify the unique characteristics of each of the three clients and how they play a role in the planning and design requirements of snake ecotourism.

Part three of this practicum applies what was learned in the first two parts into the design process. First, the regional and site-specific contexts are described in chapter seven. This chapter explores the physical and cultural elements that will influence what may or may not be designed. The chapter ends discussing a synthesis of all the factors influencing design considerations. It is from this discussion that the parameters are set that will guide design and master planning objectives. The last chapter, eight, applies what has been learned and puts it in a designed form. This process looks at preliminary thoughts concerned

with nature protection and providing opportunities, sketch ideas and final designs.

Currently the Red-sided garter snakes in the Narcisse-Inwood area are not managed under an ecotourism master plan. The existing nature viewing facilities at the Narcisse Snake Dens have become a popular regional destination. This area has been managed by responding to problems as they became apparent. Most notably a committee was organized and successfully found a solution to road mortality issues by constructing tunnels and fences to direct migrating snakes off and away from the highway. Local people have also expressed the desire to develop an abandoned quarry for ecotourism. Public money was made available to improve the management of the snakes and people visiting the snakes by developing an ecotourism master plan for this area. This research, with partial funding and full support from Manitoba Conservation, is intended to fill the current planning and design void by developing an ecotourism master plan for the population of garter snakes in the Narcisse-Inwood area. The scope of this practicum includes the existing facilities at the Narcisse dens and an examination of the ecotourism potential of the Inwood quarry site. This plan will provide the necessary information and guidelines to not only protect the snakes and their habitat but will also plan and design for human engagement and provision of local benefits. Since this practicum is written from a landscape architecture perspective, it should contribute to the knowledge base with an unique interdisplinary and wholistic approach in the attempt to design and plan for ecotourism.

Goals and Objectives

The goal of this project is to plan and design for snake ecotourism in the Narcisse-Inwood area of the Interlake region in Manitoba. From this goal it was necessary to identify that there are three equal clients in snake ecotourism: locals, visitors and the snakes. To plan for and manage the needs of the three equal clients, and issues associated with ecotourism and protected areas the following objectives were established:

1. To define ecotourism and identify principles that are applicable for Narcisse/ Inwood area and post-industrial sites.
2. To identify current and future ecotourism/conservation issues associated with the Red-sided garter snake den sites.
3. To provide a participatory approach in the planning and design process
4. To design and generate a regional master plan and site plans for the Narcisse and Inwood Quarry sites as ecotourism destinations.
5. To provide suggestions for interpretation material (signage, brochures)
6. To provide guidelines for site management, maintenance and staffing needs

Part One: Background Information

Figure 1. Inwood Quarry (Zonneveld, 2004)

Introduction

The planning and design of snake ecotourism encompasses a number of distinct arenas of knowledge. This section, part one of this practicum, looks at these arenas of knowledge considered relevant to this work and has organized them into separate chapters. These sections include: ecotourism, protected areas, quarry rehabilitation and the human-nature relationship. The methodology used to collect this background information includes literature review and personal interviews with practitioners in their respective fields of specialization. A summary at the end of Part One examines the interrelationship between the arenas of knowledge.

Chapter One

Ecotourism

Definitions

Ecotourism research and subsequent writing has been growing steadily since the early 1990s. The United Nations had designated 2002 as the International Year of Ecotourism, which led to a proliferation of documents and articles leading up to a world summit in May of 2002. Early ecotourism literature was concerned with definitional problems and the potential for sustainable development for developing countries (Mowforth and Munt, 1998). Ecotourism as defined by Conservation International is "responsible travel to natural areas which conserves the environment and sustains the livelihood of local people" (Conservation International, 2001). Other definitions have included issues of traveling to relatively undisturbed or uncontaminated natural areas (Boo, 1990) or suggested that ecotourism can only occur in protected areas (Bottrill, 1995). Blamey (1997) has looked at a number of definitions and concludes that ecotourism is: nature based, environmentally educational and sustainably managed. While ecotourism is most often considered positive development, it has also been criticized as degrading the very places it was supposed to protect (Thompson, 2000). The benefits of ecotourism are often questioned and the theories behind the sustainability of tourism are a matter for discussion (Pleumaron, 2000).

Much of the ecotourism literature has focused on the issues of developing countries and the concerns of tourism development in national parks. Although tourism and environmental issues have been of interest in Canada for sometime, written material about ecotourism in the Canadian context is limited. Scace *et al.* (1992) identifies the growth of ecotourism in Canada and identifies the need for universal definitions, and the need for government policies and a code of ethics from not only developers and tourism operators but from the tourists themselves. Similar to the Scace document, the Northern Ontario Development Agreement (Canadian and Ontario Departments of Natural Resources) has published two documents identifying the importance of ecotourism in rural development. One document lists ingredients for communities to succeed in ecotourism (Wanlin *et al.*, 1994) and the other is an 'Ecotourism Opportunity Identification Study' that used a behavioural approach to identify preferences for activities and settings for northern Ontario forests. The results of this survey lists outdoor recreation activities and setting preferences (such as for water-based activities) and found that there were socio-economic differences in ecotourism demands for northern Ontario (Twynam *et al.*, 1995). Rahemtullla and Wellstead (2001) examined the problematic nature of defining ecotourism and conclude that the issues

originate from conceptual and semantic levels in academia and are based on the 'expert' perspectives of researchers, planners and government agencies.

Ecotourism is often considered a sustainable development tool for less developed countries, often citing case studies such as Kenya, Costa Rica, Ecuador and Belize (Wood, 2002). In regard to sustainable development, ecotourism literature is often focused on tourism issues of economic leakage, globalization and power, environmental degradation and the impacts on local indigenous people (Mowforth and Munt, 1998; Honey, 1999). Early development concerns pay attention to conservation, sustainable development, community and participant participation, and preparing guidelines and planning tools (Lindberg and Hawkins, 1993). Ecotourism is considered a form of nature-based tourism, but has also been "formulated and studied as a sustainable development tool by NGOs (Non-Government Organizations), development experts and academics since 1990" (Wood, 2002 p.9). Wood's United Nations document identifies 'ecotourism' with early definitions (p.9) that include:

> *Ecotourism is responsible travel to natural areas that conserves the environment and sustains the well being of people (The International Ecotourism Society* (TIES) 1991).

and,

> *Ecotourism is environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features-both past and present) that promotes conservation, has low negative visitor impact, and provides for beneficially active socio-economic involvement of local populations* (IUCN now called the World Conservation Union, 1996).

The term ecotourism is often and incorrectly used to '*greenwash*' other tourism and development activities to market a destination to the increasingly environmentally aware traveler. This undermines the legitimacy of true ecotourism and creates misunderstanding of the principles of ecotourism (Wood, 2002).

Ecotourism is also considered a concept in sustainable tourism, where there is a strong orientation toward the evolution of principles, guidelines and certification based on the tenets of sustainability. The following seven components have been identified to separate ecotourism from other forms of tourism, specifically: adventure tourism, nature tourism, wildlife tourism and cultural tourism, where ecotourism:

- *Contributes to conservation of biodiversity.*
- *Sustains the well being of local people.*
- *Includes an interpretation/learning experience.*
- *Involves responsible action on the part of tourists and the tourism industry.*
- *Is delivered primarily to small groups by small-scale business.*
- *Requires lowest possible consumption of non-renewable resources.*
- *Stresses local participation, ownership and business opportunities, particularly for rural people* (Wood, 2002 p.10).

This definition helps to clarify how ecotourism compares to other forms of alternative tourism that are often incorrectly used interchangeably. Alternative tourism,also known as 'special interest tourism' or 'responsible tourism', are alternatives to mass tourism which is characterized " with large numbers of people seeking replication of their own culture in institutionalized settings with little cultural or environmental interaction in authentic settings" (Newsome *et al.,* 2002 p10). Alternative tourism that broadly focuses on 'nature' is referred to as natural area tourism. As explained by Newsome *et al.* (2002), under this broad umbrella of natural area tourism, are 1) Adventure Tourism, with an emphasis on activity (such as the physical challenges associated with backcountry travel and travel in exotic, remote or unusual locations), 2) Nature Tourism, with an emphasis on the natural setting (the whole landscape) and fostering an understanding of conservation and the natural environment and 3) Wildlife Tourism, with an emphasis on viewing and learning about a natural area's living or biotic elements, the flora and fauna of a specific area (such as a safari in Kenya, bird watching or whale watching). Cultural Tourism is yet another category of alternative tourism that focuses on cultural or social elements such as human history, arts and crafts, religion and other forms of human expression. Like nature-based tourism, cultural tourism is developed in reaction to mass tourism and attempts to provide a more meaningful, and possibly more intimate and 'authentic' experience for the participant. Aspects of cultural and nature based tourism may also merge as tourism associated with rural, farm and indigenous people based tourism where divisions of cultural and nature are less apparent.

Recently in the Manitoba context, the Travel Company (2002, p.8-9) defined ecotourism as "An enlightening nature-based travel experience that is respectful to the ecological, cultural and economic integrity of host communities/areas." Implicit in the definition are the following principles, as adopted by the International Ecotourism Society:

- *Minimizing negative impacts on nature and culture that can damage a destination*
- *Educating the traveler*

- *Stressing the importance of responsible business*
- *Directing revenues to the conservation and management of protected areas and biological diversity*
- *Emphasizing the need for regional tourism zoning and visitor management plans*
- *Emphasizing the use of environmental and social base line studies*
- *Maximizing economic benefits locally*
- *Supporting economic empowerment of local communities*
- *Ensuring development does not exceed social and environmental carry capacities*
- *Relying on infrastructure that has been developed in harmony with the environment*

For purposes of this research, the definition of ecotourism by Wood (2002), listing seven essential components, will be used since it helps to identify the intricacies of this form of tourism and it begins to inform design by setting physical and cultural parameters. In addition, Wood's definition and principles do not distinguish between traditional ecotourism sites such as national parks and protected areas and the potential to use sites such as post-industrial sites such as agricultural land or quarry pits.

Current Practice: Designing Ecotourism

While academics, non-profit and government agencies debate definitional issues and the pros and cons of ecotourism development, there continues to be a void in the planning, management and design of natural areas accessed for ecotourism (Lindberg and Hawkins, 1993). The Ecotourism Society has attempted to fill this void by publishing **Ecotourism: A Guide for Planners and Managers.** A second guidebook, with the same name (volume 2) was published in 1998 but was unavailable (copies were unaccessable) for review. In the first volume (1993), David Andersen writes a chapter on the designing of ecotourism facilities. He writes an overview establishing general principles of environmentally sensitive design and sustainable development. Andersen's writing does mention financial and organizational issues but of interest to this study is his attention to design. He recommends that there is a need to develop a sense of fantasy, adventure and discovery since visitors have 'civilized expectations' beyond the primary attractions of the beauty and uniqueness of the natural environment. He believes most facilities are inspired from urban contexts, and are often perceived by visitors as ordinary and uninspiring. He also believes nature is an obvious source of inspiration for the architectural design of facilities. He suggests the need for an organic approach to design, where the designer immerses themself in the context of the ecotourism site. He explains:

> *In order to draw closer to nature and begin to understand it complexities, one must abandon the shapes, textures, and surfaces of manufactured products and fickle real estate markets. The designer of an ecotourism facility must feel the land*

> *and grow into harmony with it as he or she creates this organic architecture. The spirit of the architecture must grow naturally from the earth and dwell lightly on the landscape (Good, 1990). For example, the designer needs to observe the behavior of animals peculiar to the specific property so that placement of the buildings does not interrupt behavioural patterns and habitat* (Andersen, 1993 p.122).

Andersen also identifies the merits of working with local people and resources, contributing to ecological knowledge and design, providing local involvement and benefits and ensuring long term support while reducing negative cultural impact. This guide is beneficial to designers by providing a 'checklist' for developing ecotourism facilities. This 'check list' includes issues related to: site planning, building design, energy resource, utility infrastructure and waste management. For the landscape architect the recommendations are basically common sense, reinforcing ideas of protection, limiting impacts and scale. Andersen identifies the need to protect existing soil from erosion and indigenous vegetation and wildlife patterns. He also recommends: reducing the use of automobiles and other vehicles, using appropriate technologies and building materials; providing signage and interpretive materials; providing low impact structures such as boardwalks, and designing to accomodate seasonal variations and solar angles. Ultimately, once the ecotourism design has addressed issues of security and comfort, it has the opportunity to be an educational tool that can inform visitors of both the local culture and new ways of looking at the natural environment , and creating a sense of fantasy or awareness. Andersen's chapter is beneficial in providing basic guidelines for environmentally aware design specifically related to ecotourism. Similarly environmentally sensitive design is discussed in an urban planning context in Hough's (1995) **Cities and Natural Process** and in a more general design context with Papanek's (1995) **The Green Imperative: Natural Design for the Real World.**

In addition to the theoretical, landscape architects and designers have created places to connect humans with the natural world. The number of examples of these 'places', labelled as *ecotourism,* is limited. Designers have developed canopy walks in old growth forests in the United States(Rodriguez, 2000) where the design was recognized and awarded by The American Society of Landscape Architecture (ASLA). The Portico Group's canopy walk design was recognized for its educational component, the potential for understanding the environment and the opportunity it gave people to realize that "there is a whole other landscape out there" (Rodriguez, 2000 p. 44). While having the primary goal of protecting the environment, the design gave a perspective that visitors had never experienced before allowing them to come away with an appreciation and a sense of stewardship (Rodriguez, 2000). Landscape architects, with their specialized knowledge, have been identified as

having a role and value in proper ecotourism development. It has also been identified that there are a lack of guidelines, controls and appropriate infrastructure in ecotourism design and development (Thompson, 2000). For some landscape architects the problem has been the size of developments where large firms, such as Florida's EDSA, will involve itself with large, 'Island sized', projects but they will not consider the smaller 'boutique ecolodge' developments (Bennett, 2000).

Non-wilderness Ecotourism

As mentioned in this document's introduction this study will look at the idea of providing ecotourism in a non-wilderness setting. A review of ecotourism and protected area literature has *not* found any documentation specifically addressing the idea of non-wilderness ecotourism. One exception is the recent development of Green Tourism or Urban Ecotourism (www.planeta.com/ecotravel/tour/urban.html) where urban centers are providing information and programs to educate visitors of local environmental issues and conservation, making cities more livable and protecting biodiversity. The first Urban Ecotourism Conference took place on the web in September-October, 2004 and defining urban ecotourism appears to be of primary concern. The term *wilderness* is being used here to connote a landscape without human interference or impact. National parks, as well as protected areas are, in this case, considered *wilderness* areas. Case studies in the ecotourism literature usually refer to parks, most often national parks, or other protected areas as the locations where ecotourism takes place (Fennell, 1999). This is most likely a result of how the concept of ecotourism has been identified, in that it tends to involve "travel to fragile, pristine and usually protected areas" (Honey and Stewart, 2002 p. 2). As identified in the rationale for choosing Wood's definition and principles, it is not apparent why ecotourism could not occur on post-industrial sites or other non-traditional ecotourism landscapes. Ecotourism does occur in places that do not fit within the 'pristine' wilderness definition of ecotourism. An example of this involves shipwreck diving. The issue here is not with the naturally occurring flora and fauna but with how the reef in the ecosystem was created. Ships and drilling platforms have been deliberately and accidentally scuttled, creating artificial reefs. Over time, with the succession of organisms, these human artefacts, figuratively and literally speaking, become the framework for a reef ecosystem. Divers motivated by wildlife viewing and the cultural significance of a historic ship pay as ecotourists for the opportunity to access this 'pristine' underwater experience. Even though diving wrecks may appear 'natural' or 'wild', having re-established natural systems, the site has been modified and would not meet ecotourism definitions requiring a pristine (non-modified) land base.

A second example where the 'pristine' aspect of ecotourism comes into question is the famous polar bear viewing experience in Churchill, Manitoba. As mentioned in the introduction, polar bear viewing in Churchill is considered one of Canada's premier ecotourism destinations (Weaver *et al.*, 1995). Ecotourists experience the polar bears, not in a pristine (wilderness) setting, but from motorized vehicles and usually from a cluster of vehicles where competing tour groups vie for views of the wild animals. The use of motorized vehicles and the number of people competing to view the animals is also a problem for African safaris and whale watching areas. This however, is totally acceptable for the ecotourist and wildlife/conservation managers who are in charge of protecting the various wildlife species.

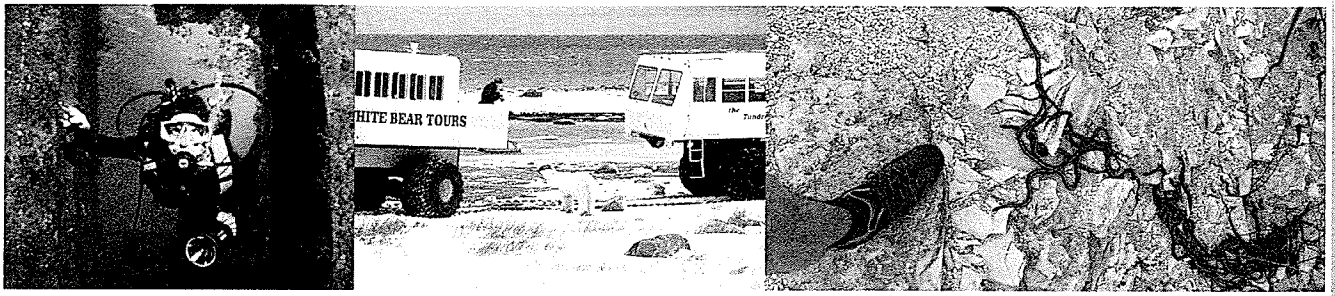


Figure 2. Diving, Bears and Snakes. A) Wreck diving (http://www.octopuseatrips.com/photos/discoverbig.jpg, 2004) B) Polar bear viewing in Churchill (Travel Manitoba, 2004), C) Snakes climbing quarry wall (Zonneveld, 2004)

In summary, a number of questions arise when reviewing the current state of ecotourism and related research. A review of the literature suggests tourism and specifically ecotourism have become important factors in development and protected areas (Evans, 2000). The importance of this development is emphasized where tourism is now considered the world's largest economic force (Potts and Harrill, 1998). Since ecotourism is a relatively new concept much of the literature has focused on definitional issues and with concepts of sustainability. Most of the literature focuses on developing countries in South and Central America, Africa and Asia. Only a few documents were found concerned with the issues of ecotourism in Canada or how landscape architecture plays a role in this growing specialty market. Most literature also focused on national parks as the designated protected sites where ecotourism occurs. Little, if any, research reported on non-national parks or non-designated protected areas as ecotourism settings. This is surprising since national parks are becoming increasingly inundated with more people, often resulting in ecological degradation. This practicum will attempt to develop an ecotourism strategy and site design elements, using the definition of ecotourism as expressed with seven essential components (Wood 2002) in a non-traditional context, specifically post-industrial, culturally modified sites.

Chapter Two Protected Areas

Ecotourism most often occurs in ecosystems or landscapes that have a legal designation protecting the land from industrial or other forms of human development. These lands, with protection legislation are called 'protected areas'. This chapter describes the concept of 'protected areas', a range of protected area strategies (International to regional) and a number of management tools used to plan and manage these lands. The sites chosen for ecotourism development have been given full or interim protected area status, therefore it is important to understand what this designation means according to potential visitor experiences and site designs.

The most common explanation of how humans perceive the natural environment has been reduced to a dichotomy between the human-centred or anthropocentric view and the life-centred or ecocentric outlook (Newsome *et al.*, 2002). The anthropocentric view, held by most industrial societies, perceives nature as an unlimited supply of resources for the most important species: humans. Humans are also separate from the rest of the world and gain access to nature through science and technology (Newsome *et al.,* 2002). The other view, the ecocentric, believes that "our worldviews must be expanded to recognise inherent or intrinsic value to all forms of life, that is, value regardless of their potential or actual use to us" (Newsome *et al.,* 2002 p4). How we approach nature, from the anthropocentric or ecocentric, or somewhere along this continuum, will ultimately influence how we perceive and use our land.

Both of these paradigms have supported the need to protect and/or sustain natural areas through preserving, usually large tracks of land, called protected areas. Protected areas are "any region of land and/or sea that have legal measures limiting the use of the wildlife within that area" (McNeely *et al.*, 1990 in Newsome *et al.*, 2002). The amount of human development or use that is allowed in a natural area is used to categorize a site within a system of protected areas. The IUCN (International Union for the Conservation of Nature and Natural Resources now the World Conservation Union) has, at an international level, defined six categories of protected areas. Ranging from the most restricted to humans (wilderness) to land with more human use and development, the categories are (IUCN in Newsome *et al.,* 2002 p5):

Category I- Strict Nature Reserve/Wilderness Area
Category Ia- Strict Nature Reserve
Category Ib- Wilderness Area

Category II- National Park
Category III- Natural Monument
Category IV- Habitat/Species Management Area
Category V- Protected Landscape/Seascape
Category VI- Managed Resource Protection Area.

While the World Conservation Union works at the international level, Parks Canada would be considered Canada's equivalent at the national level. Parks Canada also uses a zoning system with 5 categories:

Zone I- Special Preservation
Zone II- Wilderness
Zone III- Natural Environment
Zone IV- Outdoor Recreation and,
Zone V - Park Services.

Each of these zones represents various levels of environmental sensitivity and tolerance for visitor use and management regimes (Rollins, 1993).

The protected area system is also evident at the provincial level. Manitoba's Manitoba Protected Areas Initiative (PAI) was created in 1989 to protect natural areas (land, freshwater and marine sites) from industrial resource extraction. The PAI is well documented with the program's statement of intent, strategic plan, goals, criteria of establishment, history of protected areas in Manitoba, co-operation with First Nations and a progress report of this initiative in the document: **An Action Plan for Manitoba's Network of Protected Areas** (2000). The Plan introduces the PAI:

> *Today, Manitoba's network of protected areas is made up of a collection of different land designations including federal and provincial parks, ecological reserves, wildlife management areas and provincial forests*
>
> *Much work remains to be done for Manitoba to reach its goal of adequately representing and protecting its natural regions from logging, mining, hydroelectric development, oil and gas exploration and development and other activities that significantly and adversely affect habitat (p.2).*

Similar to the Canada' national park's mandate, Manitoba's network of protected areas will conserve ecosystems and maintain biodiversity that is representative of each of Manitoba's natural regions. There are 18 natural regions and sub-regions or *enduring features* in Manitoba's protected area system. Unlike Parks Canada's system, Manitoba's PAI includes land not only under provincial jurisdiction such as provincial parks, Wildlife Management Areas, provincial forests and ecological reserves but includes federally

managed land (National parks), First Nation designations, municipally protected areas and privately own land.

While the degree of human manipulation within the various protected area systems vary, the value of protected areas is "to conserve nature and biological diversity, (and to) offer humans opportunities for recreation, inspiration, education and understanding" (Newsome *et al.*, 2002 p.6). Protected areas therefore have included landscapes that range from 'untouched' wilderness to landscapes completely modified by humans. Examples of culturally modified landscapes that are protected include working landscapes using traditional farming techniques, land suitable for recreation, and landscapes protected for their scenic and historic significance (Phillips, 1997). Designating working landscapes as protected areas helps "to bring in professional skills to work alongside traditional ones, focus financial assistance in support of the traditional methods of land management, and increase the area's ecotourism potential" (Phillips, 1998 p.8). Phillips expresses that there is also a need to expand or extend protected areas beyond culturally derived boundaries. He suggests a bio-regional planning strategy, selecting a scale appropriate to the effort of focus. This broad scale system would include stakeholder participation and co-operative arrangements, in an attempt to protect and sustain elements of wild nature as well as produce material goods, environmental services, and cultural, aesthetic and spiritual benefits (Phillips, 1998). Although Phillips' writing was focused on large-scale landscapes, even to the extent of the size of the biosphere, this concept could also be used at a scale the size of the Interlake region in Manitoba.

The Narcisse Wildlife Management Area, which contains the Narcisse Snake Dens, falls under the jurisdiction of the provincial government. The land is managed by Manitoba Conservation and has been set aside from the working landscape, the surrounding pastureland to protect the snake denning sites. The Inwood quarry has also been given a form of resource protection (for the snake dens) by changing the locus of control from the jurisdiction of the Manitoba Mines branch to Manitoba Conservation, thereby protecting the den site from mining activities and other forms of resource development. The Inwood quarry however is considered crown land and open to public access.

The province of Manitoba protects natural areas from industrial resource extraction through the Manitoba's Protected Areas Initiative (Manitoba Conservation, 2003). The Narcisse Snake Dens are protected as Small Enduring Features (1-8,000 ha) in the Wildlife Management Areas classification. Initially the Manitoba program designated protected

areas according to species, but "(o)ver time, the focus of conservation, preservation and protection efforts has shifted from "single species" to "wildlife habitat" and, most recently, to "landscape protection" (Manitoba Conservation, 2003 p.9).

Protected areas are not exclusive to natural areas, but cultural landscapes have also been identified as worthy of protection. Cultural heritage sites as found in the national parks system are given similar considerations of sustainability and preservation as their natural counterparts. In a way it is much easier to preserve a cultural artefact, from the effects of time, than it is to prevent natural systems from succession or suspended in a state that is conducive to human needs. New protected areas are being designated that value both the natural and cultural elements of the land. Most recently the Sahtu Dene people of the Northwest Territories campaigned for and received National Historic Site designation for Grizzly Bear Mountain and Scented Grass Hills situated on Great Bear Lake. This is unique in Canadian protected areas because the land is being protected not only for it's natural features but also because the land has cultural value as sacred places where traditional stories take place for the aboriginal people. The Canadian government explains this designation for historical protection:

> *This oral tradition plays an important role in the culture of Canada's Aboriginal people. Among the Sahtu Dene, some oral histories express traditional beliefs that they have retold for more than 5,000 years. Other stories are more recent. Because some stories can only be properly told on site, the actual places on the land must survive for the story to persist.* (NWT Protected Areas website: www.gov.nt.ca/RWED/pas/specialp.htm, accessed April 2003).

As previously mentioned, protected areas have focused on protecting the flora and fauna located in wild areas:

> *Wild plants and animals have their natural places, but natural places are abundant only in natural areas. Wilderness indicates the abundance of special places for these plants and animals. The state of the wilderness therefore secures this abundance…. The threat to species viability lies primarily with the loss of habitat, and loss of habitat is associated with the exploitation of natural environments* (Von Maltzahn, 1991 p.44-45).

While, today, much of the concern is aimed at living beings, areas are also designated as *protected* to sustain the non-living. Water, soil, ecological processes and scenery are also considered worthy of protection. What features take priority in the development of a protected area has been a long contentious debate. Sellars suggests:

> *The central dilemma of national park management has long been the question of exactly what in a park should be preserved. Is it the scenery—the resplendent landscapes of forests, streams, wildflowers, and majestic mammals? Or is it the integrity of each park's entire natural system, including not just the biological and scenic superstars, but also the vast array of less compelling species, such as grasses, lichens, and mice? The incredible beauty of the national parks has always given the impression that scenery alone is what makes them worthwhile and deserving of protection. Scenery has provided the primary inspiration for national parks and, through tourism, their primary justification. Thus, a kind of "facade" management became the accepted practice in parks: protecting and enhancing the scenic facade of nature for the public's enjoyment, but with scant scientific knowledge and little concern for biological consequences* (Sellars, 1997 p.5).

Independent of the history and goals of developing a park or protected area, such as sustaining a specific species, watershed or wonderful view, the experience of visiting a natural place potentially imbues the visitor with deeper meaning.

> *Beyond the sheer enjoyment of scenery, a heightened aesthetic sensibility may have inspired in many a deeper understanding of, and concern for, the natural environment. This benefit defies quantification, but surely it has had consequences of immense value, both for individuals and for the nation* (Sellars, 1997 p.5).

The purpose of protecting natural or cultural areas and artifacts is to preserve aspects of 'cultural importance'. The act of protection is a form of human manipulation to prevent features from changing from the effects of time and natural processes such as ecological succession and life cycles.

> *Still, it is important to recognize that, although extensive manipulation and intrusion took place in the parks, fundamentally the national park idea embraced the concept of nurturing and protecting nature—a remarkable reversal from the treatment of natural resources typical of the times. Yet with the parks viewed mainly as scenic pleasuring grounds, the treatment of fish, large mammals, forests, and other natural resources reflected the urge to ensure public enjoyment of the national parks by protecting scenery and making nature pleasing and appealing; and it was development that made the parks accessible and usable. Even with legislation calling for preservation of natural conditions, park management was highly manipulative and invasive. "Preservation" amounted mainly to protection work, backed by little, if any, scientific inquiry* (Sellars, 1997 p.27).

Conserving a landscape as a park or protected area has meant managing the land at equilibrium. '*At equilibrium*' means the land has been managed to remove naturally occurring fluxes and ecological processes that could potentially change a landscape in culturally undesirable ways (Adams and Mulligan, 2003). Nature, in this case, was seen as system of processes, much like a machine, with internal and external feedback mechanisms.

> *Ecological science could therefore be used to generate technocratic recipes for managing nature. Ecologists coined words and concepts drawn from thermodynamics and engineering (such as system, energetics, equilibrium, feedback, balance and control) to describe nature. Conservationists, schooled in ecology, saw themselves in some cases as 'engineers of nature* (Adams, 2003 p.224-225).

Ecological science also uses a system of 'natural' subdivisions, or a taxonomy of 'natural units' to classify the parts of an ecosystem. It is believed that these units require intervention, based on science, to control nature for conservation and social values. The assumption was that nature is (and should be) in equilibrium. (Adams, 2003). It is thought nature should control ecological change. Worster has challenged this thinking:

> *You cannot 'preserve' such ecosystems by 'managing' them any more than you can by putting a fence around them and declaring them 'protected'. Their biodiversity depends directly upon natural patterns of disturbance, driven by climate change. Indeed, their very existence depends upon such natural change, and in such environments disturbance must be seen as a part of the 'nature' with which conservation is concerned. What you can do, of course, is to protect them, both from direct human exploitation... and from indirect human-induced change ... . However, conservation them becomes not a matter of trying to dictate through management the exact form that nature takes, but of protecting processes of natural change from incompatible changes in economy and technology* (Worster, 1994 in Adams and Mulligan, 2003).

This new concept, 'a non-equilibrium paradigm', recognises instabilities in landscapes as caused by disturbances and differences in scales of space and time (Adams, 2003). Disturbances are not all 'natural' disturbances but have an increasing human dimension. Adams (2003 p.228) summarizes this new paradigm:

> *Conservationists should no longer conceive of nature in equilibrium, and therefore portray human-induced changes in those ecosystems as somehow 'unnatural'. Nature is dynamic and highly variable. Its patterns at one particular place and time are contingent upon preceding events; its trajectory through time is open ended and does not tend towards an equilibrial point. Human actions are part of the web of influences on ecological change, not external equilibrium-disturbing impacts. The implication of this is that science cannot tell conservationists what nature 'ought' to be like, and it may not always even be able to describe what it used to be like, and how and why it has changed. Conservationists will very often need ecology, but their science gives them no privileged insight into the way nature should be.*

A 'non-equilibrium paradigm' challenges concepts of carrying capacity and the human role in protected areas, specifically the removal of indigenous peoples from traditional territory. If this questioning of *nature moving toward equilibrium* is accepted, the way parks and

protected areas are planned and designed also comes into question. Protected areas and how they are managed need to be more flexible allowing natural processes to change the physical and aesthetic aspects of the landscape. The protected area will concern itself more with protecting the landscapes' structure and function rather than the more on-the-surface scenic view. Visitors and tourists will have the opportunity to be educated regarding the merits of this new 'non-equilibrium' paradigm.

The two sites in this study require protection from industrial development and indiscriminate public access. Snake denning sites are extremely important in the lifecycle of this species and removal or damage to the sites or to the snakes at the sites, especially during the spring mating season, could cause this population to colapse. The study sites require protected area status that allows the sites to evolve and change according to the new paradigm of 'non-equilibrium'. Using a dynamic protection system may give the flexibility required to manage for the needs of the snakes, local peoples and snake viewers.

Management Tools for Protected areas

In the designation, development and management of protected areas, including parks, planners have used management tools to assist in sustainability analysis and decision-making in planning and design. The intent of using management tools is to create a balance, or sustainable development, creating a productive and harmonious relationship between the visitors, host community and the environment (Wight, 1998). Academics and practitioners in the fields of parks and protected areas have sought to develop an all-encompassing system to aid in the balancing act between nature protection and human use. A range of tools have been developed, especially for national parks and protected areas that include: carrying capacity, Environmental Impact Assessment, Cumulative Effects Assessment, Recreation Opportunity Spectrum, Limits of Acceptable Change, Visitor Impact Management, Visitor Experience and Resource Protection. Figure 3 illustrates the interaction of social, economic and environmental goals and the role of management tools in sustainable tourism development. These tools as well as the concept of Ecotourism will be reviewed in this section.

Figure 3. Sustainable Tourism Tools: Tools to assist sustainability analysis for sustainable tourism systems (Wight in Hall and Lew, 1998 p.76)

Carrying Capacity

Figure 3 indicates a sustainable or nature tourism destination (again using nature tourism to indicate a broad category of tourism that includes ecotourism) site needs to balance the social, economic and environmental goals of sustainability. Each of these goals has a carrying capacity, or a number of visitors or an amount of development which, if exceeded would result in negative consequences according to predetermined goals. In other words, a tourism carrying capacity "represents the maximum level of visitor use and related infrastructure that an area can accommodate" (Ceballos-Lascuráin, 1996 p.131). With origins in rangeland management and wildlife ecology the concept of carrying capacity was developed to determine the maximum population size for a given species that an area can support without reducing its ability to support that species in the future (Daily and Ehrlich, 1992 in Wight, 1998). While this concept has been applied to land use planning, and other management systems, and the term suggests objectivity, this precision however is not warranted involving human systems (Wight, 1998). One aspect identified by Wight that becomes problematic with carrying capacity is its inability to distinguish between *change*, which occurs with any interaction, and *damage* which depends on management objectives, expert judgements and broader public values (Wight, 1998). While carry capacity can result in a pragmatic number to assist in managing people and the resource, it does not allow for the consideration of human values, is reductionistic, naïve and an inappropriate paradigm to base actions that protect recreational settings or tourism dependent communities (McCool and Patterson, 2000 in Newsome *et al.,* 2002). For ecotourism development the concept of carrying capacity may be problematic. Since one of the seven components of ecotourism is that it is delivered primarily to small groups by small-scale business (Woods, 2002) a social carrying capacity is created. Knowledgeable ecotourism consumers will expect programs and facilities that adhere to the small group concept. Deviating from this expected social goal, by allowing more people on site at

one time, conflicts with this form of tourism and may reduce the quality of the ecotourism experience. This social goal supersedes economic and environmental goals that may tolerate an increase of visitors and therefore a larger carrying capacity.

Environmental Impact Assessment (EIA)

EIA is both a tool and a process whose goal is to improve projects environmentally while preventing, minimising, mitigating or compensating for adverse impacts (Wight, 1998). As a part of the planning process, EIA is concerned with the analysis and management of impacts on environmental and social systems caused by single-project development but has yet to realize successfully the integration of environmental, social and economic issues (Wight, 1998). EIA uses baseline studies to record the nature and quality of the existing environment (Ceballos-Lascuráin,1996). As a process, EIA is applied pre-development, usually on undeveloped areas but can be applied to existing facilities in the case of restoration or facility expansion (Ceballos-Lascuráin, 1996). Most new projects that have potential impacts on the natural and social environments are required by legislation, in the Canadian context, to conduct environmental impact assessments. EIA can be beneficial for ecotourism development by understanding the base situation but alone does not provide direction in balancing for environmental, social and economic goals.

Cumulative Effects Assessment (CEA)

Similar to the concept of the 'tragedy of the commons', cumulative effects assessment (CEA) considers multiple events or actions (as multiple projects or multiple processes in a single project), and how they interact and/or combine (as additive effects) to affect a natural system. EIA may or may not consider CEA, which can be quite complex and may require a modeling tool to understand all the components and possible interactions that may occur. Both EIA and CEA are subject to constraints in time and costs, and often fail to account for project costs and benefits to broad social goals (Wight, 1998). Wight (1998 p.82) summarizes the possible role of CEA in sustainable development:

> *Social and economic factors are the driving forces in promoting activities that cause cumulative effects. Solutions, therefore, may lie not only with improved environmental management (of which EIA is a part) but with a change in economic policies and social perceptions. As Matthews (1975) recognised, decisions resulting from EIAs incorporate subjective judgements involving values, feelings, beliefs and prejudices, as much as the results of scientific studies. The Canadian Environmental Assessment Research Council (CEARC), for example, believes that the CEA process 'can help forge a transition from project-specific environmental management to a more comprehensive 'holistic' approach to the environment (CEARC1998:*

1) 'Values and expectation with respect to the environment, economy and social systems, differ substantially around the world. Each particular society must define its own set of values, and each government must make policy choices based on these social ethics'.

Both EIA and CEA are useful in understanding the complexities that are involved in developing for natural area tourism. They however are limited to environmental issues and lack the ability to consider the equally important social and economic issues associated with ecotourism and protected areas.

Recreation Opportunity Spectrum (ROS)

The ROS is an instrument, which uses a systems approach to classify recreational land for multiple land use planning and management (Lichtkoppler and Clonts, 1990). Based on the principle of diversity, the ROS assumes "people seek satisfactory recreational experiences by participating in preferred recreational activities in a preferred environmental settings" (Lichtkoppler and Clonts, 1990 p.106). Traditionally, this system uses the criteria of: remoteness, size, evidence of humans, user density, managerial regimentation and noticeability. The ROS has mostly been applied to the western United States context where areas are designated according to classifications based on the amount of development and human influence. In order of decreasing development and human influence, the classes are: urban, rural, roaded natural, semi-primitive motorized, semi-primitive non-motorized and primitive (USDA Forest Service in Lichtkoppler and Clonts, 1990). Although this tool appears limited for situations outside of large natural or wilderness areas, the idea of providing various opportunities for a range of experiences is an important consideration for tourism development, whatever the environmental context.

Limits of Acceptable Change (LAC)

"LAC is a planning procedure designed to identify preferred resource and social environmental conditions in a given recreation area and to guide the development of management techniques to achieve and protect those conditions" (Wight, 1998 p.82). In other words, it is a system that identifies the social objectives and physical characteristics of a natural area and then sets standards to maintain a level of desirable conditions. The LAC process follows a process of: 1) identify issues, 2) identify indicators of change (social, environmental, managerial), 3) set standards, 4) understand current situation and monitor indicators, and 5) define management actions in the event that standards are breached (Jackson and Leavers, 2000). Although, it "provides objective measures against which to monitor visitation, usage impacts and take remedial action" (Wight, 1998 p.83) LAC

requires personal judgement, not science, to determine what values will be protected. LAC is based on a series of opportunity classes, describing the different conditions that one would encounter in different portions of an area. The Recreation Opportunity Spectrum originated the use of these opportunity classes, which LAC is based upon. While the intent of these tools is, in the end, to provide a full range of tourist experiences (a diversity of visitor expectations and preferences), this system is limited by the amount of detailed ecological information for each site. Finally, LAC has other limitations such as it does not consider cumulative effects of tourism-recreation activities in surrounding areas and if tourism and recreation are the wisest use of an area (Wight, 1998).

Visitor Impact Management (VIM)

Similar to LAC, VIM is an extension of the ROS system. VIM looks at the relationships between specific conditions of use, the impacts associated with these conditions of use (a description) and the acceptability of the various impacts (an evaluation). This system then manages visitors directly through enforcement, zoning, rationing use intensity, and restricting activities, and, indirectly through physical alteration, information dispersal and economic constraints (Wight, 1998). VIM looks at five sets of considerations in understanding recreational impacts: impact interrelationships; use-impact relationships; varying tolerance of impacts; activity-specific influences and site-specific influences (Loomis and Graefe, 1992 in Ceballos-Lascuráin, 1996). VIM is concerned with the kinds and degrees of visitor impacts more so than observing and managing opportunity classes for recreational experiences (Newsome *et al.*, 2002). The strength of the VIM framework is its reliance on both science and subjective judgement to guide visitor management on smaller rather than larger sites (Newsome *et al.*, 2002). Scientific principles are used at various stages of this system especially in understanding and measuring impacts on the site's ecology, applying understanding of human behavior, and monitoring the impacts of the management system.

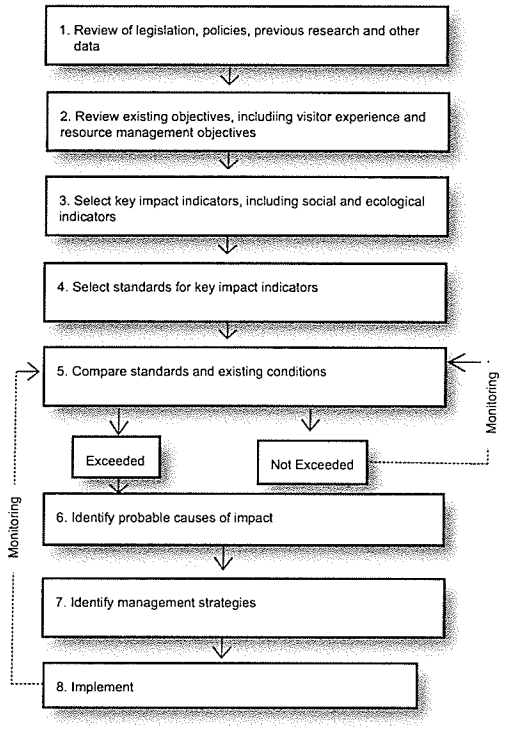


Figure 4. VIM Process: Process for applying the Visitor Impact Management planning framework (derived from Gaefe *et al.*, 1990 in Newsome *et al.,* 2002 p.169)

The VIM process, identified in Figure 4, has been applied to number of national parks, reserves and wildlife refuges across North America, Australia, Argentina and the Netherlands. It is usually not a separate process but one component within a master plan (Newsome *et al.*, 2002).

Visitor Experience and Resource Protection (VERP)

VERP is a system used by the United States National Park Service (NPS) that attempts to find a level of desirable ecological and social conditions rather than creating a magical number for visitor use. As a nine-step process VERP is intended for both front and backcountry planning and management and not just the backcountry as LAC and VIM (which VERP resembles) is intended. VERP restricts its examination on visitors to an area and does not include local populations and culture. This may pose a problem for balancing ecotourism development with local needs.

Like LAC and VIM, VERP also takes the approach that management goals must be translated into measurable management objectives by using indicators and standards. In addition, park zoning should reflect the management goals for different areas (e.g. developed; semi-primitive, pedestrian; semi-primitive, trekker; semi-primitive, motorized; primitive). Specific VERP indicators and standards are then developed for each of the zones; biological physical indicators and social indicators (Wright, 1998 p.86).

Guidelines and Zoning

In addition to the already mentioned techniques, land managers/planners have also been using guidelines and zoning. Guidelines, such as a code of ethics or as 'rules' posted at the entrance of a protected area, basically assist visitors by providing information such as how to behave and what kinds of experiences to expect when visiting a specific site. Codes of ethics or codes of practice/conduct are becoming more common to guide visitors (Fennell, 1999). Zoning, separating activities or experiences, is used to separate conflicting activities and intentions of designation. Zoning is used in the above-mentioned techniques to minimise human impacts and separate conflicting values. Similar to the various designations for protected areas, certain areas or zones are managed according to the desired outcome. For instance an area of pristine wilderness may be zoned, as wilderness, with absolutely no human development and limited access, often only for scientific research. Adjacent land would be zoned to work with the most protective zone, allowing some development or human use. This could be considered a buffer for the more protected zone. Each zone would work in conjunction with the other zones and the overall objectives of the protective area. Zones are designated according to ecological and cultural needs.

Ecotourism

It is also important to include the concept of *Ecotourism* as a management tool in this discussion. As mentioned in the ecotourism chapter, ecotourism requires certain components to be met for a development or experience to be considered truly ecotourism. As a development tool, ecotourism requires limiting impacts on the environment and host community whereby setting social parameters of limiting the number of visitors, development size (preference for small scale), and requiring the lowest possible consumption of non-renewable resources. The ecotourism concept presets management conditions, such as the approximate number of people and the limits of acceptable change of the 'development'. This occurs in advance of understanding the natural and cultural processes in the proposed development area.

Protected areas cannot rely on management strategies alone. To be successful, they will also require appropriately designed facilities (for instance, considering location, scale, materials) and education programs for both visitors and locals (Newsome *et al.*, 2002). One important point of this chapter is that protected areas/parks are planned, manipulated and managed landscapes that usually have the dual purposes to protect natural features or ecosystems and to allow humans the opportunity to experience what is being protected.

Protected areas have, in the past, not been left alone for nature to manage itself (consider fire management and safety interventions). Strategic plans have been made to allow certain activities and experiences, and modes of access, to occur within identified and managed zones. Wilderness is being manipulated with human interventions and controlled access.

The international, Canadian and Manitoba systems of protected area management have been developed using the management tools as described above. As each system varies in size and desired goals, the choice of management tools has varied. As identified from the beginning, the concept of ecotourism has been selected as a development directive for this project. This choice pre-empts the use of the carrying capacity tool and predetermines environmental, social and economic goals. EIA and CEA assist with understanding base environmental conditions and aspects of LAC, VIM and VERP help to understand social conditions and subsequent development concerns. The size of the land that is being protected and developed is small in comparison to the parks and protected areas that these management tools have been applied.

In summary, allthough the management tools described above may not be completely applicable for this project, this information does suggest for sustainable ecotourism development there is a need for: 1) a zoneing system, 2) limits of acceptable change according to environmental and social issues, 3) providing opportunities for various activities and experiences, 4) establishing and understanding base conditions, and 5) understanding the complexity of ecological integrity. To properly plan and design for sustainable ecotourism development, all aspects of the situation, including environmental and cultural aspects should be considered.

Chapter Three Quarry Rehabilitation

The first two chapters are connected through common theories of sustainability and cultural values towards nature and the wild environment. This chapter deviates from the traditional protected area discussion as it is concerned with a post-industrial landscape – a landscape that is the consequence of consuming, not preserving, nature as a resource. This chapter is divided into three parts. The first reviews the general process and objectives of quarry rehabilitation. The second looks at the current situation of quarry rehabilitation in Manitoba by exploring current practices through the literature and dialogue with representatives of the Manitoba Mines Branch. Finally, this study will look at design precedents of innovative quarry site designs in the landscape architecture literature. The intent here is to open the possibilities for designing a quarry beyond the expected outcomes of safety and aesthetic 'blending' of the decommissioned site into the surrounding environment.

Before we can review the process and objectives of quarry rehabilitation consider the following philosophical dilemma:

> *The idea of ecological restoration nicely captures the tension between conservation's concern for the naturalness of nature and its confidence in it's ability to predict, control and create nature* (Adams, 2003 p.237).

The term ***restoration*** is used here to identify a return to a former or original condition, appearance or state that once existed on a site. It is important to understand that the term ***rehabilitation*** can be similar with a meaning of restoring to a former state *or* the more common result of developing a **new** condition with ecological integrity or having cultural utility.

The Adams' quote identifies the problematic foundation of restoration. The concept behind restoration is that the science of ecology can predict and control nature, allowing ecologists to assemble species and other 'parts' of nature, then steer the natural processes in a desirable direction (Adams, 2003). Understanding the ecological system allows humans to manage a landscape at their will. While this in itself may be problematic, since science cannot understand, predict and account for all forces of nature (consider floods and earthquakes) there is also the problem of *whose will* is being enforced.

Restoration is also viewed as an aesthetic value of nature. Philosopher Yuriko Saito suggests, "if we consider the aesthetic appreciation of nature as appreciating the *way*

in which nature tells its own story through its sensuous qualities, we can account for the asymmetry between art and nature in terms of their aesthetic values" (in Foster, 2000 p.74 [emphasis in original]). Foster goes on to explain a subsequent dilemma resulting from Saito's theory:

> *If nature tells a continuous, causal story through natural sensuous qualities appearing in and through the landscape surface, but that story has been interrupted over time by human action, can the natural story then be resumed (and the environment thus restored) when a sensuous landscape similar to that of the original environment replaces whatever interrupted the natural landscape story? Or is the restored environment something quite other than nature's own story, something staged and artifactual rather than natural in character and this in reception?"* (Foster, 2000 p.74).

Foster gives the example where geological curiosities, having become tourist attractions and significant symbols with layers of history, myth and ritual, are damaged from vandalism or through natural erosion processes. "(T)he fact that restoration was being seriously considered demonstrates the marked tolerance and advocacy for hyperreality: presenting as natural that which would not longer be entirely natural in origin" (Foster, 2000 p.76). The idea of the aesthetic of hyperreality stems from the trivialization of nature where

> *(t)he cultural adherence to an aesthetic of hyperreality can thus indicate a tendency toward engaging in a trivial aesthetic appreciation of nature because such an appreciation stress surface or ambient sense qualities at the expense of an integration of those qualities with knowledge of the historical and scientific contexts. More importantly, the prevalence of a hypereal aesthetic in America marks the public assumption, however unconscious, of a tacit but thorough implosion of boundaries between the natural and artificial, thus muddying the waters for reasoned reflection about restoration. ...*
>
> *In limiting one's aesthetic appreciation to perceived surfaces without linking those surfaces to historical and scientific contexts, the narrative of time is displaced from the appearance of sense qualities in space. The resulting falsification of experience emerges through a disruption of continuity between the factual, nonperceived context and the ambient, sensuous surface. Many environmental philosophers worry about this disruption of space and time in understanding and appreciating natural environments* (Foster, 2000 p.76-77).

While Foster's explanation of his concern seems complicated, to summarize the issue is quite simple. The issue is not about the science or the ability to understand natural systems that can be restored, but is a philosophical/moral issue. There is the question: should an object or system be restored in the first place, since any human intervention

will replace the natural or 'real' state of the situation? And, secondly to what period in time should the feature be restored back to? For some people this human intervention changes the natural feature as it exists (where it may possibly already be damaged) to a 'hypereal' object, or substituting the real experience (natural or cultural) for a more convenient timeless replica of the original. Our current western society seems to accept and possibly prefer the 'hypereal' and reproductions of nature and cultures as exemplified by the success of experiences provided by Disney World and Las Vegas.

Restoration

Restoration of natural areas, like many philosophical concepts in western culture, is dualistic and has both proponents and critics. On the one side, proponents view restoration as a dialogue between community or human culture and nature. Nature is described as self-organizing, self-creating, unpredictable, and complex or in other words "wild'. Restoration is not, or need not be domestication. It is a manipulation of the landscape with the intension to 're-wild'. To accomplish this, restorations reintroduce species and systems that may include the unruly, chaotic, and turbulent such as droughts, floods and fire (Jordan, 2000). Restoration is considered a letting go, the opposite to domestication, where "the whole process is - or at least can be - done in a spirit of setting free, in an attempt not to control the forces of nature but rather to act in concert with them" (Jordan, 2000 p.28-29). This view also promotes the reintroduction of the wild at various scales and culturally defined landscapes. Although environmentalists idealize remote 'wilderness' settings and promote their preservation, many restoration advocates believe this is extremely limiting, allowing only certain means and an elite few to experience 'pristine' nature. Restoration allows more people and different means to experience *wild* ways. Jordan (2000, p.32) explains the need for restoration as compared to preservation:

> *A fundamental weakness of preservation as a paradigm for conservation is that, as a non-act, it provides only a weak base for the development of the performance and ritual that will be needed to explore and articulate the terms of our relationship with particular landscapes, to create values related to these relationships, and to generate emotional commitment to them. As an overt, complex, fascinating, and even at times inherently dramatic act, restoration can become not only a form of recreation but also ultimately a performing art, a way of creating community and other transcendent values such as meaning, beauty and the sacred.*
>
> *In this way it provides what seems to me a plausible basis for the creation of the large, deeply committed constituency that will be needed to ensure conservation of large natural- or wilderness-areas. It does this, moreover, with the material close at hand—the landscapes that most people actually*

> *inhabit, the urban -parks, rights-of-way, stream corridors, and vacant lots of the urban and suburban landscape that have, or can be made to have, a powerful relationship with larger and more remote wilderness areas.*

Jordan suggests that culture, what he calls *community*, and wilderness need to be brought together, as done in the past with rituals, such as community initiation that involved the rituals of both killing and eating, sacrifice, and understanding that life feeds on death. Jordan believes this will help the community to compensate for our 'crimes' against nature and provides a context to understand wildness including the cycles of creation and destruction.

The other side of the argument, from critics of restoration, believe the human act of interfering with the natural compromises the idea of wilderness and creates something that is artificial. There is the underlying belief of human superiority, of hubris, where "(o)ur knowledge, our science, and our technology, we seem to believe, can do anything, correct any problem, heal any wound " (Katz, 2000 p.38). Katz (2000, p.38) goes on to say:

> *The mistaken belief that restoration policies can replace natural values by the creation of functionally equivalent natural systems is an expression of human hubris regarding our technological power and mastery of the natural world.*
>
> *... But if, ... we recognise the importance of natural value unmodified by human technology, the value of a nature free from human intentionality, we will understand the limits of our knowledge and power. We will understand that there is a realm of value with which we should not interfere, a realm of value that ought to be protected and preserved. We cannot be the masters of nature, molding nature to our wishes and desires, without destroying the value of nature. The realization of this truth is the cure for human hubris, the acceptance of the limitations of human power.*

For this project there is a dilemma when considering what to do with the impacts of the quarry process. The large voids dug into the ground are not natural and are potentially unsafe. However nature, in this case the snakes, have adapted to this new landscape and are thriving even though there is nothing natural about his post-industrial site. The act of leaving a cultural artefact to natural processes may be considered an unintentional act of cooperation with nature. By letting nature continue along its way and not interfer is a potentially important learning tool. The quarry itself is a consequence of consuming a resource bu has allowed for an important dialogue between culture and the wild. An ecotourism venture that contributes to

an understanding of culturals consequences of resource use and natural processes should be looked at favorably especially when many of our wild places are being lost.

Quarry Rehabilitation in Manitoba

Quarrying for rock, aggregate and other materials has been a basic human activity for millennia. In the Manitoba context, quarries have been developed for gravel, sand and limestone. Limestone quarries, in the Bird's Hill, Stonewall and Interlake area have been developed to provide construction and road building materials and a source of lime to produce cement. The consequence of the quarrying process is a post-industrial site usually consisting of an open pit and waste materials remaining on site. These by-products of the quarry process along with our western beliefs to manage public land for a common good has resulted in government controls in an attempt to ensure public land has been treated adequately and appropriately for current and future inhabitants (Bailey, 1981).

The rehabilitation of pits and quarries on Manitoba's public land is the responsibility of the Mines Branch in department of Manitoba Industry, Trade and Mines. Introduced in 1992 under the Mines and Minerals Act, a program was developed to implement sustainable development in association with pits and quarries (Mines Branch, website: www.gov.mb.ca/itm/mrd/mines/sustain/quarry.html, accessed August 2003). With an underlying concept of implementing sustainable development, the Mines Branch identifies the programs intent:

> *It provides an equitable and efficient means of funding rehabilitation work. At the same time, the contracting of the rehabilitation work back to private industry creates employment opportunities and spreads economic activities back into the local community* (Mines Branch website).

The program has a dedicated fund, based on a $0.10 per tonne environmental levy collected on all current and future aggregate production, that pays for the rehabilitation of the depleted pits and quarries. The program is available to any land owner who wants to rehabilitate a pit or quarry. This program has a specific understanding of what constitutes 'rehabilitation':

> *The public objective of the program is to ensure that depleted pits and quarries are rehabilitated to a condition which is "safe, environmentally stable, and compatible with adjoining lands". While each site is somewhat unique, achievement of this general standard involves sloping embankments and spreading the available overburden and topsoil stripping stockpiles back over the surface. The public benefit is served once this standard has been reached. If the land owner then wishes to initiate further site development,*

> *to establish a housing subdivision or a golf course for example, they must do so at their own expense.* (Mines Branch, Manitoba's Pit and Quarry Rehabilitation Program brochure, no date, emphasis in original).

As mentioned this program has primarily focused on grading, sloping embankments and spreading topsoil stockpiles as a means of minimizing liability for unsafe site conditions and blending the site back into landscape context. The program has successfully rehabilitated mostly agricultural land back into productive use (Bailey, 2003 personal communication).

> *After an aggregate site has been decommissioned the slopes of the pit may need to be reshaped to comply with provincial regulations (not entirely accurate as it is an accepted value not an official position) to ensure the stability of the material (the acceptable minimum slope in Manitoba has been determined to be 4:1 on agricultural land and 3:1 for safety purposes only* (Carter, 1996 p.38).

The main purposes for reshaping the edge contours are for safety, to minimize potential erosion and to prepare the site for a specific end use. While temporary slopes can be left at no greater than 2:1 slopes, permanent pit closures are expected to have approximately 3:1 slopes for "biological" stability (Carter, 1996). Biological stability is described as a minimum slope that is required for successful re-vegetation to occur. Once the edge conditions are made 'safe' the overburden and organic material, usually stock piled on site are returned.

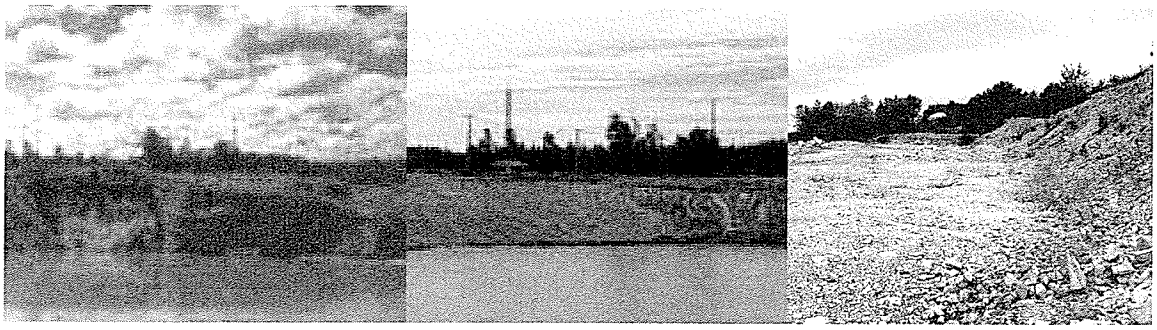


Figure 5. Quarry Rehabilitation: (A and B) Before and after photographs of derelict land rehabilitation from a Mines Branch brochure: Manitoba's Pit and Quarry Rehabilitation Program (Mines Branch, No date), C) Quarry slope at the Inwood site (Zonneveld, 2004)

This material is also scarified to minimize surface compaction and spread at various depths to allow for variations in the site conditions, which in turn, increases the chances for variation in species composition. Non-vegetative slopes also need to be re-sloped to minimize down-slope water flow velocities therefore preventing erosion.

In the process of aggregate pit rehabilitation, successful vegetative restoration is viewed as: the presence of indigenous pioneer species and, evidence that natural succession with representative species, common to the area, are present (Carter, 1996). Carter identifies factors in a successful restoration program which include: the abiotic factors of climate, length of growing season and temperature, as well as, the landform characteristics of: slope, soil stability, soil temperature regimes, soil nutrient status, soil water retention, soil pH, soil organic matter content, soil conductivity and texture. Further he suggests that "long term re-vegetation success is dependent on the presence of a population that is naturally suited to an area, both biologically and physiologically" (Carter, 1996 p.42). Where situations such as harsh climates require alternative strategies, the use of a non-indigenous "nurse crop" is recommended to assist in developing an initial pioneer population, without jeopardizing the development of a long-term indigenous population (Carter, 1996). The Manitoba government has targeted restoration and priorities according to roadway visibility, public use exposure and cost effectiveness and in the case of private pit operators there is no "legal" obligation to restore the land after closure (Carter, 1996).

As already mentioned, the efforts of quarry rehabilitation in Manitoba have primarily been focused on reshaping the post-industrial site for safety, reducing erosion, and blending the site into the surrounding landscape. The rehabilitation fund has paid for graders and scrapers to do this work. According to the Mines Branch, this manner of rehabilitation has suited the predominantly agricultural land, has been cost effective and has prepared the site for a future use. To date, rehabilitating the quarries has meant removing the steep embankments for agricultural land use goals. If the land-use goal of a quarry site were to retain or even enhance the embankments for a future use it would seem reasonable that this would still be considered an appropriate action towards rehabilitation. As long as issues of public safety and visual attractiveness have been addressed retaining the quarry walls should be considered an appropriate rehabilitation option. The unknown issue, as it has yet to be tested in Manitoba, is if money from the rehabilitation fund could be used to pay for other forms of development in addition to or besides the accepted funding of contour grading and earth moving. Representatives from the Mines Branch say this is possible.

Landscape Architecture and Quarries

The subject of quarry rehabilitation and design has been of interest for landscape architects for some time. This history goes back to 1942 when Sir Geoffrey Jellicoe was considered one of the first landscape architects to advise on long-term mineral development (Jarvis,

1995). At that time Jellicoe saw the limestone quarry as 'impressive in its own right and did not see the need to soften it by artificial means' (Jarvis, 1995 p.10). Mineral extraction has provided landscape architects opportunities to mitigate environmental impacts through design and science confronting issues such as noise, dust, vibration, erosion, loss of landscape character, visual impact and groundwater contamination (Austin, 1995). Although somewhat biased, as mineral planning is his landscape architecture focus, Jarvis expresses the importance of this/his work:

> *Involvement of the landscape architect in the mineral industry is one of the most valuable landscape design and planning inputs. There are few other areas where the work is so ambitious in scale and time, yet the objective is for the work to be unnoticeable. As we travel through these enormous hills and woodlands, we are unaware that these are not 'natural' features, and are ignorant of the people who created them to conceal a vast excavation* (1995 p.10).

Landscape design by concealing the quarry is very common, and has used a simple formulae where:

> *...landscape proposals need to address the mitigation of the visual impact of the site. This may include on- and off-site planting, earth modelling and screen fencing. ... As far as possible, planting should reflect the patterns of existing woody vegetation in the areas and contain indigenous species. ...Frequently, restoration proposals consist of evenly-graded banks at a fixed slope of approximately 1:3 and make no attempt to integrate the excavation with the surrounding landform. It is possible to construct a final landform that fits more comfortably into the surrounding topography by including adjacent areas within the excavation site and carrying out more extensive earth modelling. The judicious use of planting on side slopes can further disguise an artificial landform* (Glanville, 1995 p.19).

Not all quarry designs have attempted to conceal the industrial scars but instead have, in a way, celebrated the new landforms. Abandoned quarries have been resurrected as: Parc des Buttes-Chaumont, a sublime and seductive Parisian Park (Tate, 2001); outdoor display and work areas by artists, such as 'Opus 40' (Dalton, 1985); an Olmstead inspired, Hargreaves designed Montreal park with 'quarry pool' (O'Connell, 1999); a universally accessible human-made tidal zone park (Thompson, 1990); open water features providing a variety of recreational opportunities (House, 1995); constructed forests (Kirkbride, 1995; Pope, 1995) and wetlands (Mills *et al.,* 1995; Silver, 1990); a resort with golf course near Kuala Lumpur (Austin, 1995); a fig orchard in Israel (Benzinberg Stein, 1999); plant exhibition/botanical parks such as the Eden Project (Fieldhouse, 2001) in England or the Butchart Gardens in Victoria, British Columbia; a Civil War memorial in Barcelona (Gali, 1990); an open air museum in Greece (Golanda and Kouzoupi, 2001); and, a motorway

rest area in France (Lassus, 1998).

Figure 6. Design Precedents: A) French motorway rest area (Lassus 1998), B) Butchart Gardens in British Columbia (http://www.cse.ucsc.edu/~ soumya/artf_beauty.html), C) Sculpture garden Opus 40 (http:// pages.cthome.net/waterbury/khe/opus40.htm, 2004)

This list of quarry rehabilitation precedents identifies a broad range of end-uses. In all cases, these former quarries were further manipulated post-industry to meet current and future human needs. For instance, quarries were 'stabilized' using waste drystone retaining walls (Dalton, 1985; Golanda and Kouzoupi, 2001), and 'naturalized' terraces (Dalton, 1985). Designers have also deliberately celebrated terraces and cliff walls by exposing the remains as incorporated into the design such as in the Saint-Michel site in Montreal (O'Connell, 1999) or the motorway rest area in France (Lassus, 1998). Many of the designs incorporate walking paths for visitors to explore these unique post-industrial sites. The quarries provide a continuum of exceptional views, ranging from panoramic vistas to the details of the exposed subterranean rock and crevices. The designs have various views regarding the revegetation of the old quarries. According to Olmstead and Hargreaves, the rugged topography of the quarry site is incongruous to decorative planting (O'Connell, 1999). Other designers have let nature take its course and later protect the natural plant invaders (Lassus, 1998). Other designers have regraded the steep quarry slopes into less steep slopes or terraces, established soil cover and established "indigenous woodland" (Kirkbride, 1995; Glanville, 1995) or wetlands (Silver, 1990; Pope, 1995; Mills *et al.,* 1995; House, 1995).

Figure 7. Design Precedents: A) Wheel chair accessible tidal pools at Yaquina Head Natural Area, Oregon (http: //www.paulnoll. com/Oregon/Tourism/Yaquina-Head-quarry.html, 2004), B and C) People are encouraged to visit a stabilized Greek quarry site (Golanda and Kouzoupi, 2001)

These examples of reworked post-industrial quarry sites reveals a broad range of possibilities for the Inwood quarry site. Designing the quarry site for ecotourism requirements not only needs to consider obvious issues such as safety, but needs to commit to telling a story. The landscape narrative may cover up the industrial past and tell the story of the reconstructed 'natural' or celebrate the quarry as human artefact and landscape oddity and tell the story of the opportunities taken by nature (the snakes) to use this forgotten and neglected post-industrial site.

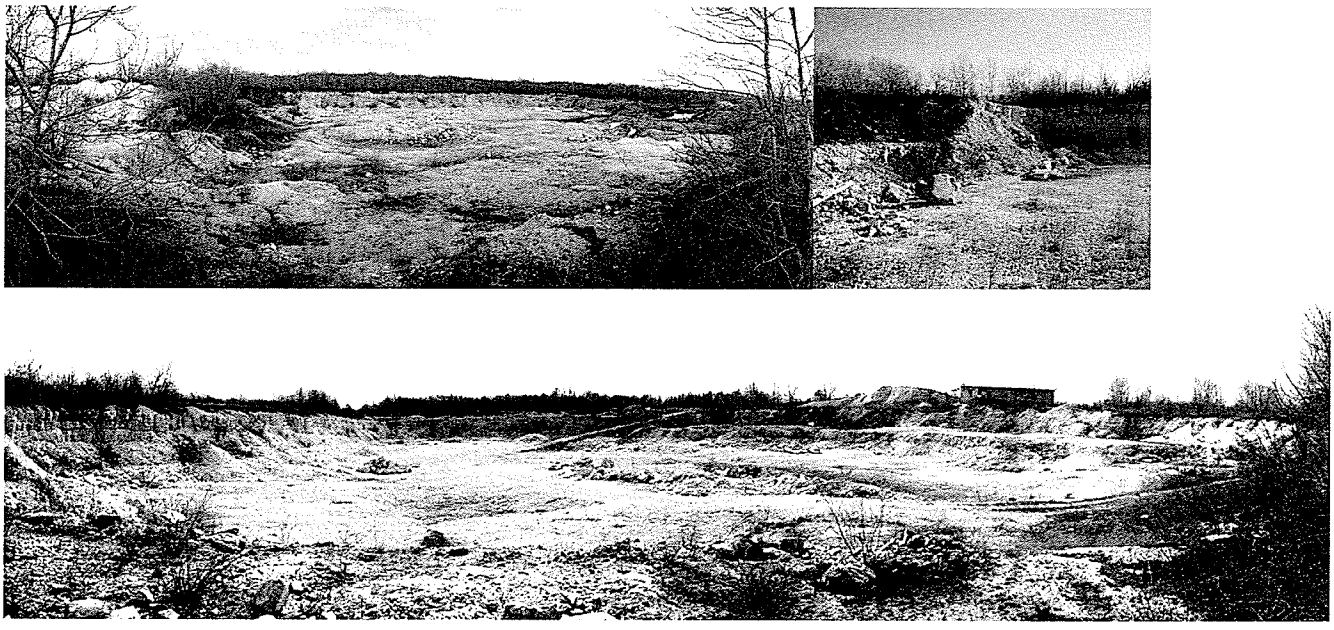


Figure 8. Various views of the Inwood Quarry (Zonneveld, 2004)

Chapter Four Human- Nature Relationship

This chapter looks at the evolving relationship between human culture (society) and natural processes (wildness). Understanding how our current culture, a 21st century North American perspective, views our connection to nature ultimately will determine the appropriateness of designing and constructing for opportunities for humans to interact and experience non-human animal species and 'natural' processes. Max Oelschlaeger and Roderick Nash have both written comprehensive histories of the evolution of the idea of wilderness. Since it would be a daunting task to summarize these seminal works, this study will be selective and focus on those issues that may influence the planning and design of an ecotourism site.

Before we continue looking at these issues we need to distinguish between the terms *nature* and *wilderness*. Although these terms could and are used interchangeably, they are different. Von Maltzahn (1994 p.44) describes nature as natural forms, compared to cultural forms, where:

> *Natural forms are forms that bring themselves forth out of themselves. This is in contrast to implemental things and works of art, which do not bring themselves forth but are produced by humans…. Cultural forms are those that humans have created out of nature or have permanently added to it. Agriculture is an example.*

Von Maltzahn continues his contrasting of culture, what humans have added to nature, and wilderness, where "(w)ilderness indicates the abundance of special places for these (wild) plants and animals" (1994 p.44). Nature is a spontaneous and naturally organized system in which all parts are harmoniously interrelated (Oelschlaeger, 1991) while wilderness is a culturally derived place of 'otherness' where wild things exist outside of the control and possibly the understanding of humans. Parks may be natural, without exotic species for instance, but not wilderness, since they have road access and amenities for humans. A backyard may be natural, meaning it has plant material, but may not necessarily be wild since the plants are maintained and manipulated, essentially controlled for human purposes. For this study, nature and natural will be used to indicate those objects and processes that are non-human. Wilderness will be used to describe large areas where nature is unimpaired by human influence. The term wild will also be used to describe a living being (a unit of wilderness) or process that is self-determined and again is not controlled by human manipulation.

When 'Wilderness' Did Not Exist.

As already mentioned, wilderness is a term used to describe nature, its forms and natural processes, which are not modified by human influence (Von Maltzahn, 1994). It is a cultural term, whose origin is believed to come about when hunter-gathering societies became more sedentary and whose subsistence was based on agriculture, and where there was a need to control and manipulate nature for food. A concept was needed to distinguish between humankind, with its modifications, and nature. Prior to agricultural societies and their need to modify the land for food, shelter and social needs, the nomadic hunter-gathering societies lived within the natural processes and were a part of the natural cycles. While these prehistory humans used tools and did modify the land to a certain extent, such as constructing route markers or cairns such as the Inuit's inukshuk, the relationship with nature was not of fear and distain but mostly likely as home, reverence and reciprocal equality.

Max Oelschlaeger's book **The Idea of Wilderness** gives a comprehensive historical development of the western meaning of 'wilderness'. His book examines the development of ideas of wilderness from the Palaeolithic mind, as mentioned above (where humans lived within wilderness), through belief in myths and totemic cultures, classical views of the Greeks and Romans, the reorganization of understanding with principles of reason and science, viewing wilderness as something to conquer or to exploit as resource, and, the development of environmental ethics from notables such as Thoreau and Muir and later with Deep Ecology.

What Oelschlaeger's work highlights is that there have been a number of shifts in how we, as western society, gaze at our natural world. The intent here is not to select one view as the principle means for design and planning, but to simply understand that the meaning and language used to communicate that meaning will vary considerably with notions of nature, wilderness and the wild.

Zoos

One way in which humans interact with non-human animals is through the experiences provided by zoos, zoological parks and game reserves. Zoos, broadly defined as collections of animals, have had a long and varied history. The rationale behind keeping animals in captivity vary from the need to control and possess nature, the feeling of responsibility, as well as a means to educate and entertain (Douvris, 1998). Modern zoos have to struggle with the growing concerns of a more aware public regarding animal

welfare and care and to keep pace with innovative interpretive and education programs. Douvris' (1989) practicum looking at a bison enclosure for the Assiniboine Zoo in Winnipeg identifies, the current thinking occurring in the care and display of animals in zoo design. She indicates that current design becomes more desirable with: a) landscape immersion, where the visitor feels that they are immersed in the animal's habitat along with the plants and animals (using hidden barriers) b) cultural enhancement, the incorporation of cultural elements significant to the animal's place of origin and association with humankind, c) habitat imitation, the enclosure use of natural habitat elements such as specific vegetation, to recreate the image of the place and d) behavior enhancement, the inclusion of elements that promote natural or life enriching (boredom reducing) behavior. This understanding of zoo design is relatively recent. Past zoo designs were enclosures that were basically cages with obvious separation from the animals and the viewing public. Later designs evolved to include natural looking habitat and include elements that would allow for natural animal behavior. The 1970s saw an increase of landscape immersion where animals and visitors were immersed in a replication of the natural environment. Landscape immersion techniques, as explained by Douvris (1998), make visitors feel a part of the enclosure, by erasing the strong distinction between pathway and enclosure area. This can be accomplished by being aware of the details such as size, rhythm and shape of the pathway, site lines, materials used, and providing for discovery and anticipation. Douvris uses information from David Hancock's **Seeking to Create Illusions of Wild Places** (Hancocks, 1990). What is important to note here is that wild areas are being recreated to influence the visitor's perception (site appears 'natural' and frames views) and to conceal infrastructure and other people and to minimize intrusion on the animals. The zoo could be considered a form of hyperreality, providing human-nonhuman animal experiences with the conveniences of human safety and amenities, and the time saving concentration of exotic animals.

Most zoo design is for the benefit of the visitor where there is a need to provide interesting and educational experiences. To do this, designs are required to develop transitions, to camoflague maintenance structures and 'ugly' views and to entertain. There are a number of ways to do this. Douvris recommends, "Walking on a wooden bridge over a serpentine body of water can be designed to add excitement to the tour" (p.23). She also suggests the using the following design elements: underwater viewing structures, the Ha-ha (an obstruction comprised of a walled ditch), one-sided water moat, the sunken fence, the double sided dry moat, and the fence. It is not the intent here to conduct an exhaustive review of zoo design but to identify that current thinking in zoo design is attempting to

provide for educational and entertaining visitor experiences while at the same time providing for the health and welfare of the enclosed animals. It is important to note that current zoo design thinking includes: landscape immersion, cultural enhancement, habitat imitation, and behavior enhancement. These concepts are potentially applicable for the design of snake ecotourism sites.

The entertainment value as well as reconstructing natural settings helps visitors to accept the current idea of the zoo. Zoo animals are still confined to a designated enclosure and are controlled by their human captors. This issue is of concern with the wild snakes in this project. Is it necessary, or ethical to confine the snakes to certain areas or for a certain amount of time for the didactic or entertainment value by humans? If we say yes, then the tourism site may take on more zoo-like design qualities. Techniques to hide the infrastructure and control the animals for the benefit of humans would be appropriate and acceptable means to engage with the snakes. The opposing answer is no. Here, it would be wrong to control the snakes by holding them or by putting a façade between the visitor and the natural processes of the snakes. As a protected area, the wildness of the snakes, and their environment should be protected from heavy-handed human intervention and manipulation.

Exhibit Viewing

Another design issue that stems from the zoo literature is the spatial experience of how and where we view animals. "The visitors position in space determines what and how exhibit objects will be perceived" (Polakowski, 1987 p.120). The designer not only controls the observer's position, but also can determine what will precede and follow the exhibit experience. Consequently, the nature of the circulation system, vertical and horizontal alignment of pathways, width of pavement, surfacing material, location of viewing station, plantings and other barriers has a substantial influence on the nature of the animal/people interaction (Polakowski, 1987). Polakowski explains that by being and viewing from above we rank animals as being subordinate. The idea of superior or inferior positioning, as above or below the viewer, stimulates human behaviour to react by learning, and developing respect or desire for dominance or control (Coe, 1985 in Polakowsk, 1987). It is important to consider the spatial location of the human viewer in relation to the animal being viewed according to the interpretation/educational values that has been planned and designed into the sites.

What is Natural Again?

So far this section has outlined a development of cultural history of what is *natural* and *wilderness*. This leads to the next question of how does this apply today? As this could easily be a dissertation on and of itself, this discussion will narrow the focus on how this understanding applies to design and planning.

It has already been identified that humans originate from nature and have, through developing civilization, created a division between what is natural and cultural. With an underlying concern to protect, western society has developed systems to control natural areas from human abuse and over development. In some cases wilderness has been separated out as protected areas. Humans are still attempting to control the ecology of these areas with fire suppression, insect control, and providing human amenities for more comfortable interaction. From the start, it is ironic that we consider the need to plan and design nature. To be truly natural, some people believe a natural system should be left to its own accord. Any human interference would automatically change a thing from natural to cultural. This would be true, if based on the philosophy that people are separated from nature and natural systems. Human manipulations to the land could also be considered natural, since humans originate from nature and therefore would be like any other natural being interacting with its environment. Humans, termites, beavers, birds, grazing animals would all be considered the same; natural beings modifying their environment for their own survival. Survival may be an important word, since humans also have the ability to go beyond mere survival and have the ability to cause global environmental occurrences such as climate change. Natural may then be determined by considering the degree of change from the original to the human modified artefact.

If humans are considered within the natural realm, how much influence and the type of change also play into the issue of naturalness. Size or scale seems to play a deciding factor, where things on a 'human' scale seem more natural than larger mega structures or projects. Materiality also plays a role where natural materials, stone, wood even bricks, are considered more natural than steel, plastic or other manufactured materials. The aesthetic of a designed object or landscape can appear more natural if the mechanics or cultural artefacts are hidden. This understanding of 'natural' is a form of authenticity. We tend to value things that are authentic, or at least more authentic than reproductions or completely 'artificially' constructed objects or spaces. Authenticity and value appears to be dependent on our knowledge of the object and especially how it was made. Rural, pastoral landscapes are valued and desirable, but are not necessarily natural, and have

over time been manipulated for human use and aesthetic appreciation and ultimately accepted as 'natural' occurrences. This acceptance, even preference is exemplified in the attitudes of two students returning from Europe (Papanek, 1995 p139):

> *I didn't like Europe as much as I liked Disney World. At Disney World all the countries are much closer together, and they show you just the best of each country. Europe is boring. People talk strange languages and things are dirty. Sometimes you don't see anything interesting in Europe for days, but at Disney World something different happens all the time, and people are happy. It's much more fun. It's well designed.*
> A college graduate just back from her first trip to Europe.
>
> *What do you do when the real place looks like a copy of the place where it's fake.*
> Another student, returning from Europe

The questioning of authenticity of built environments can also be applied to the design and construction or rehabilitation of 'natural areas'. A value judgement has to be made as to a restored landscape's authenticity and if this manipulation is explained to the visitor.

The idea of the *wild* is also relative to the meaning given the term by language and the culture that is using it. Wild often refers to 'out of control', specifically human control, or outside of or beyond civilized manipulation or understanding. 'Wild' as in a 'wild child' suggests chaos and would not be socially acceptable. However, using the colloquial expression, " that was a wild ride" is a positive statement meaning it was exciting and exhilarating. 'Wildness', not unlike beauty, is socially relative and may have multiple meanings according to the perspective of an individual or a particular society.

Going into Nature- the Experiential

There is a difference between reading something in a book, having it orally explained, seeing on film or television, and, experiencing it directly. Direct experience engages the participant by not only using all the senses, but includes being attentive and interpreting the moment, and later remembering and attaching emotion. The whole body is in tune with his/her surroundings. This is illustrated through the eyes of the naturalist, or what Wilson (1984, p.103) calls the civilized hunter:

> *He (sic) goes alone into a field or woodland and closes his mind to everything but that time and place, so that life around him presses in on all the senses and small details grow in significance. He begins the scanning search for which cognition was engineered. His mind becomes unfocused;*

> *it focuses on everything, no longer directed toward any ordinary task of social pleasantry. He measures the antic darting of midges in a conical mating swarm, the slant of sunlight by which they are best see, the precise molding of mosses and lichens on the tree trunk on which they spasmodically alight…. He listens for any sound that breaks the lengthy spells of silence. From time to time he translates his running impressions of the smell of soil and vegetation into rational thought: the ancient olfactory brain speaks to the modern cortex. The hunter-in-naturalist knows that he does not know what is going to happen.*
>
> *Without beauty and mystery beyond itself, the mind by definition is deprived of its bearings and will drift to simpler and cruder configurations. Artefacts are incomparably poorer than the life they are designed to mimic. They are only a mirror to our thoughts. To dwell on them exclusively is to fold inwardly over and over, losing detail at each translation, shrinking with each lifecycle, finally merging into the lifeless façade of which they are composed.* (Wilson, 1984 p. 115).

Kay Milton, a social anthropologist agrees with the point that direct experience plays a pivotal role in shaping a person's attitude towards nature. She has written **Loving Nature**, a book that attempts to answer the question why people become involved in environmental activism. Her argument searches for the reasoning behind our motivations and essentially how people become who they are. Milton suggests (2002, p148):

> *What each individual becomes during their lifetime is a product of their engagement with that environment, a process in which they learn about the world and themselves. … and that each individual is therefore a product of their own social experience….(however) the environment of most human beings may be predominantly social, but to say that it is essentially social is to assume that human beings can only pick up information from other human beings or in contexts of human creation, and not from the non-human things in their environment. … Throughout our lives we learn from our whole environment, not just from other human beings and their products (culture).*

Milton (2002 p.148) continues by suggesting how individual differences occur:

> *Precisely what we learn about the world depends on how we, as individual organisms, engage with it. In other words, it depends on our personal experiences, and because each individual's combination of experiences is unique, so too is each individual's understanding of the world. This diversity of experience means that some people think of nature, or parts of nature, as composed of personal agents, while others see it as a complex of impersonal objects and mechanisms. It means that some people think of non-human animals as resources for human use, while others see them as non-human persons worthy of moral concern, or respect, or punishment. It is diversity of experience that generates diversity of perception, knowledge and understanding.*

The understanding of the world we develop is also dependent on emotion. Milton (2002) suggests:

> *Emotions are fundamental to the process of learning. This runs against western cultural convention, in which thought and feeling (and, therefore, rationality and emotion) have been seen as separate processes. Academics have sustained this convention by studying cognition and emotion as separate phenomena. ... This book continues to that effort (challenging this notion) by suggesting that, whatever else they may be, emotions can usefully be seen as learning mechanisms. This view draws on the work of Damasio (1994, 1999) and those psychologists who have observed that interest and anticipation (which psychologists refer to as basic emotions) enable us to pick up information. We learn about the world by encountering things that engage our interest. In addition, memory is affected by emotional state... so how we feel during an experience influences that we remember about it, and therefore how it affects our future thoughts, feelings and actions.*
>
> *It is the things we encounter and engage with that induce emotions in us, so our emotional attachments, like our understanding of the world, are products of experience. And again, diverse personal experiences generate diverse emotional attachments. Some people learn to enjoy wild, rugged landscapes while others learn to love woodlands, or deserts, or cities. Some learn to identify and empathize with snakes, or fleas, or spiders, while others learn indifference, or fear, or revulsion.*
>
> *As fully conscious beings, who not only experience feelings but also know that we do, we can use them to guide our actions. We can plan to avoid sadness and fear, and to maximize happiness. This is how emotions motivate; they identify what matters to us. Whatever we find most emotionally compelling - most exciting, most interesting, most tragic, most satisfying, most awe-inspiring, most guilt provoking, most enjoyable – becomes what matters most, what we hold most sacred.*
> *(p. 149).*

Milton's basic premise is that we develop feeling and understanding, as well as emotional attachment through engaging with both our social and natural environments. This is important to understand when developing for an ecotourism site. People will want to visit an ecotourism site for a number of different reasons, as mentioned, since they are developing from different lives and understanding. The site will need to provide for a number of experiences, and if the site is to be didactic, the site should allow for emotional responses.

Issues of authenticity and basically what a 'natural' site should be, according to the senses is open for discussion. The comments made earlier by the college students travelling to Europe and Disneyland points to the problematic nature of re-creations and rehabilitation, and, disconnects place from products of place. Too often when recreating natural areas, humans over simplify the complexity of an ecosystem or simply neglect the operating system and only reconstruct an aesthetic equivalent. This negligence impacts the human psyche. Wilson (1984 p.115) offers:

> *Without beauty and mystery beyond itself, the mind by definition is deprived of its bearings and will drift to simple and cruder configurations. Artefacts are incomparably poorer than the life they are designed to mimic.*

Arne Naess believes: "Children learn to accept the world by feeling that they have a place within it. ... If we see the world as enriched because we are looking at it, we will not destroy what we see " (Rothenberg, 1993 p. XXII) This work believes such a perception is not limited to a child's domain, but that adults also understand this as being true.

The biophilia hypothesis (Wilson, 1984; 1996; Kellert and Wilson, 1993) provides the argument that nature and particularly the presence of other living things, is important for human health in that the destruction of nature deprives us of countless opportunities for emotional fulfillment and the extinction of other species is the extinction of our own emotional experience (Milton, 2002). This understanding of authentic, natural and wild will influence the direction of designing a quarry into an ecotourism site.

Human-Snake Relationship

The relationship people have with nature is derived from their cultural beliefs and values, and their direct and indirect experiences with nature and natural processes. It is a dynamic process changing with time and a person's collection of experiences. This is also true of the human- snake relationship. This section will give an overview of how humans have viewed, despised, fascinated and even worshiped the snake. Animal myths are not just the creation and held beliefs of Palaeolithic minds but myths and beliefs regarding snakes continue today.

Snake

A snake came to my water-trough
On a hot, hot day, and I in pyjamas for the heat,
To drink there.
In the deep, strange-scented shade of the great dark carob-tree
I came down the steps with my pitcher
And must wait, must stand and wait, for there he was at the trough before me.

He reached down from a fissure in the earth-wall in the gloom
And trailed his yellow-brown slackness soft-bellied down, over the edge of the stone trough
And rested his throat upon the stone bottom,
And where the water had dripped from the tap, in a small clearness,
He sipped with his straight mouth,
Softly drank through his straight gums, into his slack long body,
Silently.

Someone was before me at my water-trough,
And I, like a second comer, waiting.

He lifted his head from his drinking, as cattle do,
And looked at me vaguely, as drinking cattle do,
And flickered his two-forked tongue from his lips, and mused a moment,
And stooped and drank a little more,
Being earth-brown, earth-golden from the burning bowels of the earth
On the day of Sicilian July, with Etna smoking.
The voice of my education said to me
He must be killed,
For in Sicily the black, black snakes are innocent, the gold are venomous.

And voices in me said, If you were a man
You would take a stick and break him now, and finish him off.

But must I confess how I liked him,
How glad I was he had come like a guest in quiet, to drink at my water-trough
And depart peaceful, pacified, and thankless,
Into the burning bowels of this earth?

Was it cowardice, that I dared not kill him? Was it perversity, that I longed to talk to him? Was it humility, to feel so honoured?
I felt so honoured.

And yet those voices:
If you were not afraid, you would kill him!

And truly I was afraid, I was most afraid, But even so, honoured still more
That he should seek my hospitality
From out the dark door of the secret earth.

He drank enough
And lifted his head, dreamily, as one who has drunken,
And flickered his tongue like a forked night on the air, so black,
Seeming to lick his lips,
And looked around like a god, unseeing, into the air,
And slowly turned his head,
And slowly, very slowly, as if thrice adream,
Proceeded to draw his slow length curving round
And climb again the broken bank of my wall-face.

And as he put his head into that dreadful hole,
And as he slowly drew up, snake-easing his shoulders, and entered farther,
A sort of horror, a sort of protest against his withdrawing into that horrid black hole,
Deliberately going into the blackness, and slowly drawing himself after,
Overcame me now his back was turned.

I looked round, I put down my pitcher,
I picked up a clumsy log
And threw it at the water-trough with a clatter.

I think it did not hit him,
But suddenly that part of him that was left behind convulsed in undignified haste.
Writhed like lightning, and was gone
Into the black hole, the earth-lipped fissure in the wall-front,
At which, in the intense still noon, I stared with fascination.

And immediately I regretted it.
I thought how paltry, how vulgar, what a mean act!
I despised myself and the voices of my accursed human education.

And I thought of the albatross
And I wished he would come back, my snake.

For he seemed to me again like a king,
Like a king in exile, uncrowned in the underworld,
Now due to be crowned again.

And so, I missed my chance with one of the lords
Of life.
And I have something to expiate:
A pettiness.

Taormina, 1923

D.H. Lawrence (in Alexander, *et al.*, 1975)

Lawrence's poem is included in this introduction as it illustrates the mixed feelings we have towards the snake. His words describe how we are fascinated with how the snake moves, drinks and glides between our realm and a hidden dark underworld. But we also have something inside us, as humans, which panics and urges us to aggressively strike the snake. It is appropriate to use a poem or other art form to initially express the relationship we have with snakes. For art, as well as myth, not only expresses a truth, what the viewer or receiver connects with and understands, but also connects the person to the artwork in a deeper manner. This deeper connection is emotional or in someway touches the soul of the truly engaged. Emotion, therefore, strengthens our belief and memory of the truth. People, who have experienced this uneasy connection with snakes, will be triggered by this poem, to re-connect to the emotional memory of the event. Although art expresses truth, it is the role of science to develop another means of observing this truth. The next section will look at how science views the fascination and revulsion we have with snakes.

The most recent scientific explanation we, as humans, have of our relationship with other life forms, including snakes, is Edward O. Wilson's theory of biophilia (Wilson, 1984; 1996; Kellert and Wilson, 1993). Wilson explains the term biophilia as "the innate tendency to focus on life and lifelike processes" (1984, p.1). This focus is what draws children, in particular, and others to non-human life forms, the exotic, to novelty and the unexplored. Wilson gives the example of our interest in extraterrestrials to illustrate this curious

attraction.

Snakes also fascinate humans with their connection to the subterranean and the unknown. "The Serpent is somehow both the spirit of that shadowed place and the guardian of the passage into deeper reaches" (Wilson, 1996 p.6). Human interaction with the flesh and blood of the snake as reptile has expanded to the mythical and analogies of the serpent with cosmic connections. Wilson introduces the human relationship with snakes:

> *The snake and the serpent, flesh-and-blood reptile and demonic dream-image, reveal the complexity of our relation to nature and the fascination and beauty inherent in all organisms. Even the deadliest and most repugnant creatures are endowed with magic in the human mind. Human beings have an innate fear of snakes; more precisely, they have an innate propensity to learn such fear quickly and easily past the age of five. The images they build out of this peculiar mental set are both powerful and ambivalent, ranging from terror-stricken flight to the experience of power and male sexuality. As a consequence the serpent has become an important part of cultures around the world* (Wilson, 1996 p.6).

Wilson (1996 p.8-9) goes on to describe the interest and fear we have with snakes, what he considers as a somewhat odd biological human trait:

> *Perhaps the most bizarre of the biophilic traits is awe and veneration of the serpent. The dreams from which the dominant images arise are known to exist in all societies whose mental life has been studied. At least 5 percent of the people at any given time remember experiencing them, while many more would probably do so if they recorded their waking impressions over several months. The images described by urban New Yorkers are as detailed and emotional as those of Australian aboriginals and Zulus. In all cultures the serpents are prone to be mystically transfigured. ... Around the world serpents and snakelike creatures are the dominant elements of dreams in which animals of any kind appear. They are recruited as the animate symbols of power and sex, totems, protagonists of myths, and gods.*
>
> *These cultural manifestations may seem at first detached and mysterious, but there is a simple reality behind the ophidian archetype that lies within the experience of ordinary people. The mind is primed to react emotionally to the sight of snakes, not just to fear them but to be aroused and absorbed in their details, to weave stories about them.*

Wilson believes that the source of our fascination/fear with snakes originates with our earliest ancestors on the savannahs of Africa, where early humans evolved this learned behavior as a matter for survival. Wilson explains:

> *What is there in snakes anyway that makes them so repellent and fascinating? The answer in retrospect is deceptively simple: their ability to remain hidden, the power in their sinuous limbless bodies, and the threat from venom injected hypodermically through sharp hollow teeth. It pays in elementary survival to be interested in snakes and to respond emotionally to their generalized image, to be beyond ordinary caution and fear. The rule built into the brain in the form of a learning bias is: become alert quickly to any object with the serpentine gestalt.* ***Overlearn*** *this particular response in order to keep safe* (original emphasis 1996 p.18).

We also share this inborn behavior of snake aversion with other primates. Primates will alert others of their species with warning calls and follow intruding snakes until they leave the primate's area. Monkeys raised in the wild as well as in a laboratory setting exhibit the same defensive behavior. Wilson states that it "is the form of the snake and perhaps also its distinctive movements that contain the key stimuli to which monkeys are innately tuned" (1996 p.19).

> *Chimps raised in the laboratory become apprehensive in the presence of snakes, even if they have had no previous experience. They back off to a safe distance and follow the intruder with a fixed stare while alerting companions with the Wah! warning call. More important, the response becomes gradually more marked during adolescence.*
>
> *This last quality is especially interesting because human beings pass through approximately the same developmental sequence. Children under five years of age feel no special anxiety over snakes, but later they grow increasingly wary. Just one or two mildly bad experiences, such as the sight of a garter snake writhing away in the grass, having a rubber model thrust at them by a playmate, or hearing a counsellor tell scary stories at the campfire, can make children deeply and permanently fearful. The pattern is unusual if not unique in the ontogeny of human behavior. Other common fears, notably of the dark, strangers, and loud noises, start to wane after seven years of age. In contrast, the tendency to avoid snakes grows stronger with time. It is possible to turn the mind in the opposite direction, to learn to handle snakes without apprehension or even to like them in some special way… -but the adaptation takes a special effort and is usually a little forced and self-conscious. The special sensitivity is just as likely to lead to full-blown ophidiophobia, the pathological extreme in which the mere appearance of a snake brings on a feeling of panic, cold sweat, and waves of nausea* (Wilson 1996 p.20-21).

Wilson continues his explanation why snakes have such a strong influence during mental development (1996, p.22-23):

> *The direct and simple answer is that throughout the history of mankind a few kinds have been a major cause of sickness and death. Every continent*

> *except Antarctica has poisonous (sic) snakes. Over large stretches of Asia and Africa the known death rate from snakebite is 5 persons per 100,000 each year or higher. …*
>
> *Here, then, is the sequence by which the agents of nature appear to have been translated into the symbols of culture. For hundreds of thousands of years, time enough for the appropriate genetic changes to occur in the brain, poisonous snakes have been a significant source of injury and death to human beings. The response to the threat is not simply to avoid it, in the way that certain berries are recognized as poisonous (sic) through a process of trial and error. People also display the mixture of apprehension and morbid fascination characterizing the nonhuman primates. They inherit a strong tendency to acquire the aversion during early childhood and to add to it progressively, like our closest phylogenetic relatives, the chimpanzees. The mind then adds a great deal more that is distinctively human. It feeds upon the emotions to enrich culture. The tendency of the serpent to appear suddenly in dreams, its sinuous form, and its power and mystery are the natural ingredients of myth and religion.*

This innate fear has expressed itself in many forms as dreams, myths and symbols. Serpents, the mythically transformed extension of the snake as reptile, are common symbols found through out the world, and particularly evident in India, Africa, the Americas and Australia. "Even Ireland, one of the few countries in the world lacking snakes altogether (thanks to the Pleistocene glaciation and not Saint Patrick), has imported the key ophidian symbols and traditions from other European cultures and preserved the fear of serpents in art and literature (Wilson, 1996 p.23).

Balaji Mundkur has compiled an extensive collection of snake myth, symbols, cultural beliefs and explanations for ophidiophobia in humans and non-humans in his 1983 book: **The Cult of the Serpent: An Interdisciplinary Survey of Its Manifestations and Origins.** Mundkur's thesis, as he states it, is 'uncomplicated' (1983 p. xvi):

> *Sensitivity to the serpent's form and sinuous motion was fixed in man's psyche during anthropogenesis and is reflected in extraordinary ways in his animal behavior, which is inseparable from his social behavior and religious beliefs involving the serpent. These overt expressions are rooted in the complex long-term physiological effects of fear, which subsumes anxiety and stress – including their psychological repercussions. While I question the credibility of current psychoanalytical conjectures on ophidian symbolism and see the redundancy of offering similar alternatives, I cannot avoid the conclusion that the serpent was one of the earliest of animal species to have elicited veneration.*

Much of Mundkur's work addresses the serpent as viewed in cultural anthropology and primitive religions. He makes a distinction between the words 'snake' and 'serpent':

> *The former is the native English world and far more commonly used; the latter is considered alien and sometimes reserved for venomous or larger species. A snake is merely the zoological entity, but "serpent," as we will see, opens up vast metaphorical possibilities. The lexicographer Fowler aptly observes that "we perhaps conceive serpents as terrible and powerful and beautiful things, snakes as insidious and cold and contemptible."* [2] *... This mental separation is easy, for from time immemorial man's imagination has turned the animal into a creature of fantasy, including hybrids that caricature its real ophidian qualities* (Mundkur, 1983 p.2).

As Mundkur identifies, it is the serpent, the mythical creature with ophidian qualities that expresses the fears and reverence humans have towards the snake. The myths are far too numerous to be exhaustive here, but include: the *nāgas* of Hindu mythology; the basilisk; the dragon and "the anthropomorph emblematized by no more than a bifid tongue, serpent's tail, scales, or behavioural traits that are allegedly ophidian: and the limitless variety of zoomorphs whose imaginary ophidian attributes are seen worldwide in the art of both primitive and civilized peoples" (p.5). Serpent myth, cults and icons abound in most of the world's cultures.

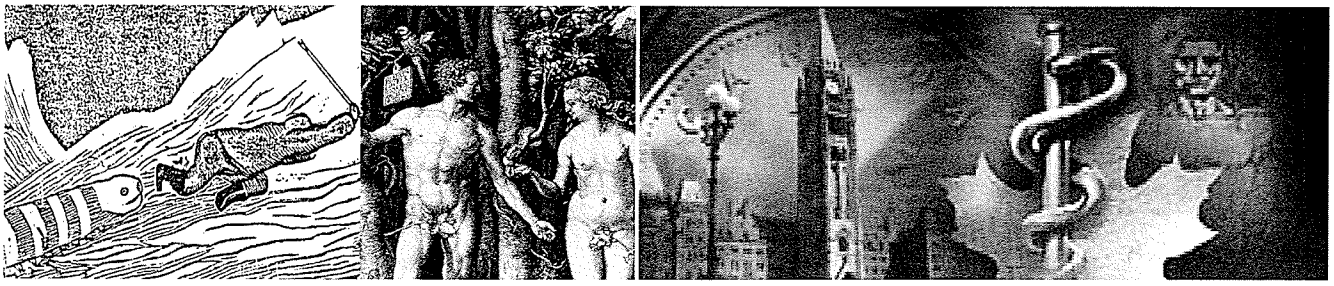


Figure 9. Serpent Myths. A) Inuit snakes myths where snakes do not exist (Mundkur 1983 p. 169) B) Dürer's Adam and Eve (Museum of Fine Arts Boston, C) The medical profession uses the icon of the caduceus (often misrepresented with two snakes intertwined around a staff) (CBC website, 2004)

The Aborigines of Australia believe in a gigantic Rainbow Serpent that is associated with the positive powers of fertility and water and gives the medicine man or shaman his/her powers (Mundkur, 1983). Serpents, as supernatural beings have been found in many indigenous groups in North and South America, Asia and Africa. As mentioned in the Australian context, serpents have been long associated with shamanism and are the link between our world and the cosmos (Narby, 1998). Jeremy Narby's book **The Cosmic Serpent: DNA and the Origins of Knowledge**, takes this a step further, and suggests that there is a connection between the snakes form and the building blocks of life; DNA. Narby considers Mundkur's veneration of fear theory as a reason so many cultures depict serpents in myth and art. But Narby believes:

> *The answer, for me, lies elsewhere—which does not mean that primates do not suffer from an instinctive, or even a 'programmed,' fear of snakes. My answer is speculative, but could not be more restricted than the generally accepted theory of venom phobia. It is that the global network of DNA-based life emits ultra-weak radio waves, which are currently at the limits of measurement, but which we can nonetheless perceive in state of defocalization, such as hallucinations and dreams. As the aperiodic crystal of DNA is shaped like two entwined serpents, two ribbons, a twisted ladder, a cord, or a vine, we see in our trances serpents, ladders, cords, vines, trees, spirals, crystals, and so on. Because DNA is a master of transformation, we also see jaguars, caymans, bulls, or any other living being. But the favorite newscaster on DNA-TV seems unquestionably to be enormous, fluorescent serpents. … This leads me to suspect that the cosmic serpent is narcissistic—or, at least, obsessed with its own reproduction, even in imagery (Narby, 1998 p.116).*

Narby's anthropological work with South American shaman has lead him to the hypothesis:

> *In their visions, shamans take their consciousness down to the molecular level and gain access to information related to DNA, which they call "animate essences" or "spirits". This is where they see double helixes, twisted ladders, and chromosome shapes. This is how shamanic cultures have known for millennia that the vital principle is the same for all living beings and is shaped like two entwined serpents (or a vine, a rope, a ladder…). DNA is the source of their astonishing botanical and medicinal knowledge, which can be attained only in defocalized and "nonrational" states of consciousness, though it results are empirically verifiable. The myths of these cultures are filled with biological images. And the shamans' metaphoric explanations correspond quite precisely to the descriptions that biologists are starting to provide* (1998 p.117).

Designing for human interaction and connection with garter snakes doesn't require this research to commit to or agree with certain theories of ophidiophobia or cosmic serpents. What is ultimately important is that cultures throughout time and place have been fascinated with, held beliefs, stories, and myths associated with snakes and serpents. This continues today, as demonstrated with **Snakes: An Anthology of Serpent Tales**, a collection of stories and poems about snakes published in 2003 (Lewis, 2003). The common thread of these stories from various authors and time periods is the snake. These narratives describe how we as humans anguish between fascination and fear as we give real and imagined attributes to the snake and transform it into the serpent with all its supernatural powers and mysteries. Snakes have made quite an impact on humans. Lewis (2003) understands this and promotes her anthology in the front flap of her book by

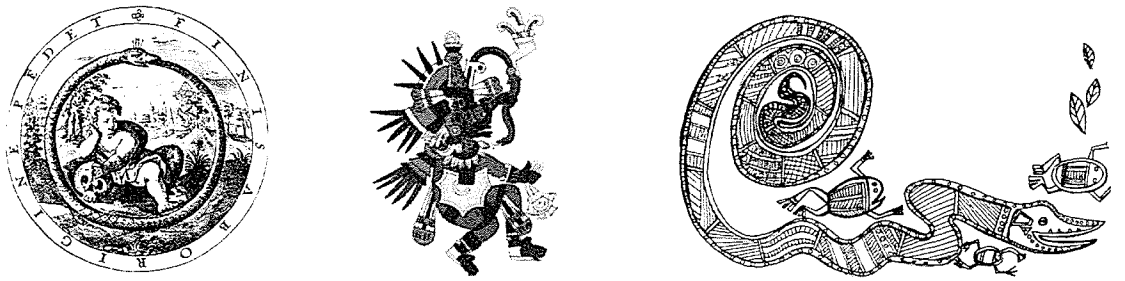


Figure 10. Serpent Myths. The serpent symbolizes cycles, connection and regeneration. A) Ouroboros, a serpent or dragon swallowing it's own tail, (http://noosphere.cc/beyond.html) B) Quetzalcoatl, the Aztec god (http://digilander.libero. it/ras_alhague/profilo.htm, C) Aboriginal creation myth of the rainbow serpent(http: //www.cornwallis.kent.sch.uk /art%20pages/ aborigines.htm)

suggesting:

> *Ever since that unfortunate encounter in the Garden of Eden, snakes have suffered from an image problem. Who doesn't recoil in horror over Perseus' meeting with Medusa and her headdress of writhing reptiles? If Daniel had to choose between a den of lions or a pit full of serpents he might have decided to try pot luck with the cats. ... But then again, perhaps not. Practically since the beginning of recorded time, and in widely differing cultures, the serpent has been invested with a rich religious, poetic and artistic symbolism. In modern times, the form and movement of the serpent has influenced our notion of beauty and design. It is no insult to describe the curved body of a handsome woman or the outlines of a piece of sculpture as serpentine. ... The functionary's remark underscores the pervasive influence these creatures exert over the imaginations of men (sic) everywhere.*

It is this continued fascination and fear that will inform designing a place that promotes snake-human interaction. A place to explore and express the feelings we have towards the snake and the serpent.

Part Two: Clients

Figure 11. Clients at the Narcisse Snake Dens (Zonneveld, 2004)

Introduction:

Part Two of this practicum describes the clients who are most impacted by the proposed designs and master plan. The three clients: locals, visitors and snakes are equally important in contributing to the experience and development of ecotourism. Part Two will identify the unique characteristics of each of the three clients and how they play a role in the planning and design requirements of snake ecotourism.

Chapter 5 Client 1: Locals

The first client group this study will identify are the residents of the Narcisse- Inwood area of Manitoba. This community is somewhat representative of rural Canada and is experiencing many of the same issues as other Canadian regions. This section will briefly describe the local population in relation to designing and planning for ecotourism. The methodology for understanding this client group has included site visits and meeting with local representatives, collecting community profile information, a community workshop and a number of presentations of this work at various stages to the community.

The parameters of what is considered 'local' have been set geographically. The local area, as indicated in the background sections comprises the region of the Rural Municipality (RM) of Armstrong, and the area in and around the community of Inwood and the Narcisse Snake Den Wildlife Management area. A local person would be a person who lives within this general area and may also include human inhabitants from other parts of the RM of Armstrong. It is important to understand who the locals are, as mentioned within the background information on ecotourism, since locals should be considered as beneficiaries and participants in the development of ecotourism.

The population of the RM of Armstrong has been steady at 1,905 people in 2001 with a 2.1 % increase from 1996 (Statistics Canada, 2003). As the background section will reveal, the main economic generators are the agribusiness of beef production and related businesses. The community of Inwood has expressed interest in ecotourism as a possible way to 'tap into' the number of people (30,000 estimated for 2002, by Roberts, 2002 personal communication) who are visiting the Narcisse Snake Dens, and as a possible means to entice younger people to stay in the municipality and not move away to urban areas such as Winnipeg (Strick, 2002, personal communication). The population of this municipality is aging and opportunities for youth are limited. The primary industry for the area, beef cattle, is experiencing difficult times given the issues associated with mad cow disease and exporting to the United States. The land is considered poor for other forms of traditional agriculture or forest resource production, and the distance away from both Lake Winnipeg and Lake Manitoba limit any potential for fishing or cottage development industries that are viable elsewhere in the Interlake region.

During the process of trying to understand both the social and natural environmental context of this region and the two sites, this research has allowed the author to meet and

talk with members of the local community. Local attitudes, opinions and concerns have been sought during site visits to the Narcisse Snake Den site and Inwood quarry, through meeting locals while having lunch at an Inwood restaurant, the Inwood Golf Course, through community interaction while conducting research for developing an artificial snake den (Nuttall *et al.*, 2002), meeting municipality councillors, through contacts with Manitoba Conservation, and through a community workshop organized and implemented for this research.

A community workshop on ecotourism conducted for this research in May 2003 revealed that local community members were interested in somehow developing the Inwood quarry for tourism associated with the snake dens. The researcher attempted to inform the participants of what constitutes ecotourism and what this might mean for developing the quarry site. Judging from feed back from a brainstorming session on potential experiences and activities that locals would like included in the development it was not certain that participants understood the term and issues associated with ecotourism. This statement is based on some of the opportunities and activities that were suggested. These included: a waterslide park, building new roads and bus access right up to the den area, mountain (rock) climbing, ski hills, year round recreation facilities, a screened in patio and souvenir shop and a RV (recreational vehicle) park. Other suggestions that may be considered more consistent with ecotourism development include: hiking, bicycling and Nordic ski trails; camping facilities; interpretive centre; artificial snake den; connecting the quarry with the Inwood park, golf course and Prime Meridian Trial; and a catwalk for viewing the snakes.

Figure 12. Understanding the Client: A) and B) Local residents share their ideas and concerns. C) Inwood snake statue in new park. D) New snake fence around the senior centre caused controversy and was later taken down (Zonneveld, 2004)

It was not surprising that the concept of ecotourism was not completely understood due to the relatively ambiguous notions of ecotourism as found in mainstream culture.

Ecotourism is often considered just another form of tourism that is selling nature. It is also understandable that a brainstorming exercise, where one is supposed to exercise one's imagination, would result in suggestions such as a water park. The water park suggestion was, and rightfully so, the idea of a water utility employee.

Local community members have been directly or indirectly involved with the snakes and denning areas for quite some time. The town of Inwood was built on or near a known major snake den (Cowan, 1993) and has lived with snakes migrating through town for decades. Locals have worked for Manitoba Conservation as interpreters at the Narcisse Snake Dens and have volunteered their time and efforts in the creation of the snake fences and migration tunnels and as already mentioned, artificial snake den research. Locals are also involved with planning and managing the Prime Meridian Trail building snake interpretive signage and promoting access to the Inwood quarry to view the snakes. Locals have demonstrated their initiative and interest to be involved with ecotourism even though it may not be completely understood what this (the tenets of ecotourism) entails.

One group of 'locals' from the community of Chatfield (north of the Narcisse Snake Dens) are worth mentioning at this point. A family, on its own initiative, has created a cultural tourism product by restoring old buildings and displaying historical artefacts from the region and conducting tours of their collections. They are located in close proximity to the Narcisse Snake Dens and therefore also cater to scientists visiting the area as well has season interpreters working at the dens with needed accommodation. What is remarkable about the way they are conducting their business is their insight into appropriateness of scale in tourism development. They have deliberately removed advertising from regional marketing programs to keep their business at a smaller size therefore providing a certain visitor experience and level of commitment from themselves. They are happy with the amount of work they have and what they are providing for their visitors and are not interested in the problems of mass tourism associated with bus tours. It is an informed decision and one worth mentioning as a precedent in developing the Inwood quarry for ecotourism.

While there is a core group of people who are prepared to be involved with ecotourism development, the level of commitment with other local community members is unknown. Not all local people will be satisfied with development that will prevent current uses of the quarry area. Designation as an ecotourism site will most likely prevent current users from target shooting, hunting, bush parties, and accessing the site with off-road vehicles. Even

for proponents of snake protection there may be issues of unrestricted snake viewing being curtailed for the safety of the snakes. And finally there is the issue that many, if not most people feel uneasy and possibly hold negative feelings towards the snakes. Cowan found while conducting research on snake harvesting that "most local residents do not care for the snakes (at the Narcisse dens) in any capacity. Snakes are considered to be more of an annoyance than as an economic opportunity" (1992 p.52).

Although it is understood that every individual will have a separate and unique opinion and attitude towards ecotourism and snakes, for ease of discussion the 'local' client group views have been amalgamated from the individual views. For this project, locals are considered to most likely support development that would provide economic diversification and retain some of the community's youth. Although some local people may prefer to support large, conventional tourism development, as most familiar and lucrative to the majority of society, an ecotourism development, restricting the size and kinds of activities, should also be deemed appropriate. Ecotourism development of the quarry site is not directly competing with other traditional uses or resource development, as is the case for most critics of ecotourism development. Some locals may question the scale of development, the smaller size of development according to current ecotourism, and may express concerns that it is not enough to solve their economic needs. The process of ecotourism development, as exemplified by this exercise of planning and designing for ecotourism, will require public participation and dialogue to inform the local community what to and what not to expect. The local community in the Inwood-Narcisse area is in the beginning phases of this development and must be willing participants of this process. If this is not the case, there may be advantages to developments other than ecotourism such as nature tourism. Other forms of tourism however, will greatly impact the other two clients and may not be most appropriate for the goals as a protected area.

Client Two: Visitors

The second client group are the visitors who will travel to the sites to have desired experiences. This client group is comprised of people with differing motivations, expectations, and visitation goals. The range of visitors include school groups, scientists, photographers, seniors, nature enthusiasts, mass tourists, locals, people with ophidiophobia (fear of snakes), snake lovers, family outings, and the curious who have become aware of the snakes through the media. This section will look at the potential users of the two designated sites, specifically the visitor out for a particular leisure experience, the ecotourist and the field researcher studying the snakes.

The Ecotourist

'Ecotourist' is a relatively new term that describes the visitor or traveller who has an interest in the alternative tourism of ecotourism. The desire for an alternative to traditional tourism is a "consequence of the dissatisfaction with conventional forms of tourism which have, in a general sense, ignored social and ecological elements of foreign regions in favour of a more anthropocentric and strictly profit-centred approach to the delivery of tourism products" (Fennell, 1999 p.30). As already mentioned in the background information on ecotourism, people who are interested in ecotourism are looking for specific experiences associated with studying, admiring and enjoying the scenery and its wild plants and animals, as well as "any existing cultural manifestations (Fennell, 1999 p.30). It is then fair to say that these visitors are, like any participant seeking a leisure experience, expecting certain benefits from their participation. In his attempt to define the concepts and variables of ecotourism, Fennell (1999) identifies a number of probable 'expectations' held by this visitor. They include: low impact to the environment; contribution to the maintenance of a species, habitat or ecosystem; contribution to the local community through economic revenues or other forms of positive development; a learning or education component; and an underlying ethical theme. One other expectation the literature suggests that is important is that the location be relatively undeveloped or even pristine (Ziffer, Boo, Ceballos-Lascuráin and others in Fennell, 1999). This expectation may be of consequence to issues of authenticity and hyperreality. Visitors are looking to immerse themselves in 'real' situations where nature and natural systems and/or traditional cultures have been unaltered by the shortened timeframes and culturally homogenized programs associated with mass tourism. 'Authentic' nature experiences are traditionally found in the realm of protected areas such as national parks, as opposed to constructed places such as zoos. What often is overlooked are places that are not pristine but have been modified by humans and while continuing to support natural systems and urbanized nature.

The Ethical Question

The ecotourist expects an 'underlying ethical theme'. This expectation helps to separate this form of alternative travel from conventional mass tourism. There is a desire here that the visitors' behaviour and the consequences of them being at a specific site are contributing, in a positive and ethical way, to the protection and understanding of a species or ecosystem. The ecotourist is conscious that their travel has consequences and they would like to make the best travel choices according to their beliefs concerning social and environmental justice. This awareness has consequences when planning and designing for ecotourism. Care must be given to making socially and environmentally aware decisions during the planning, construction, implementation and ongoing maintenance of the development. This principle is not just subject to fragile natural areas but should be applied to other destinations including the countryside and urban renewal (Honey and Stewart, 2002).

Within the broader ecotourism literature there has been an attempt to profile the ecotourist. Fennell (1999) compiled this information and found that early studies classified ecotourists on the basis of setting, experience and group dynamics. Groups were identified as 1) Do-it-yourself ecotourists, 2) Ecotourists on tours and 3) School groups or scientific groups. Ecotourists were also defined according to a person's dedication and time commitment. The four basic categories were identified as 1) hard-core nature tourists, 2) dedicated nature tourists, 3) mainstream nature tourists and 4) casual nature tourists. As ecotourism developed, with increasing opportunities, the research initially found that the average profile of an ecotourist was predominantly male, well educated, wealthy, and long-staying.

> *Both Fennell and Smale (1992) and Reingold (1993) report similar results in their work on Canadian ecotourists. On average, the Canadian ecotourists in the Fennell and Smale study were 54 years of age, with the majority in the 60-69 age cohort. The sample was predominantly male (55 percent), earned on average about CDN$60,000, with almost one-third and two-thirds having undergraduate and graduate degrees, respectively. According to these authors, this education is well above the national average of about 19 per cent and 4 per cent of Canadians having a bachelor's degree and graduate training, respectively. In Reingold's work, 24 per cent of Canadian ecotourists were 55 to 64 years of age, 36 per cent had annual incomes over $70,000, 65 per cent had a university degree; however 64 per cent of the respondents of this study were female. ...*
>
> *The studies involving ecotourists have been found to mirror related research on birdwatchers* (Fennell, 1999 p.58-59).

Previous research has found empirical differences between ecotourists and general

travellers in terms of their trip-related needs and focus (Fennell, 1999). One anthropologist believes that the idea of some ecotourism destinations, such as in Africa, are attractive because they provide an opportunity for people who "want to tap into their distant past when humans had a much stronger relationship with animals, seeing them as something more than just prey to be hunted" (Fennell, 1999 p.61).

Often ecotourists are considered the same as adventure tourists, who are looking for adventure in the form of adrenaline styled outdoor pursuits. The adventure tourist is searching for excitement through 'hard core' outdoor activities such as white water rafting, rock climbing, mountaineering, scuba diving, mountain biking and backcountry skiing to name a few. In contrast 'soft' adventure activities, differentiate from the hard core activities through increased levels of comfort and decreased risk associated with the activities. Soft adventure activities include supported (guided trips with comfortable accommodations and catering) hiking, canoeing and bicycle trips, and shorter, less strenuous versions of hard-core adventure activities. The activities identified here are not exhaustive of all the activities that are available but indicate the general nature of these leisure pursuits. The ecotourist may at times also desire to participate in adventure tourism activities; however, the primary goal of ecotourism is not the adrenalin rush but having a direct nature experience with components of learning, and benefits to the environment and local people.

Snake Visitor Goals

An informal, non-scientific questionnaire was given to a first year Environmental Design class (University of Manitoba, 2002) after a slide presentation introducing this research (predominantly the idea of three clients and visiting the snake dens) revealed some interesting perceptions in relation to this study. This questionnaire was intended to solicit perceptions towards snakes and visiting snake dens that may not have been readily apparent to this study. As expected there was a mixed reaction to snakes, in general, and mixed desires to visit snake dens as a leisure experience. Some people expressed outright fear and wanted no part in visiting the snakes. Others, who also expressed apprehension towards snakes wanted special interventions or knowledge before they would venture near the snakes. The interventions that were identified include: barriers between the visitor and snakes; being above the snakes, having escape routes, and, the ability to move at their own pace and control how close they come to the snakes. Some of the students also wanted to know if the guides had training or 'expert' knowledge about snakes and if the snakes were harmless or at all dangerous (venomous).

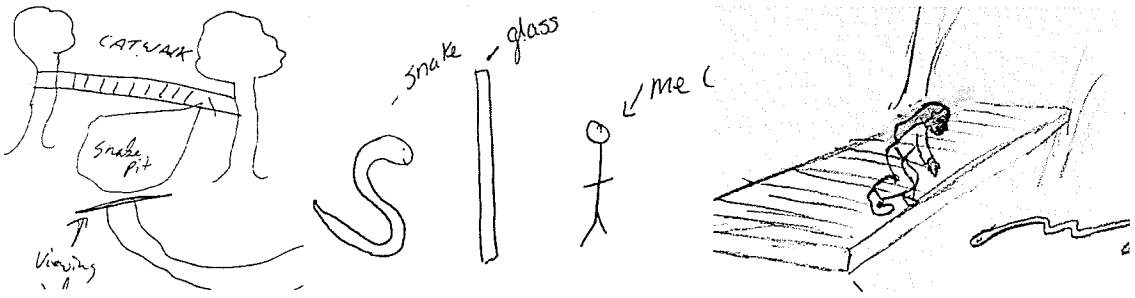


Figure 13. Student Sketches: suggesting ways to view snakes (Zonneveld, 2004)

In 2002, Manitoba Conservation conducted a visitor survey to better understand who is currently visiting this site. Three local residents using a set questionnaire conducted the survey on site at the Narcisse Snake Dens. The results of this survey is as follows:

1) For the majority of visitors, this was their first visit to the snake dens (approximately 62%) and they became aware of the attraction primarily from a) word of mouth, b) television or radio or from c) the newspaper. For visitors who had visited the dens before, the majority had not been on a visit for about 5 years.
2) Visitors were primarily family groups (51%) followed by couples (16%) and social groups (12%).
3) Visitors were from: Winnipeg (50%), Interlake (14%), the rest of Manitoba (8%), outside of the Manitoba (5%), and outside of Canada (2%).
4) The visit was a special trip to see the snakes (71%) or passing through (11%).
5) After the visit the majority of people returned home (41%), while 17% sought other tourism destinations, 10% visited friends or family and 10% visited a business or restaurant.
6) In addition to the snakes, visitors expressed interest in: 78% a drive in the country, 23% wildlife viewing, 21% bird watching, 18% viewing wildflowers or plants and 15% wanted to experience local history and heritage.
7) A third of the respondents said they were planning a short stopover while 26% were planning to visit a restaurant or business and 14% having a picnic stop.
8) When asked about the current level of service, respondents replied: 33% adequate, 23 %more than adequate, 23% excellent, while 6% indicated the service was inadequate or less than adequate.
9) When given options to improvements, respondents agreed with: 30% interpretive centre with exhibits and den display, 27% modern washrooms, 22% more interpretive signs, 20% picnic shelter, 18% improved trails, and 11% liked the idea of hourly guided tours.
10) Funding for improvements would be from: 46% voluntary donations, 40% government funding only, and an equal 20% each for administration fees for all visitors and fees for guided tours and an interpretive centre.

11) When asked if snake protection and habitat important? 78% agreed and 7% disagreed (remaining respondents chose a neutral response).
12) Protection could be improved by: 34% improve perimeter fencing, 13% restrict viewing to platforms and 12% limit group visitation by implementing a reservation system.

This questionnaire gives a good introduction into the interests and concerns of the current users of the Narcisse snake dens. In relation to the ecotourism literature, visitors to the dens are not exactly like the 'average' ecotourist. The visitors seem to resemble the average conventional tourist wanting easy access and comfortable amenities. Although possibly due to concepts of ecotourism entering mainstream thinking, the den visitors are asking for more information/educational components and expressed concern for the well being of the snakes. It is debatable if the current visitors to the Narcisse snake dens are ecotourists or not. The visitors may or may not have a deeper understanding or connection with the snakes. Also, they may or may not hold an environmental ethic that directs their actions and commitment to the snakes and natural systems. The facilities may, for some people be a roadside attraction, something to view, to possibly check off a 'to do' list, a form of entertainment and nothing more.

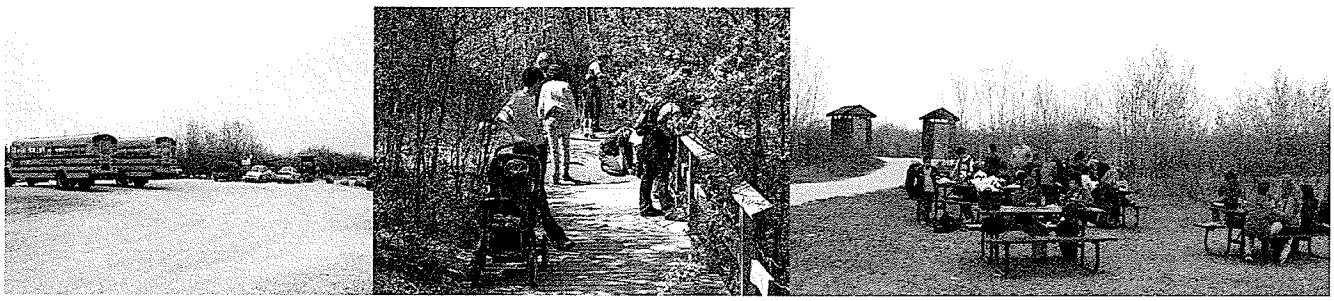


Figure 14. Current visitors to the Narcisse Snake Dens (Zonneveld, 2004)

For the majority of school groups the visit may be simply an outing from regular classes or an opportunity to prove something to their peers by catching snakes. However, for some people there is an opportunity for a deeper connection and an attempt to understand and appreciate a natural phenomenon. There may also be a willingness to learn more or to support the protection of the animal, its habitat and the local community.

Field Researchers

As mentioned earlier, scientists have been visiting and conducting field studies on the garter snakes for over 30 years. Notably herpetologists from the United States and Australia and their graduate students have been conducting studies on these snakes and have returned in 2004. The ease of obtaining large numbers of subjects for study make the snake dens in Manitoba ideal for scientists and a well-known destination for snake research. The abundance of garter snakes has made this species the most researched snake in both the field and laboratory (Rossman *et al.,* 1996). This section will describe some of the activities and needs of this visitor as collected from personal observation and communication, as well as from the perspective of a Manitoba Conservation representative who has had direct involvement with the researchers, Mr. Dave Roberts. The identity of the researchers will be kept confidential to respect their opinions and their position as visitors. As visitors from outside of Manitoba, and Canada for that matter, they want to remain neutral in regard to how the snakes and their habitats are being managed. Neutrality, it is believed, will ensure their continued access to this important and unique research resource.

The scientists live in local accommodations and have access to field research facilities operated by Manitoba Conservation. Currently this is occurring in the Chatfield area, a few kilometres north of the Narcisse Snake Dens. The researchers are predominantly visiting Manitoba in May for the spring emergence from the den sites and have also been known to visit, with fewer numbers, in August and September when the snakes return to their denning areas. The scientists and Manitoba Conservation have made agreements allowing: access to the snakes, conducting experiments including taking measurements and manipulating the snakes, and removing an agreed upon number of snakes for laboratory study back in their home universities.

Scientists have researched the snakes at den sites through out the central Interlake area including the Narcisse Snake Dens and the Inwood quarry. The Narcisse den area was once the primary focus for research but has become less popular with an increasing number of tourism visitors. Tourists consume the researchers' finite amount of time with their questions and desire to observe the research activities. The researchers have since moved most of their work to the Inwood quarry that is more suitable for their needs. Some work continues in the Narcisse den area and is considered important for their work. Since one of the objectives of this study is to open the Inwood quarry for ecotourism, there is a potential for new and renewed conflict to occur between recreational and research

visitors. It is realistic to think that the researchers would most likely prefer not to have other visitors to the Inwood site where upon duplicating the Narcisse dens situation. They would most likely prefer to control the tourist's movements on site due to the vulnerability of the snakes in the quarry. It is also believed the scientists are not against providing information to the tourists, but the tourists and the scientists would be both better served if a third party would take the primary role to educate the public.

At the Inwood quarry, the scientists have been observed to use the site in a specific manner. They often park at the top of a ramp at the quarry edge, near the den opening. They set up equipment near their vehicles and in the pit area, have set up snake fences and traps and routinely collect, mark and take samples from the snakes in the immediate den and surrounding area. Studies have also been conducted where snakes are placed in 'stress bags'; snakes are observed being attacked by predators; and dead snakes are collected and removed to the research station. The majority of their work occurs at the quarry den site and the area immediately south, in an aspen forest. The other quarry pits, outside of the one containing the snake den, are relatively unused by the researchers. Their work also appears to take place during daylight hours however one study was identified that required nocturnal timing. Rainy days delay the field research activity and the scientists refocus on their indoor laboratory work. The quarry site does not contain toilet facilities therefore the researchers would be required to use facilities in Inwood.

Herpetologists view the snakes in the Narcisse-Inwood area as an ideal natural outdoor laboratory. Nowhere else in the world can researchers be guaranteed of a large number of subjects, at a known time and location. Elsewhere researchers spend large amounts of time and effort simply collecting their subjects. The Narcisse-Inwood area removes the sample collection hurdle and allows immediate focus on the research at hand.

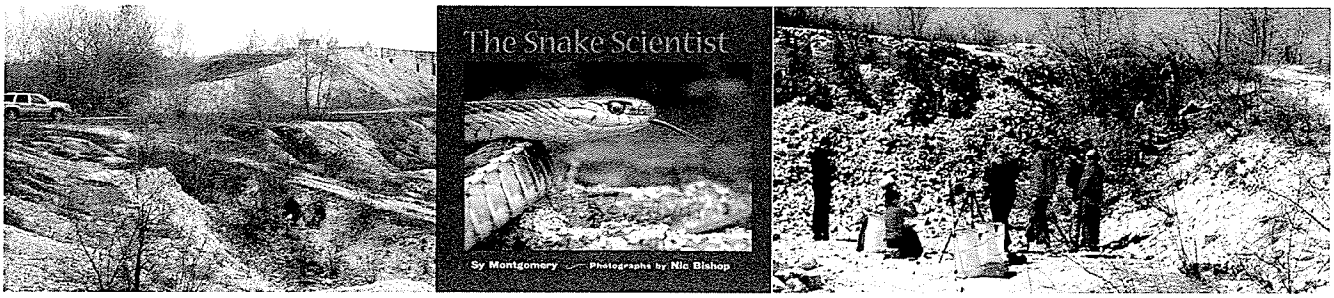


Figure 15. Researchers: Researchers are currently using the Inwood Quarry A) Sitting near den entrance, B) A children's book was created show casing one scientist who used the Narcisse snake dens, C) Recently, visitors using the Prime Meridian Trail have entered the quarry and are engaging with the snakes and the researchers (Zonneveld, 2004)

Client 3: Red-sided Garter Snakes

While it is important to understand the needs of the Red-sided garter snake as one of the identified clients it should also be emphasised that this is not an exhaustive zoological study. The intent of this section is to describe the Red-sided garter snake; it's habitat and ecological requirements and known behavioural traits in an attempt to design with and for the needs of this species.

Garter snakes are one of the most studied (in the field and laboratory) snake species and are considered representative of snakes in general (Rossman *et al.*, 1996). Although, garter snakes grow to an average shape and size for snakes and exhibit typical habits, food preferences and behaviours for terrestrial snakes, it is possibly due to the ease of collecting large numbers of snakes to study that explain the popularity of this snake to research (Rossman *et al.*,1996). The snakes in the Narcisse-Inwood area are consistently abundant and have been the subject of research for over thirty years.

Thamnophis sirtalis parietalis or the Red-sided garter snake is one of eleven subspecies of the common garter snake. The Red-sided garter snake ranges throughout the Great Plains from Texas to the Northwest Territories (Rossman *et al.*, 1996). The garter snake is considered a habitat generalist since it's habitat has been frequently given as 'everywhere'. Although the species has variations in aquatic preferences, the snakes found in Manitoba are considered to be relatively similar to those found in the Great Plains:

> *T.s parietalis is found in every mesic habitat in the summer (Fitch, 1965). Fitch (1965) ranked it's habitat preference as follows: margins of ponds with low vegetation, a silt flat with willows and trees, woodland edges and trees in pastures, native prairie, meadows with introduced grasses, a fallow field in a bottomland, hardwood woodlands, upland fallow fields with weedy vegetation, and, finally, disturbed and barren roads and yards* (Rossman *et al.,* 1996 p.256).

As already mentioned, the Red-sided garter snakes, found in the Interlake, den in large aggregates. Communal denning is a behavioural adaptation increasing the success of this species. This is achieved by concentrating the snakes prior to mating therefore increasing successful breeding and by re-using den sites that successfully and continually protect the snakes from lethal winter conditions. Not all garter snakes den en masse, as the snakes do in the Interlake making them quite unique and attractive for scientific study and recreational viewing.

Individual snake species, including those in Manitoba, have shown distinct preferences

for particular habitats. Preferences include: "canopy cover (thickness of forest) availability of thermal sites (sunny spots) and prey availability" (Rossman *et al.,* 1996 p. 96). Of interest to this study are the behavioural traits that occur at and near the denning sites. Environmental cues and the internally driven motivations, eating and reproducing, guide the actions of the snakes.

Thermoregulatory behaviour

Snakes are poikothermic or cold blooded and require external heat sources, such as radiation, conduction, and convection to maintain their metabolism. Many behavioural activities of the snake, such as locomotion, digestion, and crawling speed are also dependent upon temperature sensitive physiological processes. Northern populations hibernate when diurnal temperatures are sufficiently low as to prevent the digestive process (about 12 to 15^0 C). During this time snakes are aphagic and draw on stored glycogen and protein from liver and muscle. Snakes choose underground sites that are appropriate for preventing both freezing and dehydration from Manitoba's cold dry winters. These snakes are required to travel below the frost line and above the water table to survive. Den use seems to be habitual and learning their location is important to the individual's survival.

> In the spring, the thermal gradient in the den collapses and temperatures begin rising, stimulating animals to become active, although external air temperatures are important in the actual emergence. ... Snakes begin basking at the den primarily to facilitate courtship, not to feed. Sometimes animals rest with only the head exposed to the sun. ... As seasonal temperatures rise and stabilize, animals (mated females first) move to foraging areas (Rossman *et al.*, 1996 p.98).

According to Rossman *et al.*, studies have also shown that snakes will select hiding places under rocks with appropriate thermal preferences and will adjust their behaviour accordingly to the needs of regulating their body temperature (Rossman *et al.,* 1996). Predator avoidance, hiding under rocks, logs and other objects can interfere with thermoregulation by reducing the amount of basking needed to control body temperature.

Temperature plays an important role in the snake's life cycle and particularly in regulating reproduction. As explained in Rossman *et al.,* (1996) temperature changes cue snakes to: move from feeding grounds to den sites, move from the surface to underground chambers, activate mating behaviours, and finally to move out of the dens and migrate to summer habitat.

Water

The snakes in the Narcisse-Inwood area over-winter and mate at den sites and migrate to wet marsh areas for summer feeding. Although snakes do not feed at the denning sites water however does play an important role. Water may be critical in *Thamnophis* hibernation, as submergence is strongly correlated to a lowering of metabolism (Rossman *et al.*, 1996). Water is also critical during garter snake hibernation and a number of authors have noted *Thamnophis* hibernating in wells and other sources of water. Costanzo (1989b,c) found that T. Sirtalis has a significantly lower metabolic rate (over 50% less) and higher survival when it can submerge in water (for short durations) during hibernation (Rossman *et al.,* 1996 p.113).

The snakes therefore require access to water at the den sites. This does occur naturally where the snakes access ground water through the labyrinth of passageways in the karst formations. What is required by humans is to maintain water quality, access to and from the dens and summer habitats, and allowing the continuation of a natural water cycle (mean water levels) that includes water flowing and dissolving limestone in the formation of karst topography. Maintaining the areas' hydrological cycle at existing den sites and summer habitats is essential for the survival of this species.

Figure 16. Snake Habitat: A) and B) Protection and basking in the rocks C) Looking for water (Zonneveld, 2004)

Evolutionary adaptations

Reliance on Sensory Mechanisms

Snakes and some other reptiles have evolved a unique adaptation to engage with the world. With the use of a forked tongue flickering in and out, snakes can detect chemicals that can be used in feeding, mating and predator avoidance. The olfactory system of the nasal cavity and the vomeronasal system are used to detect and identify food, other snakes and predators. Tongue flicks are an observable behaviour of the snakes searching for these chemical cues. Visual cues are also important in the initial detection

and orientation to prey. Tactile cues also play a role in feeding behaviour and as mating signals (Rossman *et al.,* 1996).

Although foraging behaviour, such as actively hunting for food is important for the garter snake, this study will limit this discussion since the design sites are not locations where the snakes feed. There is a distinct separation between the winter denning area and the summer feeding habitat, and this study is only concerned, at this time, with the denning areas and transition areas to the feeding grounds. What is important is that these snakes use chemo-sensory, vision, and tactile means to detect predators, food, and in mating selection and communication. An introduction of foreign chemicals into this ecosystem may have negative consequences on the snake's life cycle.

Chemical, visual and tactile cues are used to detect predators. Although humans are not really a predator, they can threaten the well being of the snake. Snakes have been observed during the course of this study to strike, flee and ignore the presence of humans. Snakes will react to sensory cues from predators by voiding cloacal secretions (Rossman *et al.,* 1996). During the mating activity near the dens, snakes were observed to be more interested in each other than the gaze of the human visitor. Scientists conducting field research in the Interlake echo this observation and indicate that the snakes are quite tolerant to handling and being studied (captured, measured, sampled, and released). The presence of researchers and wildlife viewers seem to be ignored by the snakes due, in part, to the intensity of the competition during mating. Some snakes were noted to make an effort to investigate non-moving humans. While staying still, as quick movement often caused the snakes to flee in haste, snakes would move towards the stationary humans, often rubbing up against shoes and then moving on. Some snakes were observed climbing small bushes and seemed 'to investigate' the watching human. Once the snakes seemed to have identified that it was not another snake they were investigating they then lost interest and moved on. Away from the mating balls (many male snakes entangling and in pursuit of the female snake) and reproduction activity, the snakes had a different reaction to humans. It was observed that some snakes took an antipredator stance and would prepare to strike as their defensive response. Although garter snakes do not have venom harmful to humans, they appeared quite aggressive despite their relatively small size. It was observed that a human would have to stress the snake by encroaching within approximately a foot to provoke the striking response. If left alone, the snake may coil up but showed no other signs of aggression. The other behaviour noted during field observations was the flee response. Once a human (or possibly any larger animal) was

detected the snakes would, in an almost sped-up comical fashion, quickly try to escape.

Observed Behaviour at the Den Sites

Snakes at the Narcisse Snake Dens and Inwood quarry that were not engaged in mating behaviour were observed exhibiting an number of different behaviours. These behaviours included: moving in and out of openings in the rock, moving through grass and ground cover, climbing small shrubs, attempting to climb steep walls of the den areas, swimming in small pools, basking in the sun, huddling with other snakes in protected areas, moving over and rubbing against other snakes, following invisible trails, and investigating humans.

Since snakes do not have legs they propel themselves by constricting and relaxing muscles along their body. Although they can move quickly, often it is not quick enough to evade the quicker steps and hands of a focused child or other collector. There is a finite distance these snakes can lift their body therefore limiting what they can climb over. Snakes tend to move along objects they cannot climb over therefore being directed to move parallel to objects in their landscape. This behaviour is call "walling" or wall following behaviour. This information has been used to direct snakes into the snake tunnels at the Narcisse Snake Dens through the use of small fences directing the migration routes of the snakes. Movement along the ground does however provide other advantages such as camouflage by ground cover and other vegetation and ease of finding refuge under surface cover and openings in rock and ground.

Figure 17. Snake Movement: A) These snakes must move over or around their environment, they cannot dig. Snakes will follow along objects they cannot climb over. This is called *walling*. B) and C) The snake fences at the Narcisse snake dens use this knowledge of walling to control highway mortality (Zonneveld, 2004)

Orientation and navigation

The orientation mechanisms in Red-sided garter snakes are well developed (Rossman et

al., 1996) since the migration distance between hibernacula and summer feeding ranges can be up to 17.7 km (Gregory & Stewart, 1975). Orientation mechanisms range from the simple use of landmarks to " true navigation, which required a map component in addition to the compass sense" (Griffin, 1952 in Rossman *et al.*, 1995 p.104). Where snakes need to migrate over larger distances, as is the case for the Interlake snakes, it is believed they exhibit navigational skills using solar cues. Pheromone trials, predominantly produced by females, are also used by males to locate females and by both sexes to locate den sites. Pheromone trails also provide directions for neonates (less than a year old) to follow. These young snakes spend their first winter at the feeding grounds and not at the adult den location.

Hygiene

Snakes in captivity have shown there is a need to keep cages clean of feces to reduce the potential for skin infections from fecal bacteria. Although it is not the intent of this work to control the wild snakes by manipulating their feeding and environment, it is noteworthy to understand the natural cleaning systems in the snake's environment. As observed at the Narcisse snake dens, the limestone sinks are regularly flushed with spring surface run off water. It is this natural drainage pattern, with periodic flooding that formed the dens in the first place. This is important in any changes proposed for Narcisse and in the Inwood quarry that the natural cleaning mechanisms be allowed to continue their course.

Favorable Species for Ecotoursim

The Red-sided garter snakes lend themselves as cooperative ecotourism subjects. Snake behaviour is somewhat predictable (returning to den sites, spring emergence associated with temperature) which allows for program planning and facility development. The snakes also seem to tolerate human presence during mating and being handled by researchers and recreational viewers. The snakes do not feed at the den sites where viewing takes place therefore providing food for the animals is not a required design element. Although this animal is not venoumous, and therefore not dangerous to humans but whose mere sighting may illicite an emotional response makes for interesting human- nonhuman animal interactions. The cultural history of human-snake (serpent) interaction from all parts of the world also provides another dimension and possibly deeper understanding of how we as humans view this species. The various perceptions humans have of snakes definitely helps to trigger our imaginations and interest in this species.

Sites: Inventory and Analysis

Introduction

The study area has been identified, as stated in the title, as the Narcisse- Inwood area of Manitoba. This section of the practicum describes the study area and sites, and is divided into three chapters. Chapter 5 describes the regional context, while Chapters 6 and 7 give more details and site-specific conditions of the two sites; the snake denning areas of the Narcisse Snake Dens and the Inwood Quarry. To help organize this chapter, an inventory of natural and cultural features will be listed and described in detail. Each of described features will also be analysed according to ecotourism needs and issues identified in the background chapters and the client's needs. The work by Booth (1990) has informed this study as to the categories and kinds of information that is required in a site inventory.

This region of Manitoba, and the specific sites were selected for two predominant reasons. First, the phenomenon of large numbers of snakes denning in aggregation is unique to this region of the world. This area has been identified as the largest concentration of snakes in the world (Breummer, 1990) and the largest aggregation of any terrestrial vertebrate in North America (Crews & Garstka, 1982). As already explained, the geological features of this area in Manitoba provide the necessary conditions for the garter snakes to survive the winter and develop a successful reproduction strategy. Secondly, the two sites, the Narcisse Snake Dens and the Inwood quarry contain snake dens where the snakes are concentrated and have been identified by Manitoba Conservation as special places worthy of protection status. In addition to Manitoba Conservation's actions to protect these sites, local community members from the Rural Municipality (RM) of Armstrong have expressed a desire to develop the Inwood quarry for tourism.

Chapter 8

Regional Context

Geographic Location

The Province of Manitoba is found in the centre of Canada bordering the political boundaries of Nunavut to the north, Saskatchewan to the west, Ontario to the East and the United States of America to the south. The study area, the Narcisse-Inwood area, is located in the southern part of the Interlake region (the area between Lake Winnipeg and Lakes Manitoba and Winnipegoisis) of Manitoba. The Interlake region is comprised of a number of political units including the Rural Municipality (RM) of Armstrong. The RM of Armstrong's community profiles is described by Statistics Canada (2001) as: having an elevation of 905 feet; located at Longitude 97° 27′ 0" Latitude 50° 40′ 0"; and a land area of 1828.38 km^2 or 731.352 miles^2.

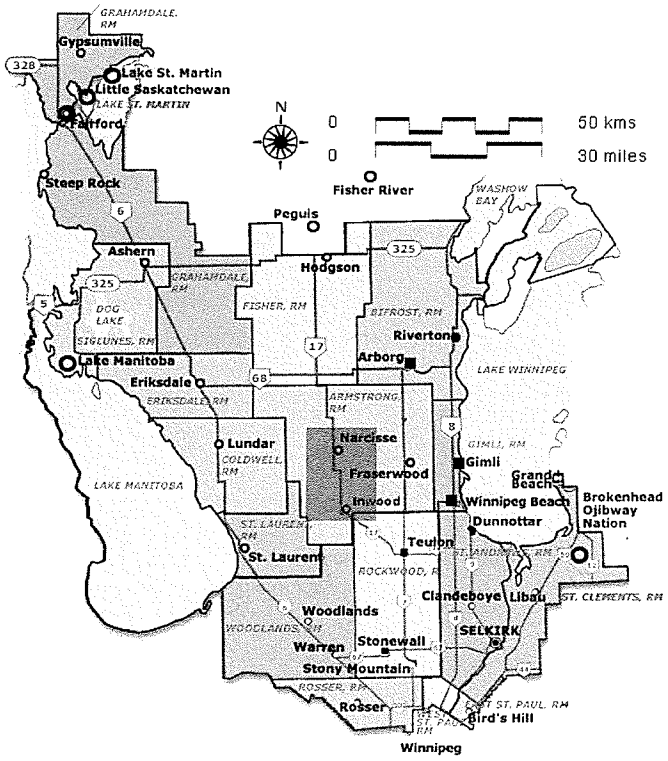


Figure 18.
Interlake Region: The shaded rectangle in the middle of this graphic represents the approximate limits of the study area.
(Base image from Manitoba Community Profiles:www.communityprofiles.mb.ca/ maps/regional /interlake.htm.)

Geology

The area to the north and east of Lake Winnipeg is comprised of the Precambrian shield, considered some of the oldest rock in the world (Corkery, 1996). The study area lies south and west of the exposed Precambrian shield and has a geological history of sedimentary deposits, over the Precambrian rock, from the Silurian Period in the Paleozoic Era.

This region is named the Manitoba Lowlands and is considered the flattest part of the province, having relief of less than 8 m (Corkery, 1996). The Paleozoic rocks, formed in a depressed area named the Williston Basin (centred in northwestern North Dakota) have provided products such as silica sand, dolomitic limestone for building stone and, high-calcium limestone for cement (Corkery, 1996). During the Paleozoic Era, Manitoba was considered to be at tropical latitude and covered by warm shallow seas. These seas contained life forms that resulted in numerous fossil records of corals, trilobites and brachiopods in the Paleozoic rock.

In addition to the volcanic and sedimentary rock formations, Manitoba has also been shaped by periods of glaciation. As glacial sheets receded, eroded material was deposited as till. The study area, the Interlake region, is identified in Corkery's (1996, p. 20) description of the Manitoba Lowlands:

> *In the Interlake region to the north (of the flattest and most prosperous farming areas in Canada) topography is more bedrock-controlled, with limestone outcrops forming plateaus, rarely more than 30 m high, often covered by a thin layer of glacial deposits. Here the lowland is forested and has extensive areas of muskeg and string bogs.*

The glacial deposits, the limestone bedrock and flat relief have contributed to the region's poor agricultural potential. The till material has caused problems for agriculture and

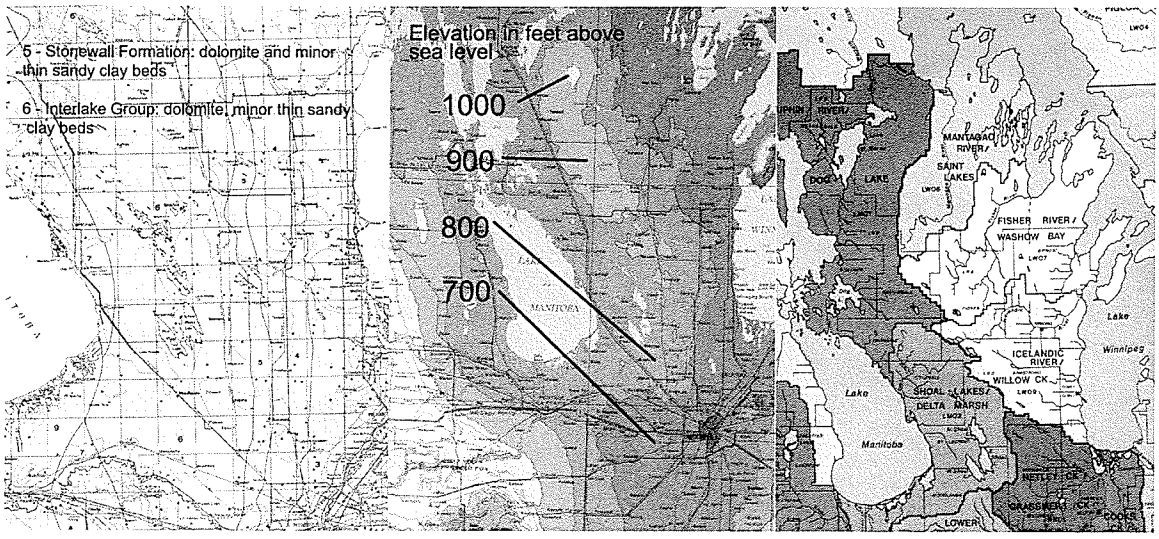


Figure 19. Land Forms. A) Geological features of Manitoba, Manitoba Department of Mines and Natural Resources, 1970. B) Manitoba Relief Map, Manitoba Department of Surveys and Mapping Branch, 1967. C) Basin and Watershed Boundaries, Manitoba Natural Resources: Water Resources,1994.

Landforms

Rock containing limestone, dolomitized limestone, and dolostone are subject to dissolving in acid-rich terrestrial water (Sweet, 1996). This soluble rock develops landscapes called "Karst" where features include pavements (resembling paving stones), depressions, caves, springs and sinkholes. Sweet (1996 p. 23) describes the Karst landforms found at Narcisse and Inwood:

> *There is some surface expression of karst in the southern part of the Interlake, where the now-famous snake dens at Narcisse are examples of collapse sinks. Water below the surface has dissolved the rock, creating cavities whose roofs have subsequently collapsed.*
>
> *At Inwood, Stony Mountain and Garson, the limestone has been excavated for building material exposing extensive enlarged joint systems in the walls of the quarries, ... (describing cave development). Some are simply long trenches, widened by running water just below ground level, probably during the immediate postglacial period, when running water was more abundant. Some are easily accessible through breaks in the roof. Others are more difficult to find; entrances are typically a small hole, followed by a short drop into the cave proper.*

Topography

As mentioned in the geological section, the study area was once covered by inland seas and later reshaped by glacial scouring and melting. Glacial Lake Agassiz also covered this area leaving the landscape quite flat with a mantel of glacial deposits. The Interlake is not completely flat but has a 'spine' or ridge that runs through the study area. The high points forming this ridge, with elevations over 900 feet, divide the Interlake into at least two drainage basins flowing either to the east or west. See figure 19-B above.

Generally speaking there are no topographical features that have a significant effect (regarding climate) on Manitoba (Blair, 1996). The significance of this 'lack of topography' is that it allows air masses from all directions to flow, relatively unimpeded, through Manitoba (Blair, 1996).

Climate

> The climate (for Manitoba) is, in fact, characterized by variability and extremes, not only in its temperatures but also in its weather in general. It subjects Manitoba to cold snaps, heat waves, droughts, floods, blizzards, thunderstorms, tornadoes, waterspouts, ice storms, hailstorms, and innumerable passages of fronts associated with pressure systems. Because of this variability, there is no doubt that it is one of the world's more interesting climates (Blair, 1996 p.31).

Manitoba is situated between 49° N and 60° N latitudes. Latitude strongly affects the amount of solar energy that is available at the surface to heat the ground, heat the air, evaporate water, or melt snow (Blair, 1996). Latitude also controls day length and solar altitude and the mid-latitudes (35°- 55°) produce large differences in the amount of daylight and subsequently air and ground temperatures.

Manitoba is located geographically near the centre of Canada and the North America land mass. This central location, identified as continentality, enhances the strong latitudinally controlled seasonality in temperatures, relative dryness of the province, and the lack of influence from the thermal sinks of the Pacific and Atlantic air masses. The continental climate strongly influences the study area and brings very low temperatures in winter, about –24° C mean daily minimum, and quite warm summer temperatures with a 25° C mean daily maximum. Across Manitoba the difference between average high and lows is approximately 50° C (Blair, 1996). The transition seasons of spring and fall have rapid changes in daily temperatures where the average daily temperature can increase 18°C in April and May (Blair, 1996). Surface albedo also affects average daily temperature changes by promoting ground absorption of sunlight, in turn affecting air temperatures and further snow melt. Surface albedo, mostly controlled by snow cover, quickly changes ground and air temperatures in spring and fall.

As mentioned, the continentality of Manitoba gives the province a fairly dry climate with the most precipitation during the warmer months of summer and the driest periods during the cold winters. The Interlake region has a mean annual total precipitation of about 525 mm (Blair, 1996).

Pressure patterns and wind vary considerably with Manitoba's continental position. Winter conditions generally are described as "the mid-tropospheric geostrophic flow over Manitoba in January is strong and from the northwest, where the air is cold and dry "(Blair, 1996 p.36). Summer conditions have a more westerly flow resulting "in fewer summer intrusions of relatively cold, dry air masses from the north, and more exposure to relatively warm, moisture-bearing air masses from the west and south" (Blair, 1996 p.36).

Vegetation

Ecoclimatic regions, defined in Scott (1996) are broad areas of the earth's surface characterized by distinctive ecological responses to climate, as expressed by vegetation and reflected in soils, wildlife and water. Each ecoclimatic region is therefore distinct

from the other regions in relation to soils, vegetation cover and wildlife. The study area is mostly characterized as Aspen Parkland under the Transitional Grassland Ecoclimatic Region (Scott, 1996) but the Narcisse Snake Dens are located in or very near the Boreal/ Prairie Transition Zone in the Subhumid Transitional Low Boreal Ecoclimatic Region. This means that the characteristics of the prairie communities (grasslands and Aspen parkland) and associated soils (predominantly Black Chernozemic), and, the southern fringes of the boreal forest (coniferous and broadleaf deciduous hardwoods with Dark Grey Chernozemic soils) are in transition. Changes from prairie to the invading Aspen parkland and transitional boreal/mixed forest would be the result of increased fire protection and the removal of the plains bison (Scott, 1996). Typical species representative of this region include for the Boreal forest: White and Black Spruce, Tamarack, White Birch and poplar, and for the grasslands: Trembling Aspen, willow, White Spruce, White Birch, Manitoba Maple, Bur Oak and ash (Hosie, 1990).

The Inwood-Narcisse area's vegetation has been modified by human disturbance. The area surrounding the Narcisse Snake Dens is a community pasture where forests have been cleared and replaced with forage and feed crops. The Inwood area has also been modified to support grazing cattle. Both areas however, still retain wet marshlands that are common to the Interlake landscape.

Wildlife

The wildlife found in the Interlake is mostly representative of Aspen parkland and to a lesser extent the transitional Boreal forest. Even though human activity (agriculture, quarrying, settlement) has disturbed and even extirpated some species such as the Plains Bison, wildlife is still abundant in the Interlake. The Aspen forests as well as the wetlands are home to species such as the introduced Whitetail Deer, 15-18 species of ducks, 4-5 races of geese, 3 species of grouse, Mink, muskrats, rabbits, squirrels, foxes, skunks and thousands of Red-sided garter snakes (Scott, 1996).

Human History

First Nations

Continental ice sheets and waters from glacial Lake Agassiz have covered the study area, and most of southern Manitoba, therefore requiring human colonization from peoples outside of Manitoba. According to Nicholson (1996) the Northern Plains has been host to a number of cultures including: the Besant/ Sonota peoples (100 B.C. to about A.D. 750) whose subsistence strategies relied on the bison; the Avonlea (A.D.150-250.to A.D.750)

another bison based culture; the Blackduck (A.D. 600-700 to A.D. 1600-1750) who have left evidence of mass kills of bison and broad subsistence strategy based utilizing fish, beaver, moose, woodland caribou, bear, migratory waterfowl and wild rice; Duckbay people (unknown dates, around A.D. 1200) who left evidence of ceramics in the Interlake region and who lived off a highly productive wetland niche; the Selkirk People (A.D. 1000 to early 19th century) who occupied boreal forest regions; and the Protohistoric/early historic peoples (A.D. 1500-1850) including: the Assiniboine, the Cree and the Ojibwa. Currently there are First Nation land entitlement claims in the Interlake region and the Inwood Quarry being crown land is subject to these claims.

Europeans make contact

The search for natural resources, specifically fur bearing animals such as the beaver led to the creation of the Hudson's Bay Company and the fur trade. From the mid 17th century to 1870 Manitoba (then known as Rupert's Land) was owned (in the European sense of the word) by the Hudson Bay Company. During this era the fur trade dominated the landscape and transformed traditional Native economies and ways of life (Kaye, 1996). Trading posts were initially constructed, then agricultural colonies and settlements, and later by Christian mission stations. Kaye (1996) describes the missionary station:

> *The extension of the Christian church as a "civilizing" or metropolitan influence into the fur trade wilderness of the Canadian Northwest began in 1818 ...*
>
> *These missionary endeavours were essentially an attempt to convert nomadic Native and mixed blood peoples to Christianity and to a more sedentary way of life, although they also served a needed function for the European personnel at the fur trading posts. For this reason, as well as a persistent shortage of manpower, most missionary activity was itinerant and focused on movement to sites of seasonal gathering of natives and Métis, mainly major fishing sites, portages, and fur-trading posts.*

The majority of European activity in Manitoba occurred along the banks of the lower Red and lower Assiniboine Rivers, comprising the parishes of the Red River Settlement (Kaye, 1996). This area has a long and colourful cultural history beyond the scope of this study. However, it is noteworthy to mention that this landscape evolved with the river-lot system (producing a linear pattern of settlement), was divided according to parishes, and predominant settlement occurred in what is now greater Winnipeg.

After the incorporation of Manitoba into the Dominion of Canada, the conditions became favourable for more and extensive European settlement. Indigenous peoples were relocated on newly established reserves and treaties were created. The Manitoba landscape was also heavily informed by The Dominion Lands Act of 1872. This act established the size of homesteads, railway lands and en masse settlements. While English-speaking settlers

dominated the majority of the Red River settlement area, the Interlake region attracted Icelandic settlement along the west shore of Lake Winnipeg. This land was unfamiliar woodland and required clearing and draining. As much of the land was marshland, this limited the development of crop and hay fields. The Icelanders survived by utilizing their fishing skills. Other ethic groups also settled in Manitoba, most notably the Ukrainians, Mennonites, the French and Métis, and a small Jewish population. The Jewish settled mostly in urban centres, but there was an attempt to form a village in the Interlake by Samuel Bender. Lehr (1996 p.98) describes the fate of the Bender Hamlet:

> *The settlement maintained its population until the early 1920s, but isolation, bad roads, low agricultural prices, and the difficulty of either pursuing a Jewish secondary education or finding a marital partner in the tiny settlement caused families to drift away to Winnipeg. With every departure, Bender Hamlet became progressively less attractive to those who remained, and it was soon abandoned ... .*

The history of Bender Hamlet foreshadows the current situation in the Interlake, where the aging population and slow economic growth of the agribusiness culture is less attractive for the younger generation who are drawn to the opportunities of larger urban centres such as Winnipeg.

The Rural Municipality (RM) of Armstrong Today

The RM of Armstrong continues to be predominantly an agricultural based economy. According to Statistics Canada 2001 Community Profiles the RM of Armstrong is characterized as following:

1. The population in 2001 was 1,905 with a population density of one per square kilometre.
2. The age distribution was:

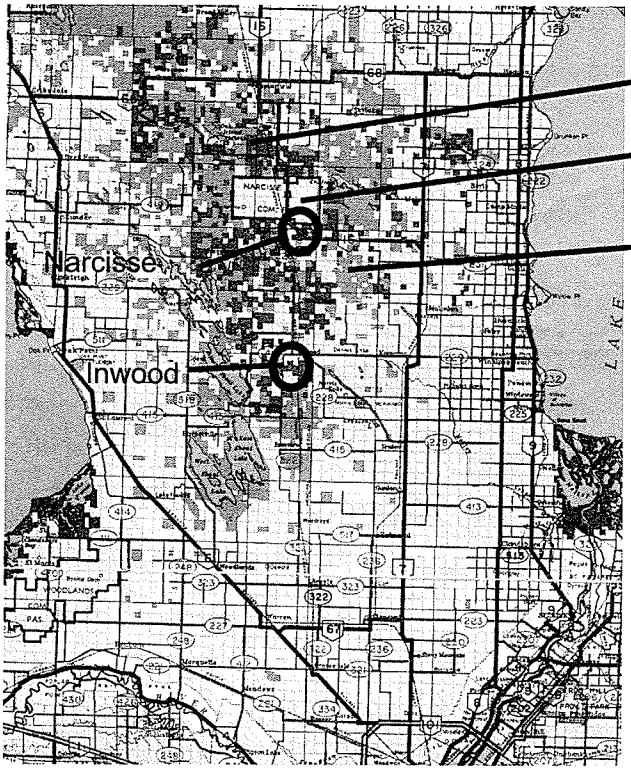
Age	0-14 yrs	345	or	18% of total population
	15-24	200		10.5 %
	25-64	1035		54%
	65+	315		16.5%

   The median age was 43.1 years in comparison to Manitoba's median age of 36.8years and 81.9% of the population was over 15 years of age.
3. The top public sector employers were Inwood School with 15 employees and the RM of Armstrong with 6 employees.
4. In the business, trades and professional services category the region has primarily accommodation type services with 2 campgrounds and 3 hotels.
5. In the agricultural services category the RM has 1 auction mart, 2 farm equipment supplies and services and 1 farm implement dealer.
6. The RM has a number of automotive related businesses: 1 auto body repair, 2 auto fuel sales (no mechanic), 2 auto/truck parts, 1 recreational vehicle sales (boats, snowmobiles, off road vehicles, etc), 1 Recreational vehicle sales (trailers/ campers, etc) and, 2 service stations with mechanics.

7. In the construction/hardware category there was found: 1 brick layer/ stone worker, 5 building /general contractors (full time), 1 cabinet maker, 1 electrical contractor (full time), 3 excavators, drillers, 2 gravel, sand suppliers, 3 painters (full time), and 1 plumbing repair/contractor (full time).

Land Use

The Interlake's geology, landforms, climate and vegetation cover have dictated the way this land has been settled, managed and ultimately used. The dolomitic limestone, rocky till mantle, shallow soils, marshlands, Aspen parkland and mixed wooded areas, have all contributed to how the land is used or in some cases not used by humans.



Procincial Crown Land

Narcisse Community Pasture
Federal Crown Land

Local Government District Lands

All light coloured areas are privately owned.

Figure 20.
South Interlake Land Ownership: The southern portion of the province of Manitoba land map, Dept. of Mines and Natural Resources, 1967. Although somewhat dated this map indicates land ownership separating crown and privately owned land.

The Interlake is not considered prime agricultural land for common field crops. Some of the land (51-67%) however has been improved as hay and pastureland for beef cattle (Carlyle, 1996). Some farms have diversified and are experimenting with bison and elk livestock.

While other areas in the Interlake region are located near beachfront property providing opportunities for fishing, cottage development and beach-water sport related recreation; the Narcisse-Inwood area has limited opportunities for these forms of development. The Narcisse-Inwood area is located in the interior of the Interlake the whose primary land use has been the agribusiness production of beef cattle. Where dolomite limestone is

exposed to the surface, scattered quarries have been developed to extract aggregate and to produce lime.

The Narcisse Snake Dens (NSD) Wildlife Management Area are situated within an area designated for community pasture. The land has been cleared of the Aspen-mixed forest to allow for forage production and cattle management. The area set aside for the wildlife management area is currently managed as a preserve area therefore excluding grazing and alfalfa production that once existed on site.

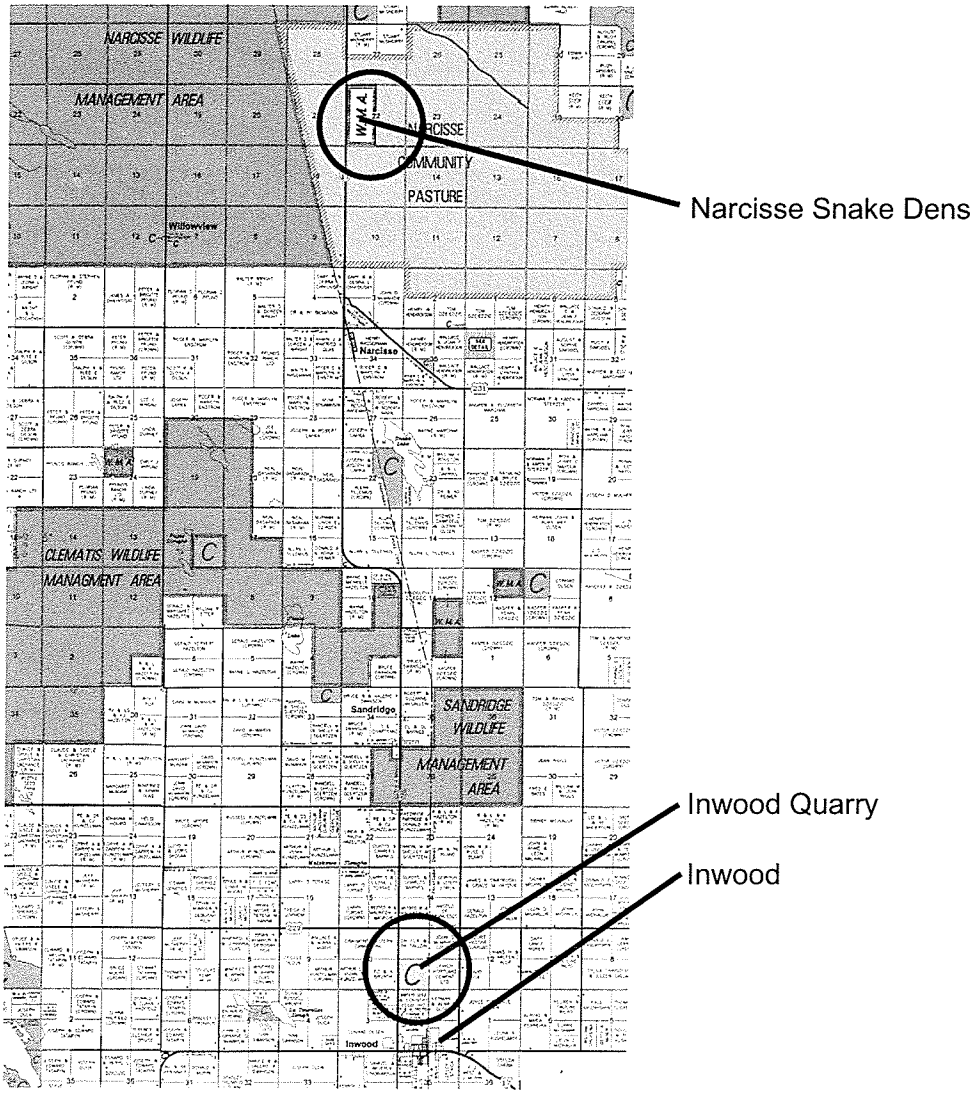


Figure 21. Land Owners in RM Armstrong (RM Armstrong, 2003)

The Inwood site is located in an old limestone quarry on Crown Land. The Inwood

area continues to have working limestone quarries, cattle production and a growing golf course. These land uses are echoed in the leading private sector employers for the RM of Armstrong (Manitoba community profile, 1996):

Puratone Corp. (Niverville)- Livestock Production 18 employed
Cotswold Canada (Winnipeg) - Livestock Production 16 employed
Inwood Action Mart (Inwood) - Cattle Sales 12 employed
Inwood Golf and C.C. (Inwood) - Golf Course 10 employed
Interlake Water Supply Co. Ltd.(Inwood) - Well drilling and plumbing 7 employed

Access

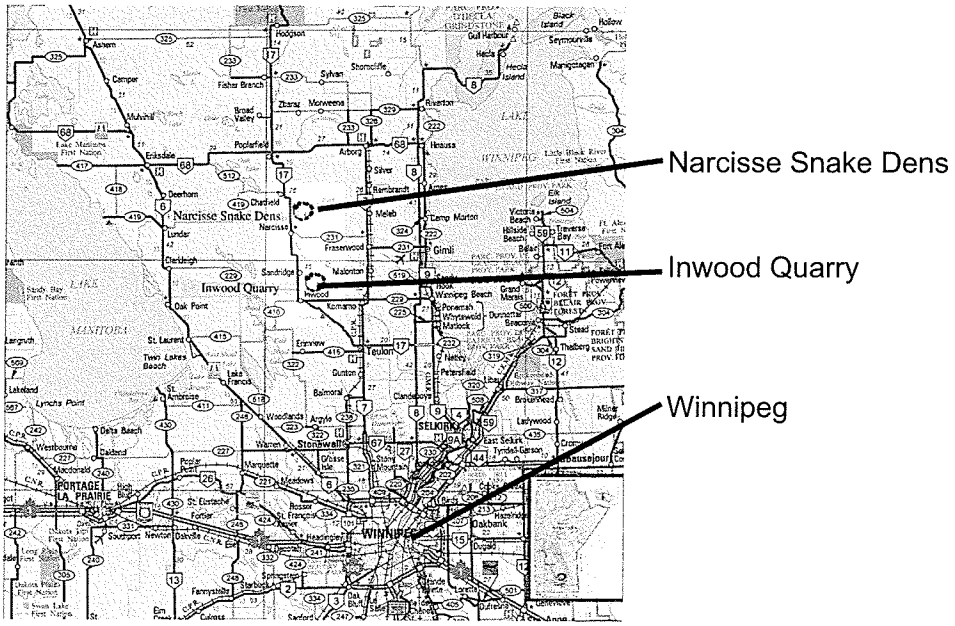


Figure 22. Access to Narcisee-Inwood Area

The Interlake region has a comprehensive highway/road system. Figure 22 shows the relationship of the highways and roads into the region. Highway 6 brings people from Winnipeg to the northwest to Lake Manitoba and points north. Highway 6 is heavily used as a transportation route to northern Manitoba and access to communities along the eastern side of Lake Manitoba. Highways 8 and 9 are the primary routes north of Winnipeg to destinations along the western shores of Lake Winnipeg. Cottage users on Lake Winnipeg as well as access to Winnipeg Beach, Gimli and Hecla/Grindstone Provincial Parks will predominantly use these two highways. Highway 7 has less traffic than the already mentioned highways. Highway 7 serves access north of Winnipeg to Stonewall and Oak Hammock Marsh in the southern part of the Interlake, to Teulon and north to Arborg. Connecting highway 9 to 8 and 7 and then running west- northwest of

Teulon is Provincial Trunk Highway (PTH) 17. PTH 17 runs almost in the centre of the Interlake (between Lake Winnipeg and Lake Manitoba) and provides access for Inwood, Narcisse, Chatfield, Poplarfield, and north to Fisher Branch and the Peguis First Nations.

The nearest airports are at Gimli (paved), Arborg (gravel) and the Winnipeg International Airport. The area is easily accessed for tourism for both regional and international visitors.

Rails to Trails

Both the Canadian Pacific Railway (CPR) and the Canadian National Railway (CNR) have had rail lines into the Interlake region. Currently there is no rail passenger service to the Narcisse-Inwood area. One (of two rail lines) belonging to the CPR is no longer used as a railroad but has been converted into the Prime Meridian Trail (PMT). The PMT runs from Grosse Isle (northwest of Winnipeg), through the communities of Argyle, Erinview, Inwood, Narcisse, Chatfield, Poplarfield and ends 116.5 km later at Fisher Branch. The trail runs adjacent to the Inwood quarry site but not the Narcisse Snake Dens. This trail allows pedestrian access to the Inwood quarry adding a new dimension to a site visit.

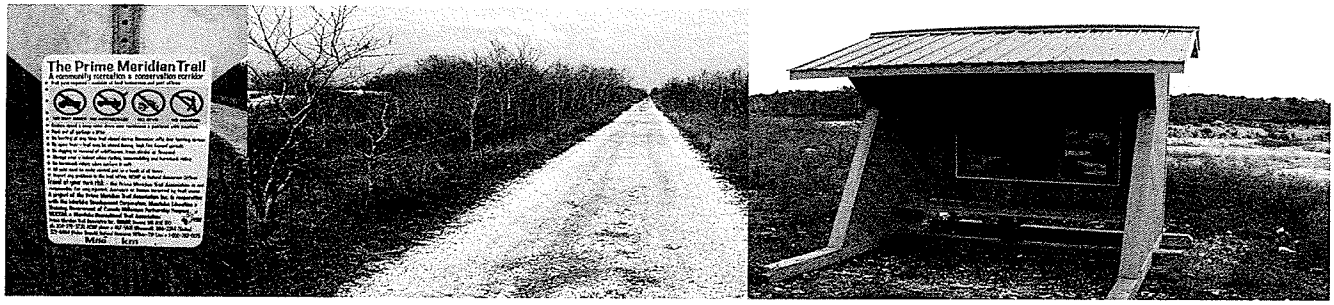


Figure 23. Prime Meridian Trail A) Rules of the trail, B) A very straight route, C) An information shelter near the Inwood quarry (Zonneveld, 2004)

Infrastructure and Utilities

The Interlake region is serviced with relatively well-developed infrastructure and utilities. As already described the Narcisse-Inwood area is accessible by a good system of paved roads and is located approximately 110 kilometres from the primary service centre of Winnipeg. The communities have full access to hydroelectric power, natural gas and telephone services. Cellular phone coverage is somewhat hindered by the distances between transmitter towers and 'dead' service zones are experienced. Potable water is

from groundwater wells and quality is considered 'excellent' by Manitoba Conservation (RM Armstrong Community Profile). Sewage is managed with septic tanks and is trucked to a lagoon at Meleb. The RM of Armstrong owns the waste disposal grounds and also manages a recycling program. Inwood and Fraserwood have post office outlets and the area has similar television, radio and newspaper coverage as Winnipeg.

Tourism Developments

Although the RM of Armstrong is in close proximity to Winnipeg, with an hour to an hour and a half driving time, the area has limited tourism development. The land base is poorly suited for cottage development and has limited scenic values. According to the RM of Armstrong community profile, major tourist attractions in the area include:

Tourism Attractions

Name	Location	Type of Event or Facility
Bender Hamlet Cairn	Narcisse	Historic Marker
Inwood Snake Statue	Inwood	Statue
Kreuzburg House	Fraserwood	Historic Site
Narcisse Snake Dens	Narcisse	Wildlife Viewing
Prime Meridian Trail	Western Armstrong	Walking Trail
Wildlife Management Areas	Various Areas	Wildlife Viewing

Major Events & Festivals

Annual Events	Location	Date
Chatfield Picnic	Chatfield	3rd weekend in July
Raserwood Picnic	Fraserwodd	4th Sunday in June
Inwood Ice Carnival	Inwood	1st Saturday in March
Inwood Sports Days	Inwood	September long weekend
Meleb Picnic	Meleb	3rd weekend in July
Silver Picnic	Silver	2nd weekend in August

As evident in the RM of Armstrong's list of attractions and events, tourism in this region is not well developed and would be considered minor to the region's economy. Not listed in this information that may be important to the area's tourism is the area's opportunities for hunting (deer and upland game) and snowmobiling on the Prime Meridian trail.

Located in relatively close proximity to the Narcisse-Inwood area is the Oak Hammock Marsh facilities. This nature tourism/education facility is an award winning, well-known destination that provides nature tourism programs, primarily related to birds, but also includes day trips to the Narcisse Snake Dens.

Regional analysis

The Interlake region of Manitoba has been defined by it's landscape. It has an economic history of natural resource use, specifically agriculture and quarrying, which has fallen on difficult times. This region has few economic options other than what has already been

developed. The abundance of snakes in this region does however provide an opportunity for wildlife viewing or ecotourism. This region has the optimum land conditions and history to support developing snake ecotourism into a profitable (for all clients) venture. Some of the key positive attributes of this region include: a history and reputation for snake viewing, proximity to a large urban centre and transportation routes, close proximity to other nature-based facilities such as Oak Hammock Marsh, local people who are willing to initiate snake ecotourism, and sustainable populations of snakes. Limitations of this region include a history of piecemeal planning for tourism (projects do not consider a plan) and an unclear understanding of what is involved in ecotourism development.

Chapter 9 Narcisse Snake Dens Site Inventory

Conditions and land uses surrounding the site

The Narcisse Snake Dens (NSD) are located in an area with naturally occurring sinkholes. The land was owned by the Prairie Farm Rehabilitation Administration (PFRA) and set aside from the grazing land to protect the snake dens. The area was given protection status and parking and trails provided as a response to curious visitors who were climbing fences and accessing the grazing land. As Figure 24 indicates the land immediately surrounding the Narcisse Snake Dens continues to be owned and managed by the PFRA. Other land in the area is privately owned or components of the Narcisse Wildlife Management Area.

Vehicle circulation/ access

Figure 24 shows the relationship between the snake den sites and PTH 17. Vehicles entering the protected area are limited to the parking lot area. The trails from the parking lot to the den sites are pedestrian only. Motor vehicles and bicycles are not permitted. Vehicles can access the PFRA areas and travel the rangeland. The current access to the parking area works well and does not need improvement.

Land ownership, boundaries

The NSD are a part of the Narcisse Wildlife Management Area. This land is Crown Land managed for the people of Manitoba by Manitoba Conservation. The boundaries of the NSD are shown in Figure 24.

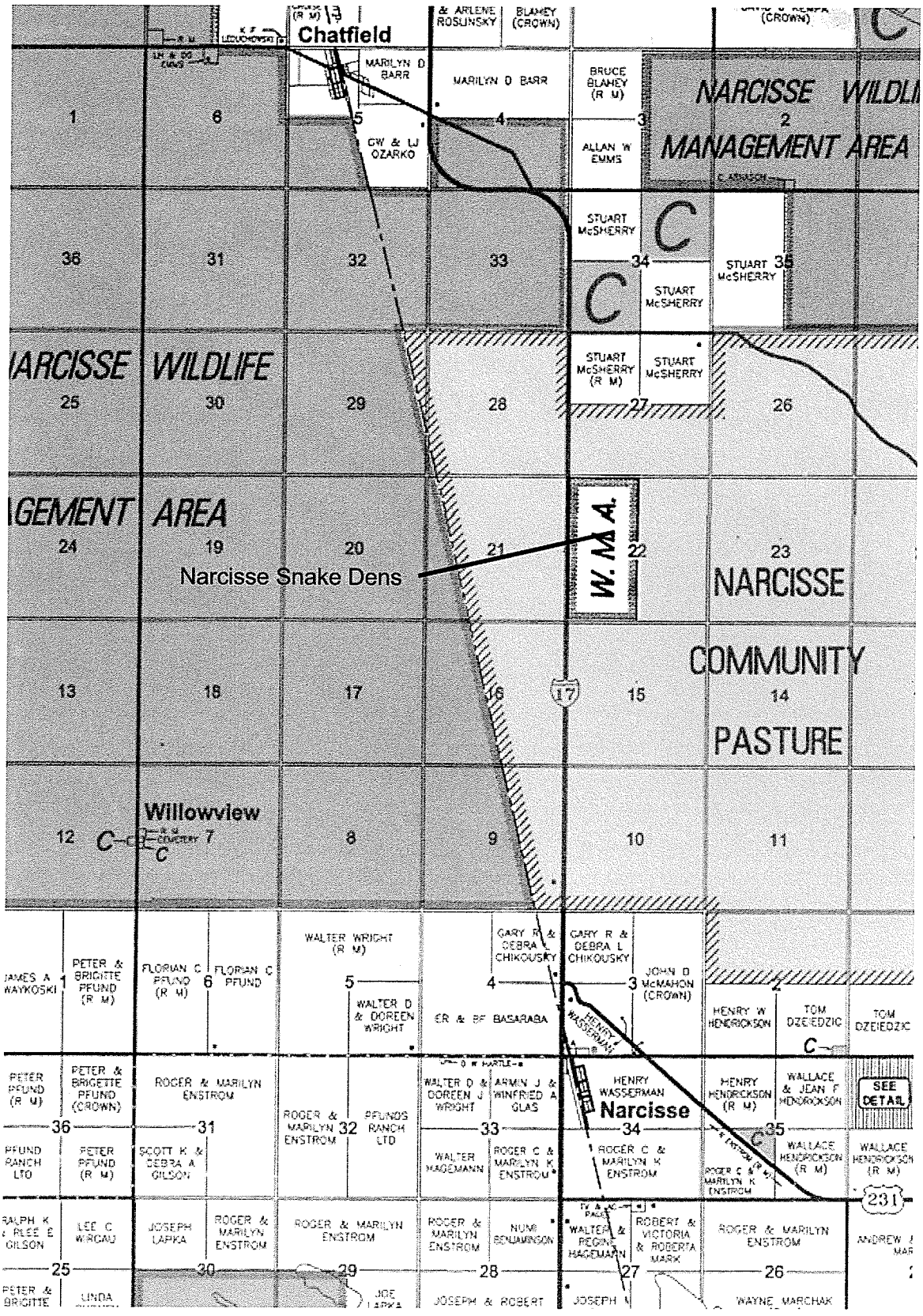


Figure 24. Narcisse Snake Dens are surrounded by Crown land (RM Armstrong, 2003)

Topography

The NSD is typical of the geology and landforms already mentioned in the Hydrology and Drainage section. The region is known as the Interlake Till Plain of the Manitoba Lowlands and has an elevation range from 260 m (853 feet) to 282m (925 feet) (Neily *et al.,* 1999). This 'flat' relief results in runoff from small ridges to collection areas such as swamps and intermittent lakes. These wet collection areas are important summer range for the snakes and needs to be managed for sustainable ecological integrity.

Soil and Vegetation

The soil is a dark grey to dark grey wooded clay loam called the Stonewall Complex (Neily *et al.*, 1999). This soil type as well as the shallow depth of soil places limitations on the plant species found in this area. Introducing new species may have adverse impacts on local populations.

Vegetation

The Narcisse area is characteristic of the Aspen Parkland ecosystem found throughout much of Manitoba's Interlake region. Here Trembling Aspen (*Populus tremuloides)* is the dominant tree and Saskatoon (*Amelanchier alnifolia)* is the dominant shrub species. The dominant herbs include Kinnikinnick, (*Arctostaphylos uva-ursi)*, Rough-leaved Rice Grass (*Oryzopsis asperifolia*), Western Snowberry (*Symphoricarpos occidentalis*), and Fringed Aster (*Aster ciliolatus*) (Neily *et al.,* 1999). The ridge and swale topography, typical of much of the Interlake, results in an interspersion of different habitat types, from dry gravelly ridges to wet meadows and open water. This area is near the northern limit of the Aspen Parkland, and as a result, portions of the area are somewhat more boreal in character, as evidenced by the presence of some White Spruce (*Picea glauca)* and Tamarack (Larix laricina) stands. An unpublished resource inventory (Neily *et al.,* 1999), conducted for Manitoba Conservation found:

> Trembling aspen (*Populus tremuloides*) is the most common tree in the area, occurring in most wooded areas. In dry sandhill areas, aspen occurs mainly in depressions, while the hilltops and many slopes are covered mainly by grasses. Bur oak (*Quercus macrocarpa*) also occurs in some depressions and extends up slopes, especially north-facing ones.
>
> Although limited in size, the wetlands here are interesting for their diversity of species. Most are dominated by shrubs but lack *Sphagnum* and heath plants, and are therefore classed as swamps. Willows (*Salix* spp.) and swamp birch (*Betula glandulosa*) are the principal tall shrubs in these, with shrubby cinquefoil (*Potentilla fruticosa*) forming most of the low shrub layer, and they have a surprising number of boreal herbaceous species, such as northern bog sedge (*Carex gynocrates*),

prairie sedge (*Carex prairea*), northern green orchid (*Habenaria hyperborea*), rush aster (*Aster borealis*) and glaucous grass-of-Parnassus (*Parnassia glauca*).

Transect 12 (Aspen, Snake Dens, Narcisse Wildlife Management Area)

White Spruce wss also common in this area but has been logged and not re-established in the community pasture and Narcisse Snake Dens areas.

Microclimate

The homogenous 'flat' relief of this region produces few microclimatic opportunities. There are some minor variations with thermal gradients in relation to aspect, geological features such as sink holes, vegetative cover and exposure to the sun.

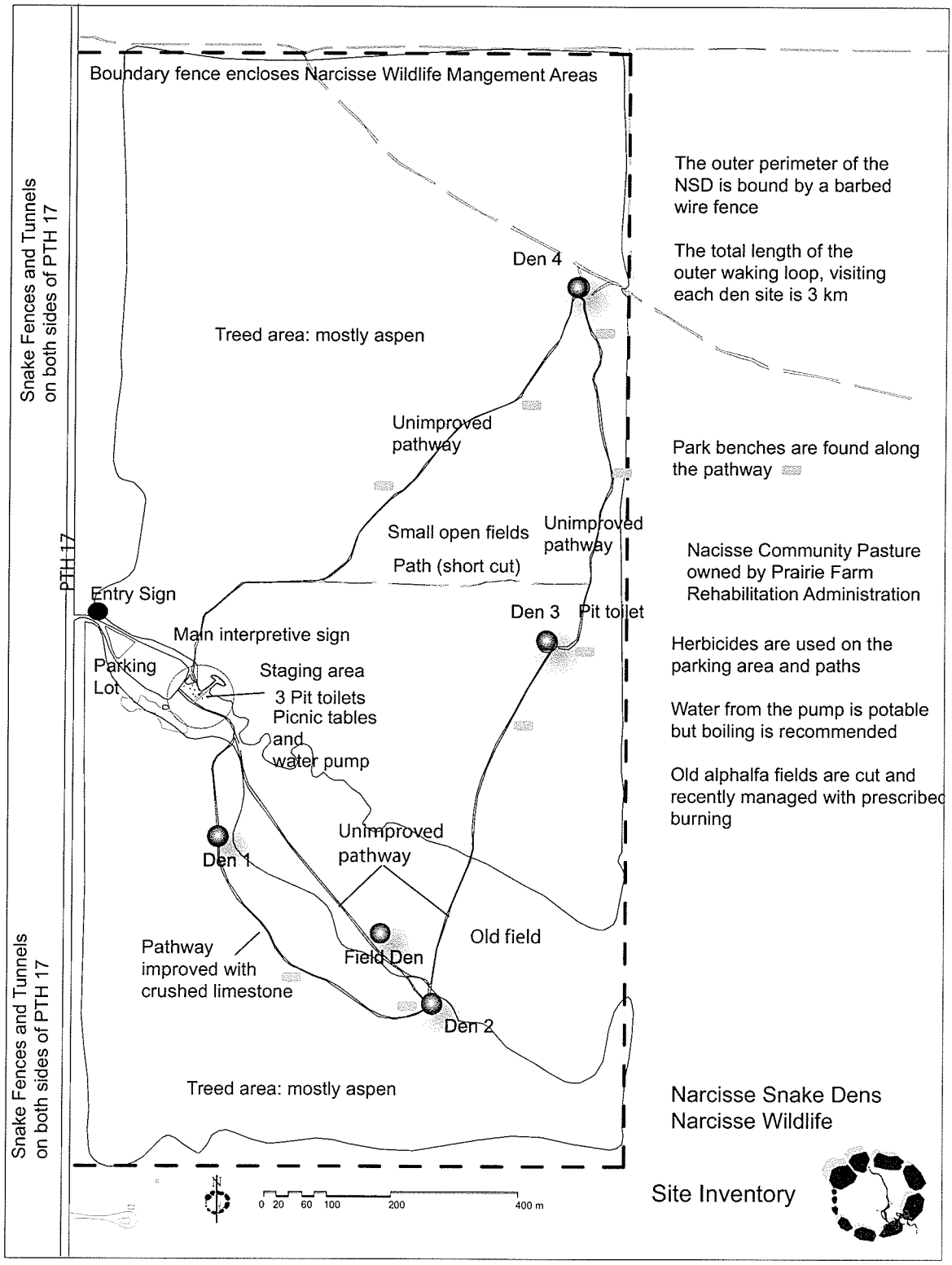


Figure 25. Existing structures and other infrastructure on site

Signage- The entry sign is well maintained and provides an identifiable landmark to the site's entry off PTH 17. Trailhead, interpretation and orientation signage requires replacement and is a management priority. Manitoba Conservation has acquired other sources to develop: interpretive signage text and images; new trailhead, interpretive and orientation signs and sign structures.

Figure 26. Signage A) Entry sign to the Narcisse Snake Dens, B) Distance sign on PTH 17, C) Current Staging area sign (Zonneveld, 2004)

Parking lot- The existing parking lot is approximately 5,900 square meters and covered in crushed limestone. The lot is lined with large local fieldstones and boulders. The lot does not designate parking stalls or direct drivers as to how the lot is to be used. The parking lot currently accommodates buses and smaller vehicles. Manitoba Conservation has identified a need for a parking capacity of 200 vehicles.

Toilets- There are three toilet structures at the staging area and one structure at Den site three. Two structures at the staging area have recently been constructed and are universally accessible. The three staging area toilet facilities use a vault storage system and require regular maintenance. The den site three toilet is a pit toilet.

Water- The site has one hand pump that provides well water. The water is not potable.

Interpretive structure and Picnic Shelter- There are currently no picnic or interpretive structures on site. Manitoba Conservation has identified a desire to include these facilities on site. Other sources have been obtained to design these facilities.

Trails- There are 3 kilometres of trails on site. The trails link the trailhead and amenities to the snake den sites. Figure 25 shows trail linkage and loops. Currently trails from the trailhead to dens one and two have been widened and resurfaced with crushed limestone. These trails are universally accessible. The universally accessible trails are however linear and do not provide a loop back opportunity. Manitoba Conservation has identified

a need to loop the universally accessible trail back to the parking lot. Other trails are covered in grass or have exposed soil conditions.

Den sites- Each site has a small viewing platform near the entrances to the snake hibernacula. Chain link fencing has recently been installed to the site to prevent people from venturing down into the snake dens. The chain link fencing replaced wooden snow fences.

Utilities

The site has few utilities and other amenities. As already identified there are pit toilets and non-potable water from a ground well. A concession truck has operated in the parking area and provides basic food and drink. There are no electricity or public phones on site and cellular phone coverage is minimal.

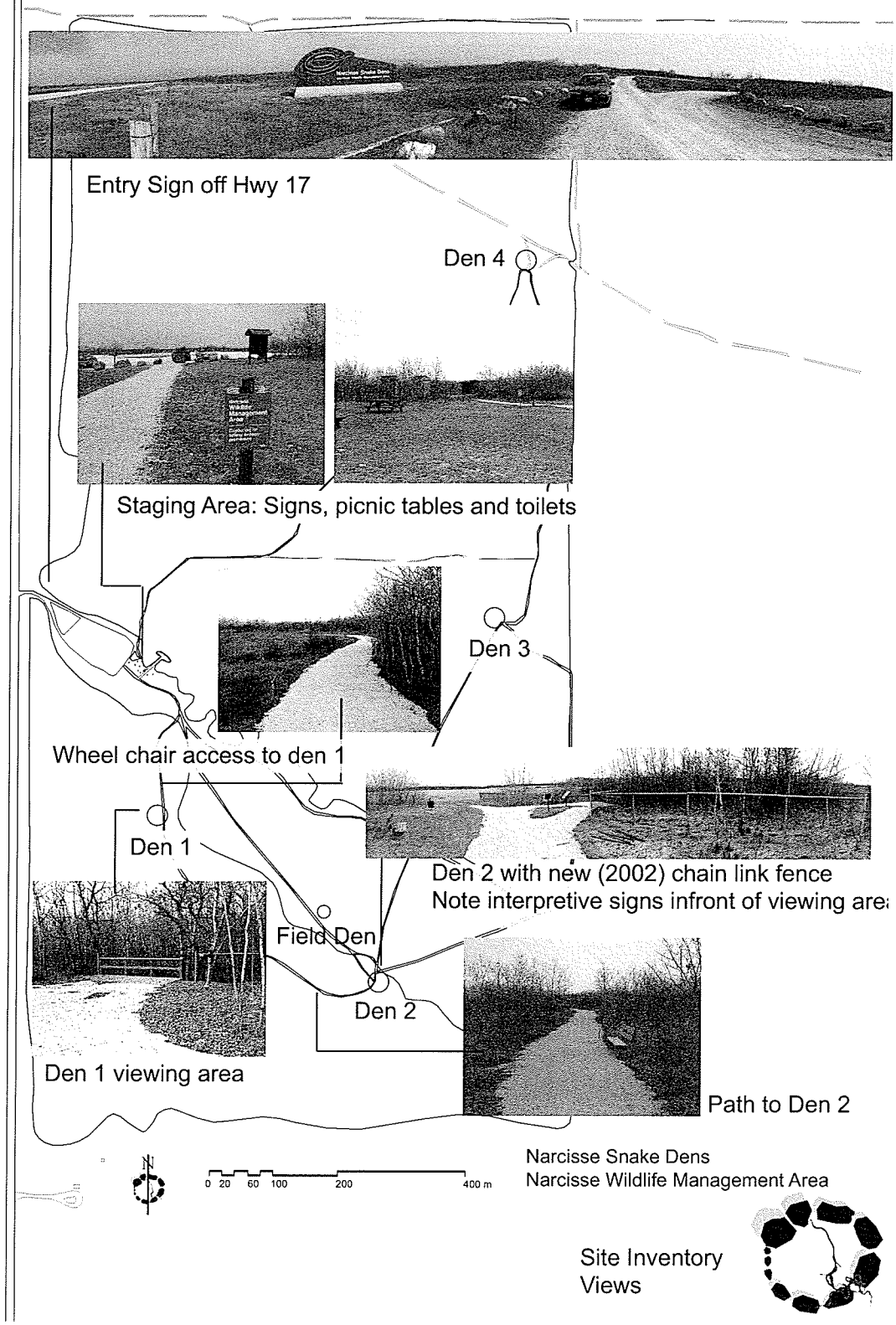


Figure 27. NSD Site Inventory Views 1

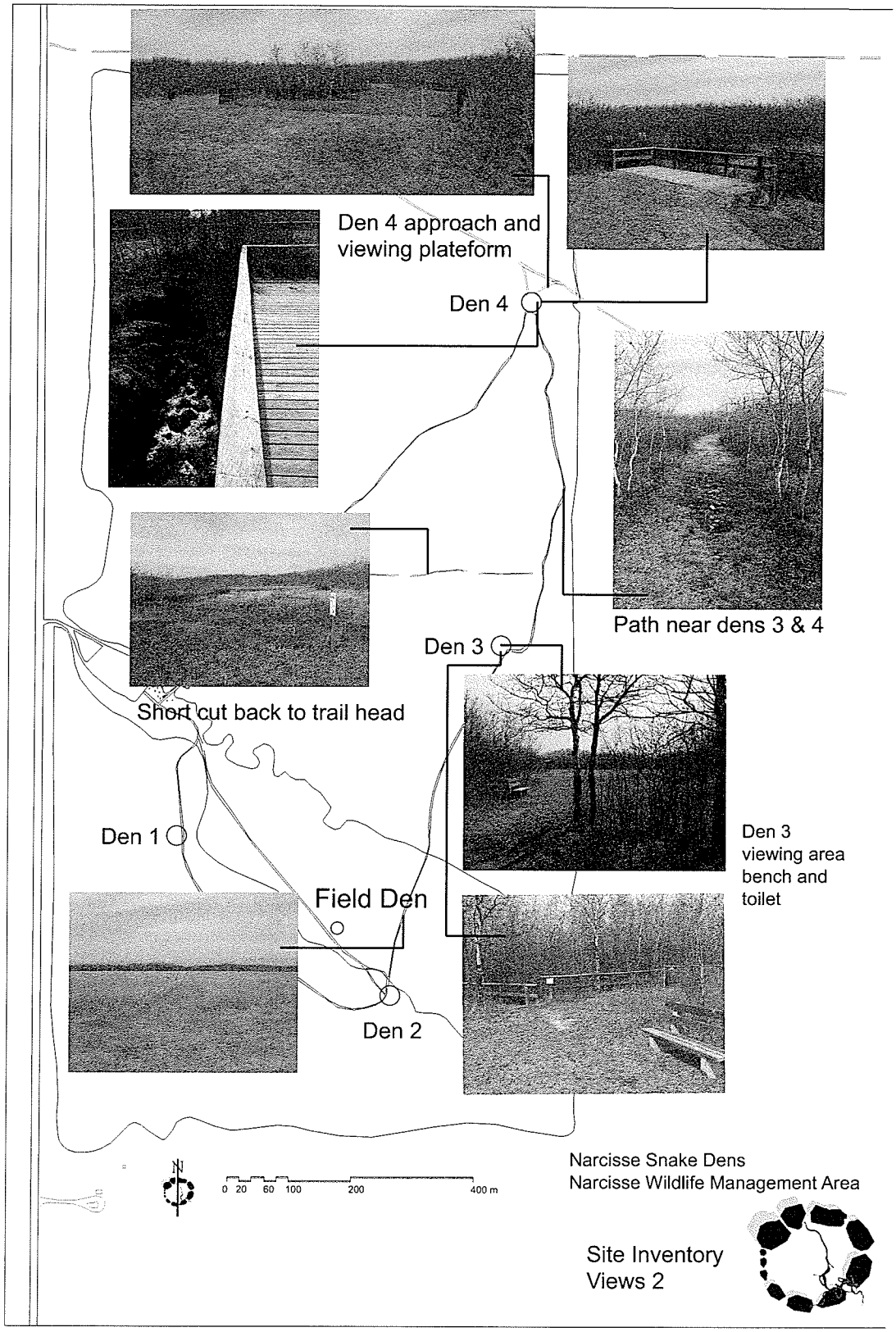


Figure 28. NSD Site Inventory Views 2

Spaces and senses

The NSD allows visitors to experience both the natural conditions of Karst sinkholes at the den sites and the agricultural history of the site. The open fields provide a refreshing foil to the stunted aspen parkland. The layout of the trails give the visitor a sense of the landscape, a mix of former fields and Aspen forest and whose length provides the time to leave everyday thoughts back at the parking lot.

Site functions

The NSD are primarily visited in spring from the end of April to early June. The majority of people, especially school groups arriving by bus, visit from 10 am to 2 pm. It is believed most people stay for an hour or two. The numbers of visitors vary according to weather, snake emergence and day of the week. School groups (as many as 12 at one time) visit the dens during the week. Weekend use is primarily family groups and has reached visitor numbers in the thousands. Limiting the number of people on site at any one time through scheduling (school groups and tour groups) could alleviate issues of crowding. However, Manitoba Conservation's current policy is not to manage visitors by scheduling tour groups.

Site analysis summary

The site analysis for the NSD is depicted in Figure 29. The site has been evaluated according to the needs of ecotourism, wildlife viewing management (Manitoba Conservation), and the needs of the identified three clients. The visitor survey conducted by Manitoba Conservation played an important role in analysis and has resulted in a strong visitor perspective with a 'light handed' approach to development. It was also considered appropriate to use the visitor's views of maintaining the status quo within the strategy of 'limits of acceptable change'. Visitors voiced a desire to maintain the level of development at the NSD to the current conditions, so it is reasonable to consider only minor changes to this site.

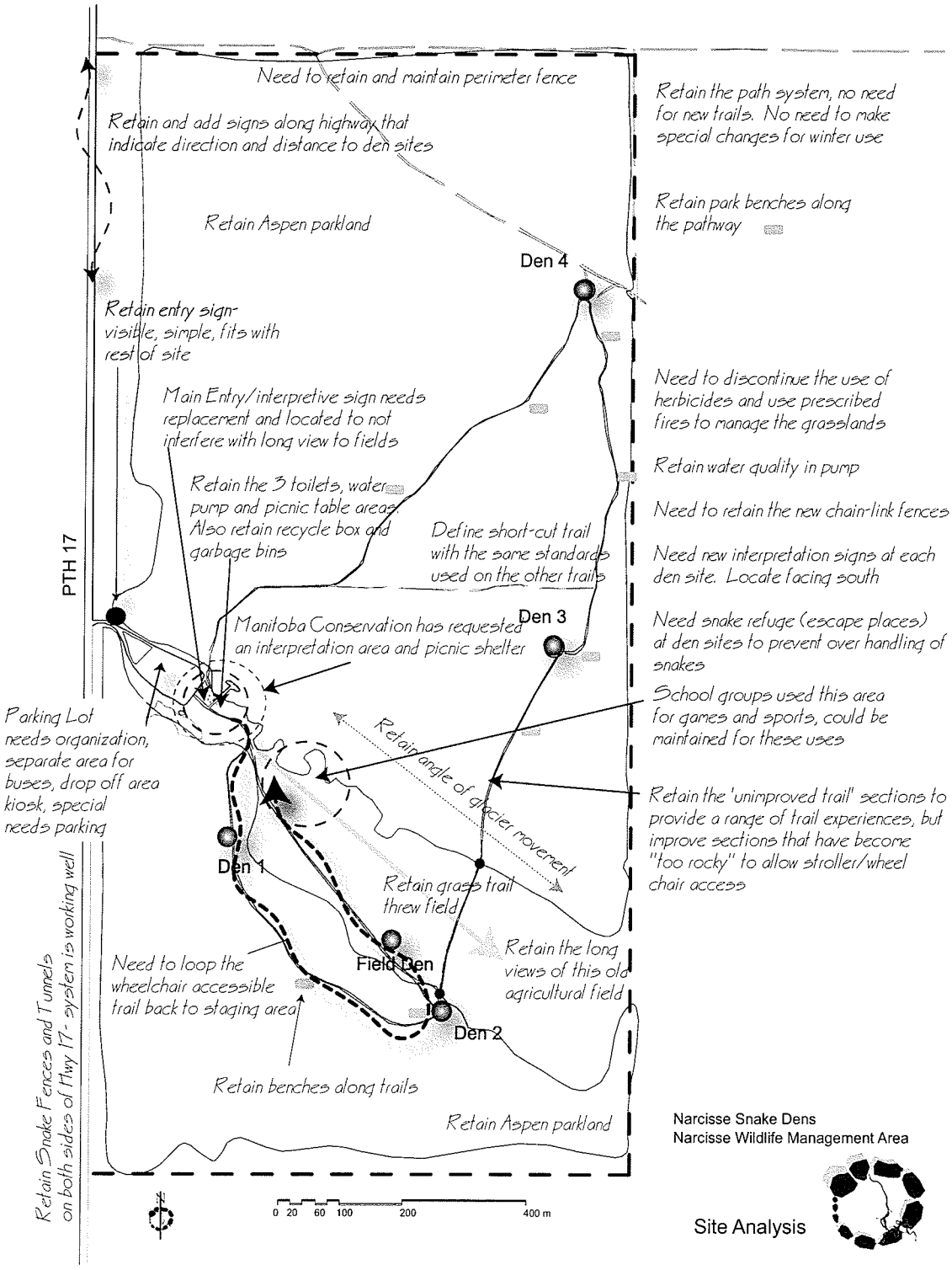


Figure 29. NSD Site Analysis

Conditions and land uses surrounding the site

The area outside of the quarry sites are predominantly privately owned land and used for agribusiness. Figure 30 shows the location of the quarry site and surrounding land and relationships to the town of Inwood and Inwood golf course. The two quarries nearest the highway are still in operation producing primarily aggregate for road construction. Tourism development should not impact other recreation or agricultural uses in the area but has the potential to place limitations on the current quarring operations.

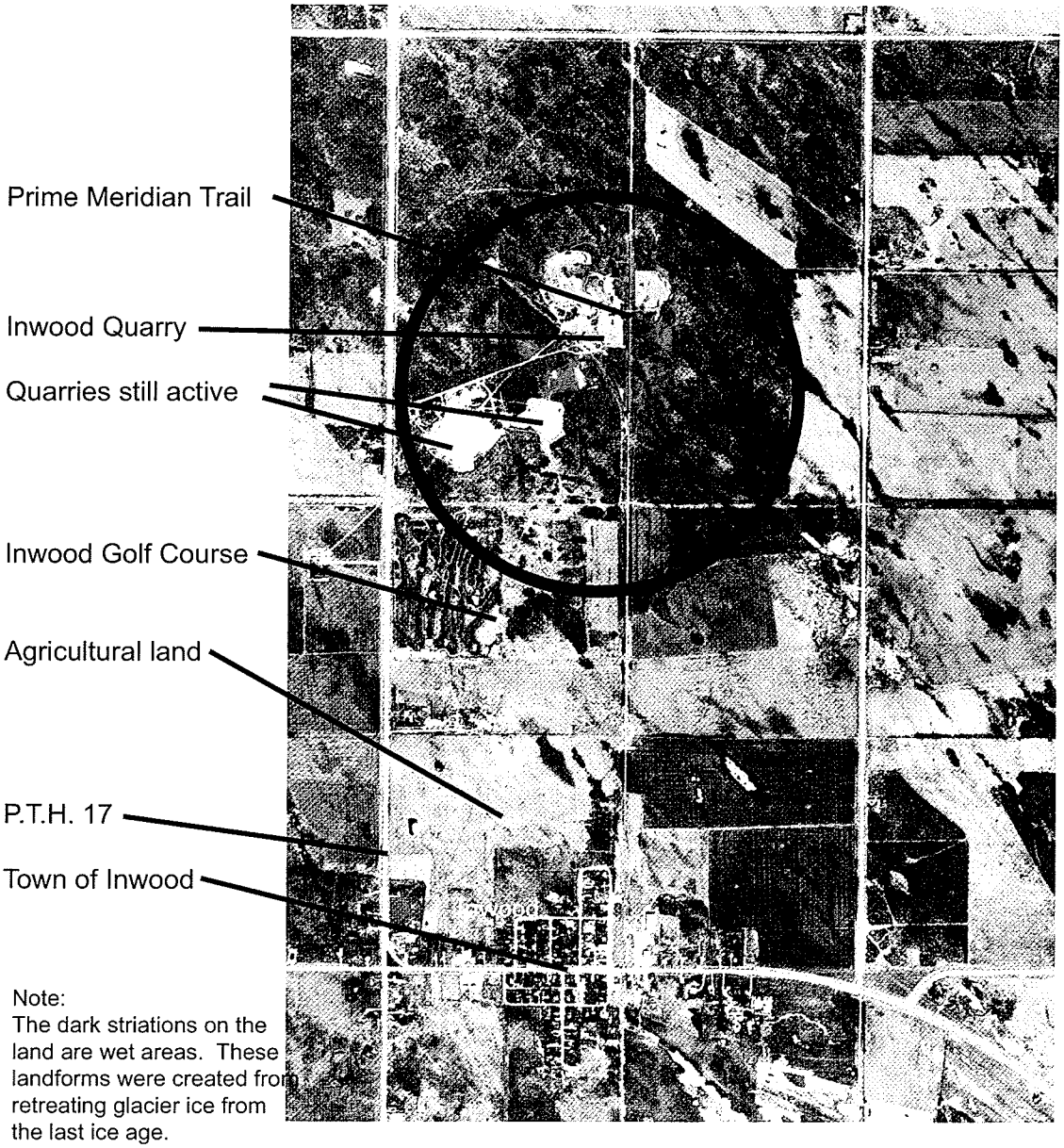


Figure 30. Inwood Quarry Location

Vehicle circulation/ access

The site has vehicle access on an existing quarry road from PTH 17 to the quarries. The site can also be accessed (by foot, bicycle, and snowmobile) along the Prime Meridian Trial and by existing trails in the surrounding Aspen forest. Although considered illegal, motor vehicles have been observed on the trails and on the Prime Meridian Trail. Site access will need to controled to protect the snakes and site facilites once tourism is established.

Land ownership and boundaries

The quarries are located on a quarter section of land (Southwest corner of 11, 18, 1 west of the Prime Meridian) owned and managed by the Province of Manitoba. The Mines branch is responsible for quarry operations and rehabilitation, while the Parks and Natural Areas branch has recently taken responsibility to protect the den sites from further quarry activities. The land to the north of the proposed ecotourism development (includes the northern part of the quarry) is in private hands. Open communication with this land owner is essential for a sustainable development.

Topography

Similar to the Narcisse area the topographical relief in this area is relatively flat. However the quarrying activity has created constructed topography with steep slopes on the quarry walls and mounds of waste material from the production of lime. This human created topography is desirable from an aesthetic and tourism perspective as a wonderful change from the surrounding landscape and should be maintained.

Hydrology and drainage

The Inwood quarry is located on a ridge where the limestone substrate is exposed to the ground plane. The quarries reveal ground water movement and have been known to flood. Figure 31 below, shows the water level of flooding in the Inwood quarry. However, the water does not remain and drains into the limestone fissures and out as ground water to the surrounding area. The spring runoff also evaporates in the exposed limestone pits. Local drinking water is acquired from the area's aquifers therefore it is important to sustain the integrity of the ground water (quantity and quality) and prevent any form of contamination. For the reason of maintaining water quality, blasting and removing limestone should be minimized in the proposed ecotourism quarry sites. Any new openings into the acquifer could potentailly lead to contamination.

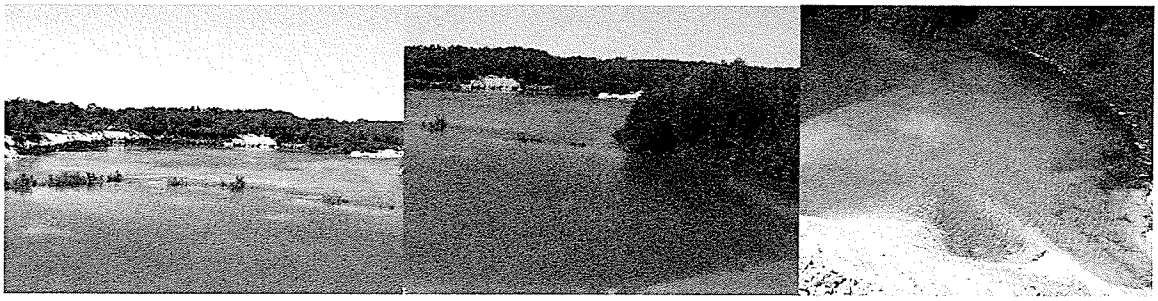


Figure 31. Quarry Flooding (Prime Meridian Trail website, 2003)

Soil

The soil classification is alluvial, morainal ridged with a 1-3% slope. The area is mostly till. The soil depth is between 1 to 3 meters. These thin soils are poor as a growing medium and would require improvement if the area were to support new or exotic plantings.

Vegetation

The quarry area has been greatly modified with much of the natural vegetation removed, soil stripped and pits blasted into the limestone rock. Remnant Aspen forest is found in undisturbed patches. It is assumed that the remnant flora is similar to the vegetation indicated for the Narcisse site. The Aspen appears quite stunted possibly due to the shallow, poorly developed soils. These poor growing conditions place limits on the species that may be introduced on site.

Microclimate

The exposed rock walls and floor of the quarries create microclimatic conditions where south facing slopes can become warmer than the rest of the site due to direct sunlight. The openness of the quarries also causes exposure to the predominant north, northwest winds. During the time of snake emergence the north walls will cast shadows onto the quarry floor. These microclimates provide desirable conditions for visitors and snakes alike.

Existing structures and infrastructure

There is an existing concrete shell of the former lime kiln and stone foundation on the site. There are also remnants of a small test kiln located near the Prime Meridian Trail. A capped water well is located on the stone foundation. The Prime Meridian Trail Association has built an interpretive sign/shelter along the trail near an entry point to the quarries. The concrete shell of the lime kiln structure is aesthetically appealing with irregular openings

and natural light filtering into the interior space. If possible this structure should be maintained with few changes to help tell the story of the site's industrial past.

Utilities

Currently there are no utilities (power, water or sewage) on site.

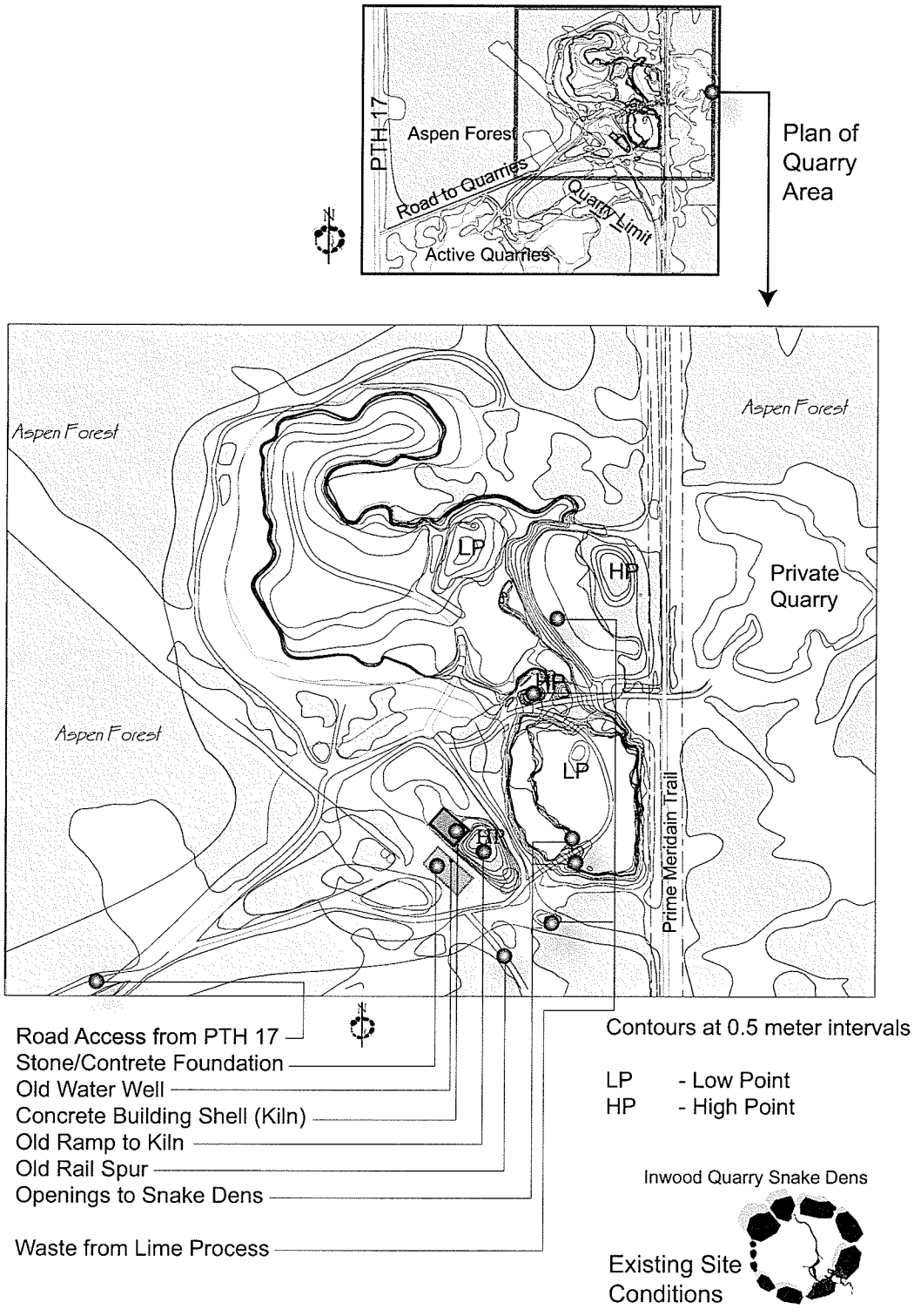


Figure 32. IQSD: Existing Site Conditions

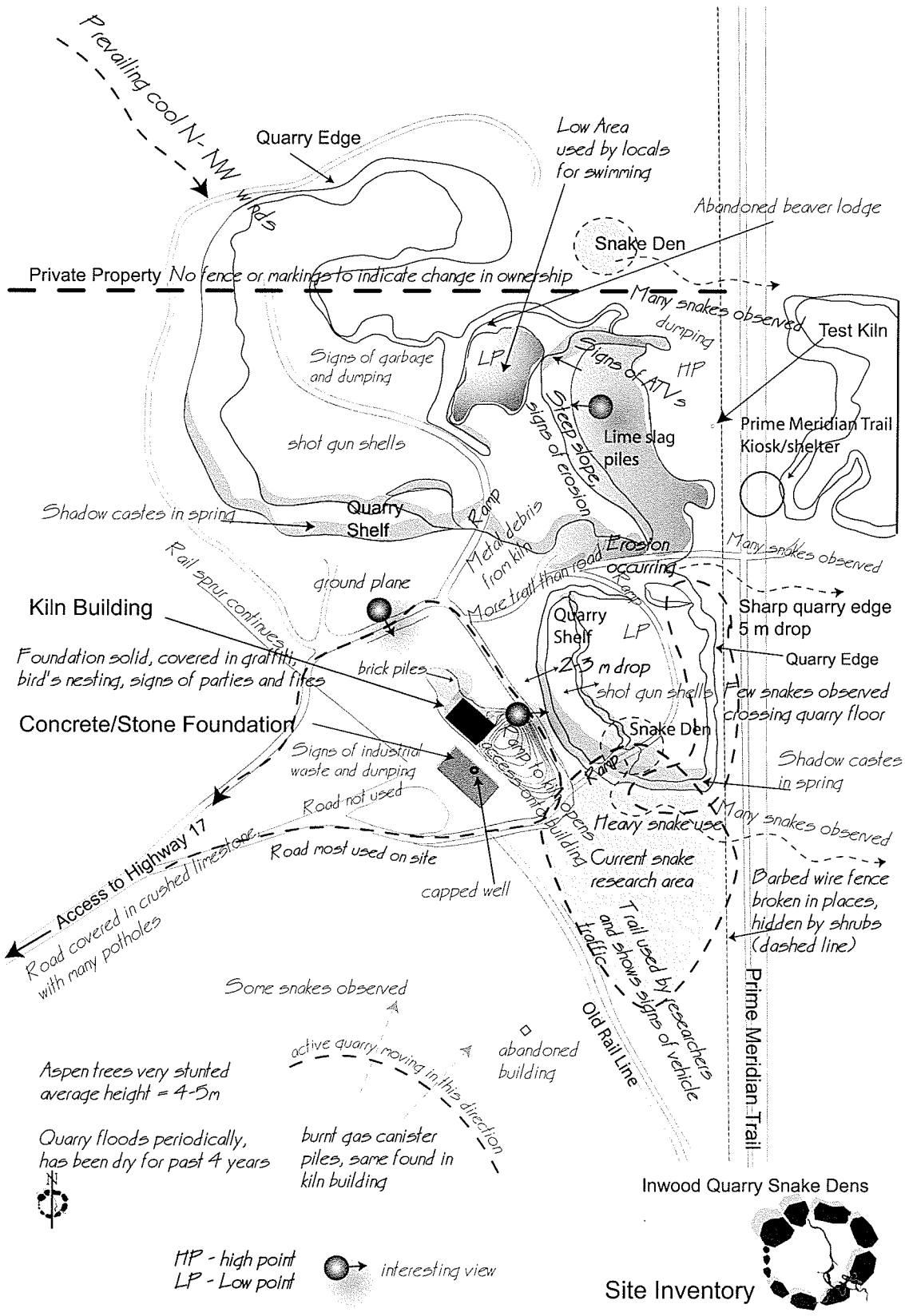


Figure 33 IQSD: Site Inventory

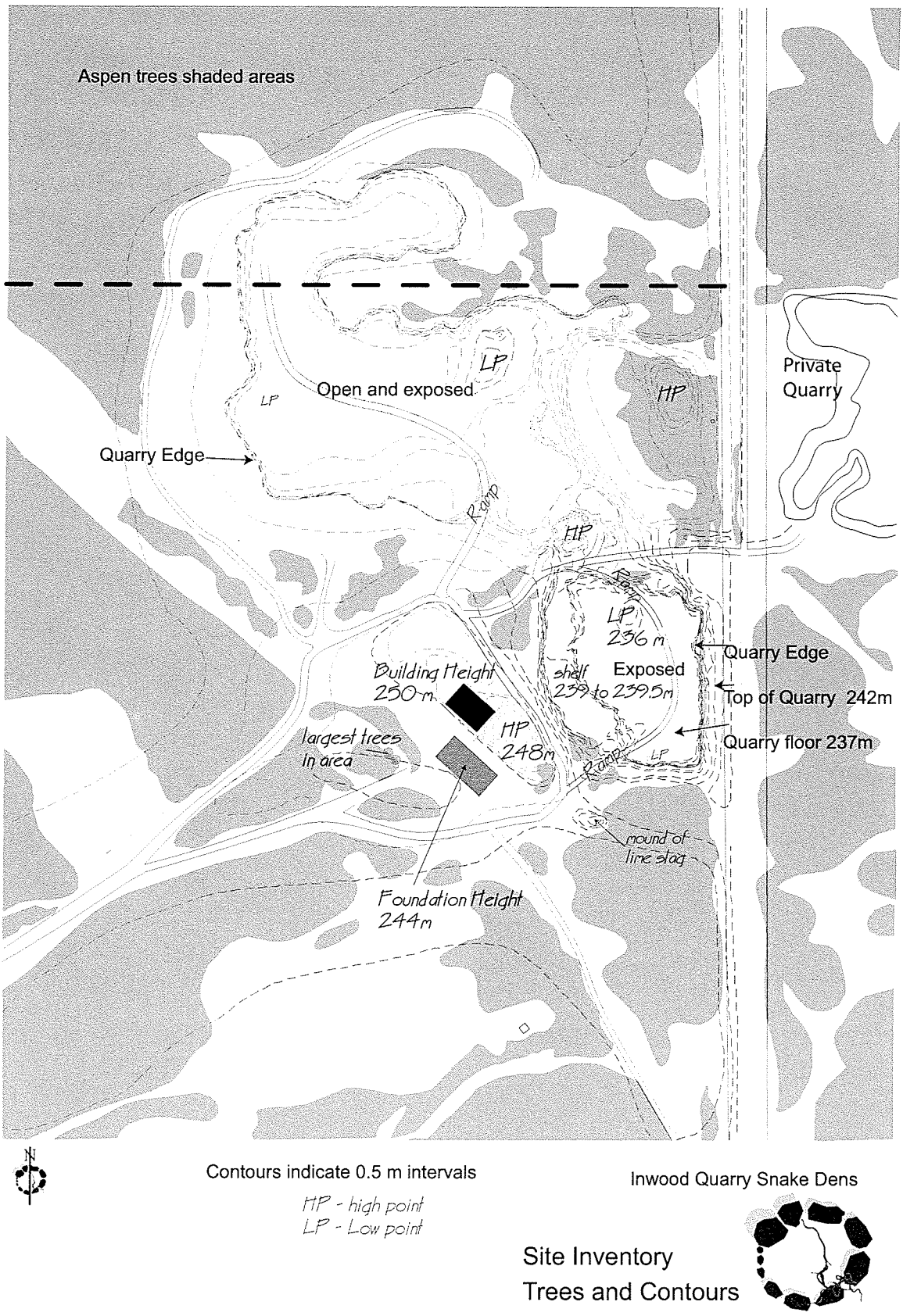


Figure 34. IQSD: Site Inventory - Trees and Contours

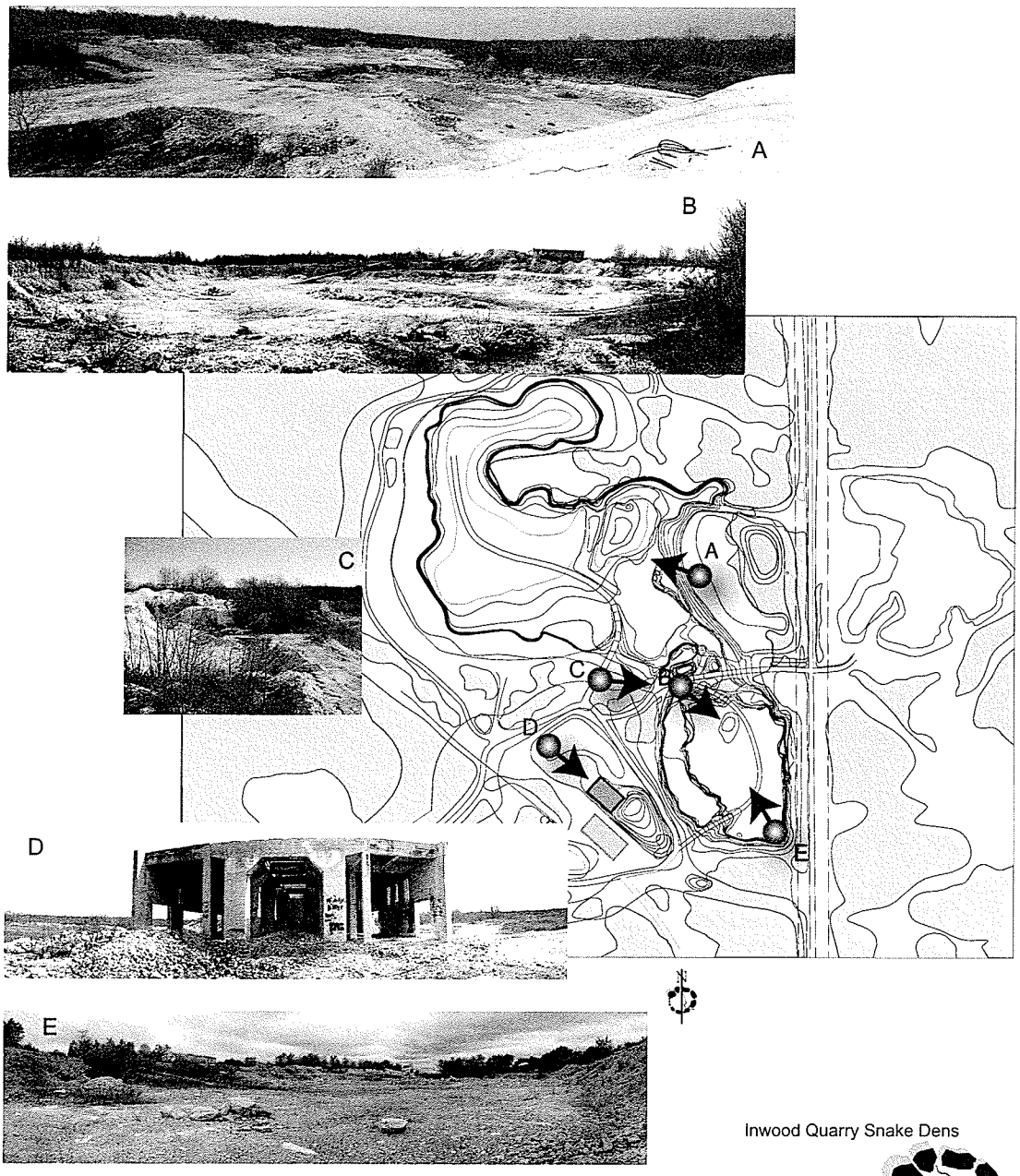


Figure 35. IQSD: Inventory Views

Spaces and senses

The quarry has a distinct austere aesthetic. The large pit opening expresses a sense of exposure and change, or possibly an escape, from the surrounding agricultural land. In the sheltered protection of the quarry pit, the sounds of snake to snake, and snake to vegetation contact are audible. The cooling wind and the heat sink properties of the stone pit also interact to create many microclimates and sensations of human comfort. The pit feels like a large expansive room, with walls and entrances. The building, as a ruin, draws attention and becomes a focal point. Overall, the site has an industrial neglected feeling while at the same time a sense of beauty occurs in the presence of the snakes.

Site functions

Currently scientists conducting research on the snakes denning in the area use this site. These den sites are also becoming popular for visitors who are learning about the site by Prime Meridian Trail volunteers and by word of mouth. The site is also used randomly for target shooting, removing limestone boulders, parties, and people riding off-road vehicles. Locals also use an intermittent pond as a swimming hole.

The popularity of visiting the snakes at the Inwood quarry is increasing. Increased visits to the exposed nature of the quarry will most likely threaten the safety of the snakes and interfere with the researchers on site.

The Mines Branch is also considering rehabilitating the decommissioned pits and has and may continue to regrade or' fill in' pits to remove 'unsafe' conditions of the steep quarry walls.

Figure 36. Attractions. The quarry has much to offer the visitor if the snakes and quarry ruins can be protected (Zonneveld, 2004)

Site Analysis

The site analysis for the Inwood quarry is depicted in Figure 37. The site has been evaluated according to the needs of ecotourism, wildlife viewing management (Manitoba Conservation), quarry rehabilitation and the needs of the identified three clients. The site has an abundance of snakes and opportunities to view them in the austere conditions of the quarry. The key advantages of this site include: close proximity to the town of Inwood, opportunities to walk to the site, therefore limiting the need for large parking facilities, the old kiln building has an interesting ambience and could be reused, the quarry itself is a space few people have a chance to visit, and the openness and stark conditions of the quarry transport the visitor into a new world and set the stage for telling the story of the snake and the serpent.

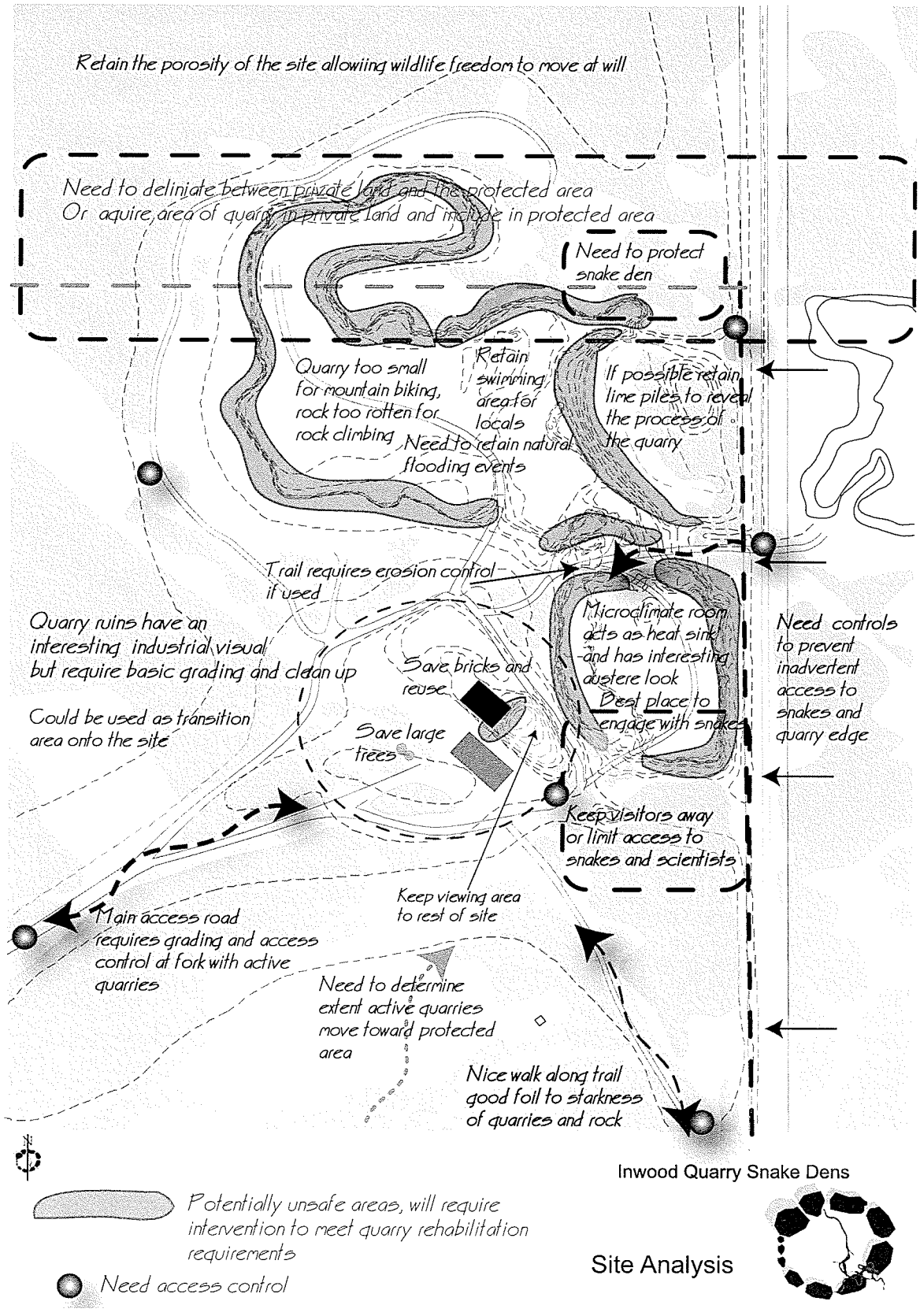


Figure 37 IQSD: Site Analysis

Chapter 11 Plan and Design Intentions & Design Process

This chapter will outline this practicum's design intentions and design process. The design intentions were established during the study's proposal stage and are listed below. The design process used in this project follows a traditional methodology as described by Booth (1983). This process will be described, explaining the journey building on a foundation of environmental and cultural needs (the background arenas of knowledge, the context and site conditions, and the three clients) and developing a snake ecotourism plan and site designs. This process includes the methodology and preliminary thoughts that were used in developing the final plan and site designs.

Intentions

In preparing this study a number of goals were established at the outset to direct process and establish limitations. The goals as found in this study's proposal were:

- To define ecotourism and identify principles that are applicable for Narcisse/Inwood area and post-industrial sites.
- To identify current and future ecotourism/conservation issues associated with the Red-sided garter snake den sites.
- To provide a participatory approach in the planning and design process
- To design a regional master plan and site plans for the Narcisse and Inwood Quarry sites as ecotourism destinations.
- To provide suggestions for interpretation material (signage, brochures)
- To provide guidelines for site management, maintenance and staffing needs

The aim of this project was to develop a master plan and site designs for snake ecotourism for the Narcisse-Inwood area of Manitoba. The concept of *ecotourism* was identified at the project's origin and has set parameters to the direction of this work. If *ecotourism* had not been selected as a driving force to this work, the process, the final designs and master plan would have been different. The underlying intentions of this work are being identified to reveal process transparency and identify any bias that influenced the decision making process.

The Master Plan and Site Designs have the following overall intentions:

1) Promote Ecotourism as a means for Sustainable Development

The concept of *ecotourism* has been used and continues to grow as a means of sustainable development in the many parts of the world. When considered as sustainable development, ecotourism must meet a number of criteria or components in order to be called *ecotourism.* The omission of considering these elements will most likely introduce unwanted issues related to authenticity, quality, and *ecotourism* definitions. The 7 essential components of ecotourism as identified by Wood (2002) are:

1) Contributes to conservation of biodiversity.
2) Sustains the well being of local people.
3) Includes an interpretation/learning experience.
4) Involves responsible action on the part of tourists and the tourism industry.
5) Is delivered primarily to small groups by small-scale business.
6) Requires lowest possible consumption of non-renewable resources.
7) Stresses local participation, ownership and business opportunities, particularly for rural people.

This specific concept of ecotourism is becoming more widely accepted. This acceptance recognizes this form of sustainable development provides for a unique experience with an underlying social ethic. The paying ecotourism consumer whose desire is to support sustainable development and receive a unique nature/cultural experience recognises this and understands the limitations and restrictions associated with this form of development. For people who do not understand the intricacies of ecotourism, this project may act as a model. Ecotourism is a growing alternative form of development to the traditional mass tourism concept.

2) Accepting the Context

The master plan and site designs must demonstrate the resource limitations that are available for developing snake ecotourism. The development form and scale are reflective of the community's resources (human and financial), environmental conditions, three clients and the development concept of ecotourism. It is considered inappropriate to plan and design a concept that is not affordable nor easily maintained by the community's resources. This project must also accept the parameters of seasonality, landscape character and regional limitations. The principles of ecotourism will also be reflected in the principles of low consumption, small scale and environmental responsibility. The local community needs to understand from the outset that ecotourism is not a panacea for the communities' problems and is only part of the solution to diversify the economy and

retaining youth in the community.

The plan and designs should also accept the expectations of current users to the Narcisse Snake Dens. Surveyed visitors expressed a desire to maintain the site as it is. This work will employ the Limits of Acceptable Change (LAC) approach to maintain existing positive experiences while adding improvements.

3) Promoting Human – Nature/Wild engagement

The snake dens provide an incredible opportunity for humans to engage with wild animals and natural systems. The plan and site designs need to allow for a range of opportunities to engage with the snakes. It is also understood that individuals visiting the sites have different attitudes and goals for engaging with the snakes. The plan and design will reflect this range of goals by providing a spectrum of engagement opportunities from virtual and traditional wildlife viewing to complete emersion. A spectrum of opportunities will be required where the two sites will act as one system to provide for snake ecotourism.

4) Exploring Fear as a natural human response

Planning for the interaction between humans and non-human animals often overlooks issues of emotional responses to these interactions. The emotion of *fear* has been identified as a biologically (innate propensity) learned behavior that needs to be addressed since the fear of snakes (and the more extreme ophidiophobia) is a common and often strong emotion found in all primates including humans. Design should express an understanding that visitors may experience fear and provide some means for them to cope with this natural response. Design and programming should also allow visitors to learn from each other and to confront their emotions that are fundamental in the learning process.

5) Maintain the authenticity of the postindustrial site

This project sees a need to maintain the authenticity of the postindustrial sites, both agricultural and quarry, as a means to express the site's narrative. The plan and design should reflect the sites' history, 'blemishes and all', to provide the visitor an additional layer to the story of how we view and use the land. It would be a disservice to the region's people and to the snakes to simply 'beautify' the sites by masking the industrial history by creating pastoral park-like settings. The beauty of the sites will have to develop in the visitor's mind through experiencing nature's rhythms, adaptability and spectacle. Beauty may be found in engaging with the snakes and developing an understanding of how different cultures

have expressed their beliefs and attitudes towards the snake and the serpent.

The quarry site provides opportunities to experience human artifacts and natural processes coexisting. The intent is to design the landscape, providing an experience similar to wreck diving, where visitors can engage with the naturally sublime all the while exposed to consequences of human manipulation and artifact. The landscape narrative is expressed as coexistence between culture and nature and possibly as a positive statement towards the future of our planet in spite of the consequences of a resource consuming past.

6) Provide opportunities to express cultural views toward snakes

The Inwood quarry site presents an opportunity to provide a space for public displays. As a modern ruin, a concrete shell of a former quick lime kiln provides an opportune space for displaying art, sculpture or other media and forms of expression. The intent is to provide a unique gathering space that works in conjunction with wildlife viewing and seasonal changes. The theme to display snake myths and beliefs from various cultures is an attempt to reflect our reality as a global village. These displays are also likely to attract visitors who share these beliefs and take pride in their culture. Without this cultural dimension, it is believed that some groups would not consider visiting a nature site. If various groups are involved in producing what is being displayed it is reasonable to believe that they would be more committed to visit the site. In addition to expressing various world cultures, the display area is also available to science, historical and environmental topics. Providing cultural elements adds another layer or dimension to the site and potentially increases the marketability of this experience.

7) Question our (human) roles and attitudes to non-human animals

Engaging with snakes brings to the forefront our culture's attitudes towards other animal species. The snakes are not endangered, nor are they rare or considered 'charismatic mega-fauna' (large attractive animals e.g., bears, lions) that are often associated with ecotourism and protected areas. A snake ecotourism program provides an opportunity to educate our culture of the nuances of ecotourism and a code of ethics towards living with other creatures. It is believed if we can promote developing experiences and emotional responses to a species like the snake, with all the 'cultural baggage' associated with this animal we may be making strides to understanding and respecting our natural and wild world. Our culture seems to forget the consequences of our consumer society while the gap between opportunities to engage with wild processes widens. A snake ecotourism program provides an opportunity to question our current cultural hegemony over other

species and towards our natural world. Incorporating environmental, cultural and ethical issues into the site's design and programming will also open up opportunities for funding especially from foundations that are concerned with the environment, learning and sustainability.

The Design Process

In this project a number of methodologies were used to design for a snake ecotourism master plan and site designs. This section will outline what was used and the key thoughts behind the decisions that were ultimately made. The design process of creating form and assigning function to the landscape started after identifying, compiling and understanding the background information, the sites and the clients.

Designer Understanding

Site Immersion

In addition to talking with locals, researchers, government representatives, and doing the background research, this work has developed understanding through site visits and personal observations. Multiple trips were made where the researcher spent the day observing snake behavior, snake movement, visitor behavior, researcher behavior and changes in the sites according to time of year, time of day and various weather conditions. Efforts were made to record conditions and observations with photographs and note taking. In addition to these solo observation trips, the researcher deliberately invited others to join him on his site visits. On six separate occasions other people, with various backgrounds and personal experiences, joined the researcher in visiting the snake dens. An effort was made to understand their observations and attitudes towards the sites, the snakes and ecotourism.

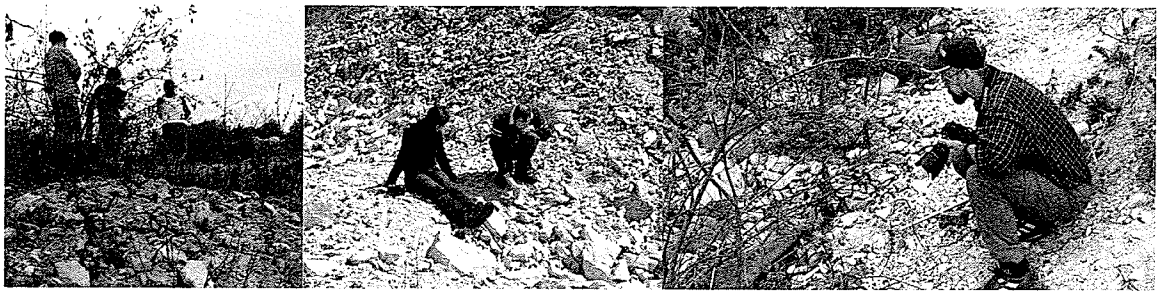


Figure 38. Site Immersion. Other's joined in the site visits and gave their views and perceptions of the snakes and ecotourism (Zonneveld, 2004)

Recording Thoughts: Function and Form

This research did not take a linear process where the design process progressed along a predetermined methodology. The design process was more exploratory and focused on how the site would be experienced. During site visits, background research, drafting the site conditions and at various other times, the designer recorded observations and thoughts how the sites may function and work. These ideas were then reconsidered, developed more or discarded during the next site visit, with conversations with the practicum committee, and while moving along the design process. Ideas were recorded in sketchbooks and a sketch plasticine model was developed to help understand the spatial relationships of forms in the Inwood quarry.

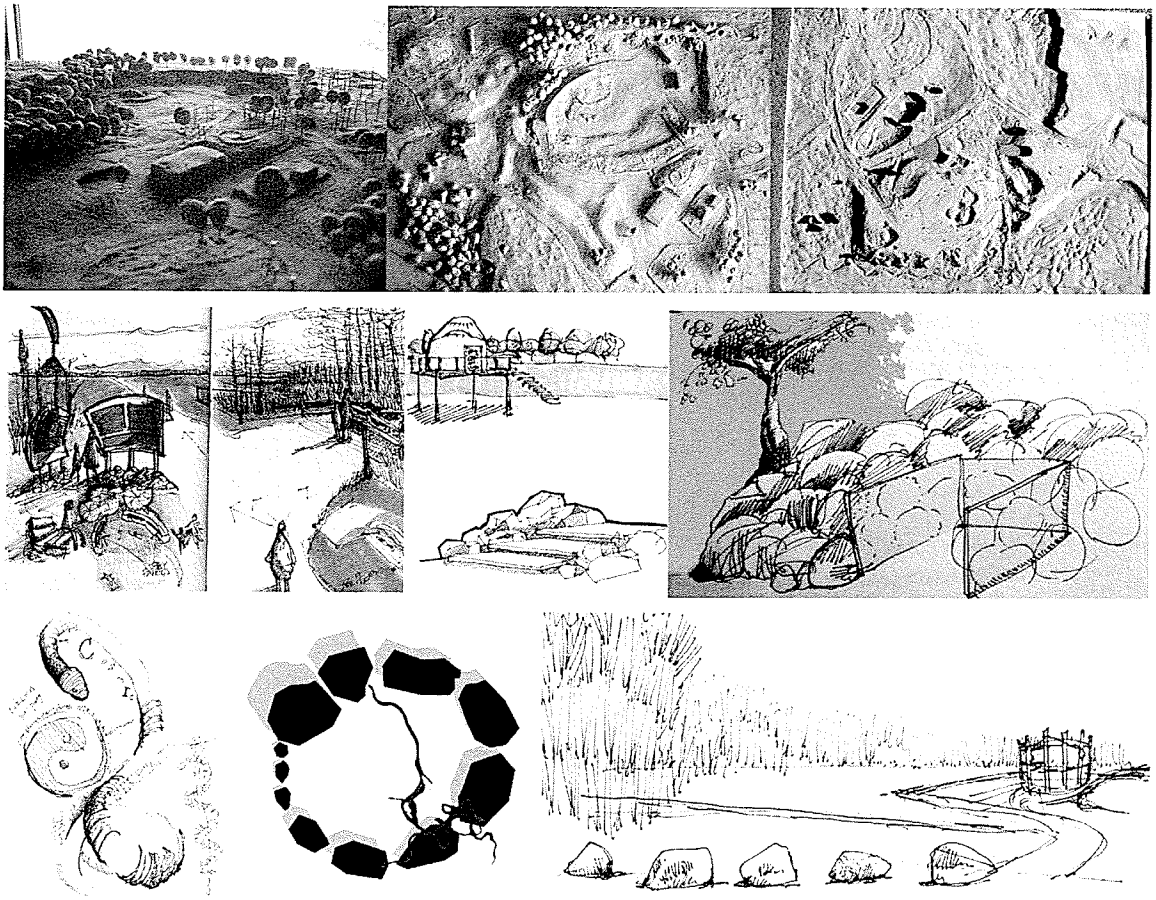


Figure 39. Model and Patper Sketches.
First row: Plastercine model of Inwood quarry in transition, Second row: Sketches of NSD site signage idea, yurt and step detail in the quarry, concept of viewing into rock piles, Third row: serpent myth and this project's Ouroboros icon. The Ouroboros icon: a stone snake swallowing it's own tail represents the rebirth and connection of all things. The stone snake aspect is a play on the stone serpent effigies found in eastern Manitoba and the traditional Ouroboros myth. The snakes between the rocks are on the move. Interpretation structure idea at the NSD.

Chapter 12 Snake Ecotourism Master Plan

This chapter has been written and is intended as a 'pull out' (from this document) master plan for snake ecotourism in the Narcisse-Inwood area of Manitoba. Because this chapter could be used on its own, some information has been repeated from previous chapters. Information was repeated to assist in explaining the plan and to be inclusive in the types of information required in the planning process. This is not a summary of the previous chapters but has been written as a result of understanding the information and issues identified in the background information, the three clients, site characteristics and design intention sections. Some information has also been described differently from previous chapters to better fit the writing style and needs of a planning document.

Snake Ecotourism Master Plan and Site Designs for the Narcisse-Inwood Area

Purpose of the Snake Ecotourism Master Plan (SEMP)

The Red-sided garter snakes (snakes) found in the Narcisse-Inwood area of the Interlake region of Manitoba have and continue to hold the attention and imagination of our culture. Thousands of visitors are drawn to view the wild snakes emerging from underground denning areas to mate and migrate to summer habitat, to later return in the fall. The snakes, especially at the Narcisse Snake Dens, are recognised by Manitoba Conservation as an important natural heritage feature providing opportunities for education and recreation, and worthy of protection.

The purpose of the SEMP as an ecotourism master plan is to lead the community, government, and visitors in the development of ecotourism specifically related to the snakes in this region. The SEMP recognises the priority of ecological integrity and sustaining site resources and the surrounding region in a way that integrates ecological, social and economic values.

Management Planning Process

Development of the SEMP was initiated by the local community and government representatives and has included significant participation by stake holders and individuals with an interest in the future of the snakes in the Narcisse-Inwood region.

Consultation was conducted in various ways during the development of the plan. Meetings with government representatives from Manitoba Conservation and Mines branch have been conducted as well discussions and information-sharing workshops with local people and interest groups. The SEMP was written as a component of a practicum/thesis project and is intended as preliminary guidelines. This plan is intended to initiate snake ecotourism and should evolve and change as decisions are made and new information/ interest becomes apparent.

Cooperative Management

Currently the Manitoba Conservation plans, manages and maintains the Narcisse Snake Dens. To better manage the snakes as ecotourism a mechanism of shared or cooperative management is desired. A cooperative agreement between Manitoba Conservation and a community board is required to establish clear roles, responsibilities and procedures for managing the two snake denning sites. Manitoba Conservation will continue to act as

landowner, principle ecological advisor and assist with basic funding and administration assistance. A voluntary non-profit community board, with paid staff will manage the daily operations and maintenance of the sites and programs. The intent of this partnership is to work with the strengths individuals bring to the table and provide employment for community members. The arrangement and details of the cooperative management agreement and snake ecotourism board have not been developed and will be priorities in the next phase of managing for snake ecotourism.

Scope and Limitations

Planning Area

The SEMP is intended for a study area consisting of two separate sites containing snake denning areas: The Narcisse Snake Dens and the Inwood Quarry site. The Narcisse Snake Dens is defined by existing boundaries of the Narcisse Wildlife Management Area within the Narcisse Community Pasture in the western half of section 22, township 20, range 1, west of the Prime Meridian. The Inwood quarry site is defined by the area of land (four pits) removed from quarry operations on crown land known as the Inwood quarry. Two pits in this location are still in operation. The Inwood quarry is found in legal subdivision 6, southwest quarter of section 11, township 18, range 1, West of the Prime Meridian, approximately 2 kilometres north of the town of Inwood.

The study area, however, will also include areas that are necessary for sustaining tourism and ecological needs such as the land required to access the two sites (roads and trails), and the probable home range (approximately 20 km radius) of the snakes using the two sites.

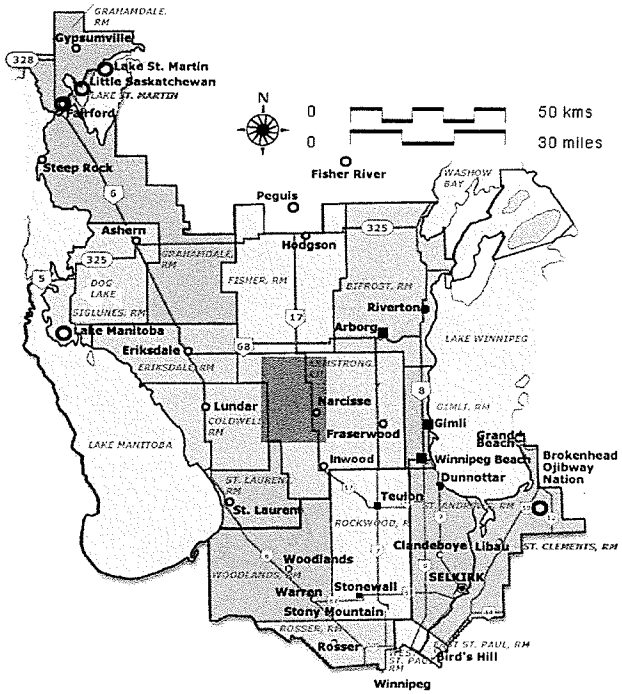


Figure 40. The Narcisse-Inwood Area. The darker rectangle in the middle of this graphic represents the approximate location of the area covered by this plan.

Vision

The Narcisse-Inwood area will be a leading snake ecotourism destination with the community, government, industry and visitors working in partnership to provide unique experiences and environmental sustainability.

Objectives

The Snake Ecotourism Plan will lead best practices in Manitoba, Canada and the world by*:

- Protecting for all time a representative natural system of international significance, composed of the snake denning sites and critical snake habitat;
- Offering visitors unique and exciting *ecotourism* experiences that foster an appreciation and understanding of natural and cultural heritage. Ecotourism is defined by seven principles:
    - Contributes to conservation of biodiversity.
    - Sustains the well being of local people.
    - Includes an interpretation/learning experience.
    - Involves responsible action on the part of tourists and the tourism industry.

    - Is delivered primarily to small groups by small-scale business.
    - Requires lowest possible consumption of non-renewable resources.
    - Stresses local participation, ownership and business opportunities, particularly for rural people;
- Recognising and protecting current recreational/research use of the Narcisse Snake Dens and introducing other ecotourism opportunities in the Inwood quarry site
- Making positive contributions to local communities (other than monetary values)
- Contributing to the conservation of the natural and cultural environments through the establishment of partnerships between government, industry and the community;
- Being a model for other forms of tourism, encouraging wider use of sustainable technologies and the promotion of ecotourism principles; and,
- Assisting in realising the tourism potential of Manitoba's regional areas through sustainable economic development

* The wording of some of these objectives have been adopted from Tourism Queensland 2002, *Queensland Ecotourism Plan 2003-2008*, State of Queensland, downloaded from: www.tq.com.au/ecotourism.

Protecting Ecological Integrity

Manitoba's Protected Areas Initiative (PAI) stresses the importance of protecting representative areas of each natural region in Manitoba creating a network of diverse landscapes. This plan proposes a further development to this protection system by recommending the inclusion of post-industrial (agricultural and quarry pits) sites to the protected area initiative. This occurs in practice since the existing PAI system recognises the Narcisse Snake Dens as a wildlife management area even though it is a post-agricultural site. The intent is to protect the land base that sustains the integrity of an ecological system, specifically the snake's life cycle.

The snake ecotourism sites will be managed to protect the ecological integrity as well as the integration of people into the environment that sustains the quality of life for humans and non-human species. The SEMP is not a wildlife management plan. A separate wildlife plan is required to understand, manage and monitor for ecological health, environmental stressors, regional landscape ecology, and biodiversity.

Protecting Cultural Integrity

In addition to the intent to sustain ecological integrity, this plan also seeks to express the cultural attitudes towards snakes and to the natural environment in general. The two denning sites are not pristine wilderness areas but have been shaped by cultural values and resource extraction.

This plan advocates exposing cultural views and use of nature as natural resource. The intent is not to advocate a certain point of view, but to express these beliefs as an origin for understanding various ethics, attitudes and beliefs.

The quarry location is a unique landscape that is often unavailable for everyday exploration. The quarry site will be developed to express the landscape narrative as natural resource, grade changes in the pit, modern ruins, and recycled material as artifacts of consuming nature.

Visitor Activities and Research Management

A key objective of managing the snake den sites is to provide Manitobans, and others from the rest of Canada and the world, opportunities to appreciate and understand unique natural processes and the human-animal relationship we have with snakes. The sites will be developed with amenities to support the following audiences:

- Local community members in the Narcisse-Inwood area;
- Site visitors;
- Manitoba residents;
- School groups;
- The public, in Canada and abroad;
- Researchers; and
- Commercial tourism operators.

Recreational activities considered appropriate at the denning sites include:

- Wildlife viewing ranging from viewing platforms to immersion;
- Interpretive programs;
- Walking/hiking;
- Photography/sketching and other forms of art expression;
- Handling snakes, one at a time.

Recreational activities considered inappropriate at the denning sites include:

- Bicycling, all-terrain vehicles and other mechanical means of conveyance;
- Consumption of nature as resources, including collecting, disturbing and removing natural/cultural objects from the sites;
- Disturbing mating snakes and harming the snakes in any way.

Commercial activities will include:

- Permits for still photograph, film and video projects;
- Outside tour operators providing programs (guided by an established visitor code of ethics).

Interpretation is an important ecotourism component that will provide, within the snake denning sites, public education and recreational experiences for visitors. Outreach programs, taking place outside of the denning sites and on the internet, will also be developed as a marketing tool and to develop the management and programming of snake ecotourism as a year round enterprise. Unique stories about snakes and the denning sites, and adopted in the interpretive material includes:

- The snake-human relationship (including issues of fear and fascination) expressed in story, myth, legend, and, science;
- The Red-sided garter snake story: communal dens, mating balls, she-males, pheromones, thermal gradients, migration and summer habitat;
- The human relationship with nature and resource consumption;
- The dynamic nature of landscape form
- Quarry functions and rehabilitation

Visitor services and Facilities

Visitor services and facilities will be designed, managed and maintained to reflect the meaning and principles of ecotourism and sustainability. The two sites will be managed for a range of leisure experiences. The character of the sites will be developed as a dialogue between natural systems and cultural interpretations of the human role within nature. There will not be an attempt to 'reconstruct' or express the sites as 'wilderness'. There will also not be an attempt to 'beautify' the sites with gardens and park like settings. Important for ecotourism, beauty will be expressed from the experience of engaging with the snakes, provoking feelings and emotions and with the expression of these human reactions in art forms and cultural displays found in the interpretive area.

Facilities and programs will be designed and implemented according to principles of

sustainability and awareness to the consequences of resource consumption. A conscious effort will be given to consider material lifecycles, recycling, energy efficiency, and impacts on water, air, soil, and the existing ecosystem. Program and facility development will be regulated giving priority to natural systems such as seasonal change, snake habitat needs including migration routes, natural changes in species composition, and flooding. To prevent over development the concept of Limits of Acceptable Change will be used.

The Narcisse Snake Dens

The Narcisse Snake Dens will maintain traditional use of self guided trails with interpretation support from seasonal interpreters and signage. A new interpretive orientation area, trailhead sign and new signage at the den sites will be introduced. A proposed Narcisse Snake Dens interpretive package by Sherry Dangerfield, has been developed. The natural environment will be protected and human comforts provided by:

- Parking for private vehicles and buses;
- On site toilets at the staging area and on trail;
- Continued use of fences and viewing platforms around the den sites;
- Looped trails, including one loop that is surfaced allowing wheel chairs and stroller access;
- Continued use of picnic tables and water pump;
- Introducing a new interpretive orientation signage, trailhead sign, and picnic shelter;
- Introducing refuge devices to allow snake escapes from over zealous children.

The freedom to move at will within the confines of the trails and den site fences will be sustained at the Narcisse Snake Den site. To exercise the concept of providing for the local community and placing an economic value on natural heritage a donation concept will be introduced.

Inwood Quarry Site

The unique landscape and modern ruins at the Inwood quarry provides an opportunity to express a different landscape narrative at this site. The exposed nature of the quarry and ongoing research projects requires this site to be regulated through guided tours. Interpreter guides will lead small groups (no more than 10 to 12 at a time) of visitors to the site. The natural environment will be protected and human comforts provided by:

- Site access through the Prime Meridian trail from the town site of Inwood. This requires a 2 km walk/bicycle to the quarry site. During travel to the quarry site, the

interpreter guide will introduce the need to change our pace and set the context of snakes/culture in the landscape, provide information, discuss issues of fear and phobias and answer questions;

- Other Prime Meridian trail (PMT) users will be discouraged entry to the quarry by means of fencing, stone walls, small berms and using vegetation as barriers and information from the PMT office and staff on site;
- Site access by the existing road for people with mobility or other issues. The site will promote universal access in a controlled way. The shared use of the access road with quarry operations requires cooperation and controlled public use to the den sites;
- The above mentioned access road is controlled near PTH 17 and can be opened for access for maintenance and for other uses of the quarry;
- Zoning of the site to allow uncontrolled access in certain areas, and restrictive use in environmentally sensitive locations;
- Facilities will be limited to a composting toilet and a barrier system (stone wall and fencing) to control access on to the quarry site;
- Other facilities, such as retail, library, and information will be provided off site to encourage a focused environmental/culture on-site experience. A future on-site herpetological centre, as suggested in other research (Nuttall *et al.*, 2002) may be considered appropriate to encourage continued snake research;
- The old kiln building, a modern ruin, will be used as a display area for various forms of expression and information. The area surrounding the ruin will provide open space and opportunities for events and outdoor displays;
- Allowing community use of the quarry area outside of the denning areas. Appropriate other activities will include a swimming area during natural flooding, and a hiking trail around the north pit. Areas zoned for multiple use will be available during the winter and other times when the snakes are not in the area. The snakes and their environmental needs will take priority if development or scheduling conflicts arise.

Research

Researchers have been visiting the Narcisse-Inwood area for decades attracted to the abundance, and known location of guaranteed subjects (snakes) for herpetological study. It is important to continue the relationships with researchers as a means to contribute to better understanding of our natural world. The supporting snake research will best be served by:

- Providing visitors opportunities to view research, while limiting potential interference and distractions associated with visitor questions and curiosity;
- Developing information sharing relationships so information is available for managing the snakes, being able to answer visitor questions, and becoming the local experts which could benefit additional and long term research;
- Educating visitors about snakes, research and the scientific process;
- Assisting projects to use the least intrusive methods and consider the quality of life for the snakes being studied.

Implementation Priorities

Initial priorities for implementation of the SEMP will include:

- Designation of the Ecotourism sites as protected areas to prevent negative impacts from resource development and indiscriminate public access;
- All Ecotourism developments, as well as surrounding regional development, are appropriately reviewed for potential impacts on the three clients: locals, visitors and snakes. For the snakes, it is important to review areas outside of the den sites, such as the summer habitat and migration routes to maintain the integrity of this ecological system;
- Encourage public participation and involvement in the development of ecotourism;
- Encourage supporting entrepreneurial projects (accommodation, transportation, tour operators, other destinations) to develop with concepts of sustainability;
- Address issues of risk management and public liability as they relate to ecotourism;
- Developing the partnerships between the community, government, and visitors (recreational and research oriented).

Key Elements

Ecotourism is dependent on the natural environment

Successful ecotourism projects should consider the needs and requirements of the natural environment. For snake ecotourism, success will be measured according to the sustainability of the ecological systems associated with the snakes. The snakes are being considered as one of the three clients associated with ecotourism development. The other two clients are the local community and visitors.

The gathering of snakes at the den areas is of exceptional quality and uniqueness. Although the denning areas have been disturbed by agriculture and the quarry industry, the sites provide visitors unique opportunities to experience extraordinary natural processes and to engage with nature, snakes in particular, which have had a strong impact on our cultures. The non-wilderness setting of the protected areas provide opportunities to explore nature-culture relationships and reduces probable negative impacts of providing similar experiences in a wilderness setting.

Ecotourism is a viable option for sustainable development

The Narcisse-Inwood area of the Interlake region has the opportunity to develop natural features into ecotourism sites and demonstrate sustainable development as environmental, social and economic benefits. The proposed sites are currently crown land managed by Manitoba Conservation. The sites are found within working landscapes and will not cause any further impacts such as fragmentation or access into pristine wilderness. The nature of ecotourism allows for strategic and incremental planning and development. The land base has few other options for economic development at this time.

Partnerships are created for Optimal Development

Developing sustainable ecotourism requires an understanding of ecology, business, tourism, planning and the consequences of any intervention or program. The best-case sustainability scenario, drawing upon required expertise, is to develop a partnership between the community, managing government agencies and the ecotourism industry. A dialogue between this partnership and visitors is also required.

Ecotourism Defined

The term *ecotourism* plays an extremely important role in setting parameters to how the landscape and programs are designed and managed. Although there are a number of definitions in use today describing ecotourism as: nature based, ecologically sustainable, contributes to conservation and local communities, and involves education and interpretation of the natural environment, this master plan defines ecotourism using the seven principles identified by the IUCN (Woods 2002) where ecotourism:

- Contributes to conservation of biodiversity;
- Sustains the well being of local people;
- Includes an interpretation/learning experience;
- Involves responsible action on the part of tourists and the tourism industry;

- Is delivered primarily to small groups by small-scale business;
- Requires lowest possible consumption of non-renewable resources;
- Stresses local participation, ownership and business opportunities particularly for rural people.

These seven principles establish a foundation that ultimately guides ecotourism development in terms of how sites are designed, built, maintained and managed.

The Current Situation

Manitoba Conservation currently manages the Narcisse Snake Dens as a nature-based attraction. The site has been managed with traditional wildlife-viewing infrastructure such as viewing platforms, interpretive signs and trail system, and basic amenities such as picnic tables, park benches and washrooms. A basic interpretive program is also operated on site to provide information and 'policing' to visitors, especially school groups from the surrounding region. Although the local community has been involved in some aspects of site planning such as the snake migration tunnels the government has sole decision-making authority. The local community has been involved with interpretation of the den sites as seasonal interpreters with Manitoba Conservation or as guides from Oak Hammock Marsh. Using the definition of ecotourism provided earlier it is questionable if what is presently occurring at the Narcisse Snake Dens is truly ecotourism.

The Inwood quarry, a decommissioned, non-rehabilitated limestone quarry, has not been developed for ecotourism but is currently used by international scientists and a growing number of visitors looking for recreational experiences. Uncontrolled use by visitors put the snakes as potential risk and interrupts the research that is taking place. The quarry site is also being pressured by the Manitoba Mines branch to be rehabilitated. Traditional rehabilitation may change the physical character of the site removing some opportunities for tourism and the snakes.

The Market

Ecotourism is a growing and becoming an increasingly mainstream form of nature-based tourism. Research has identified the ecotourism experience includes a broad range of activities including: viewing wildlife and scenery; visiting historical and protected areas; hiking, bicycling, and canoe/kayaking. Ecotourists have been classified as people: with relatively higher levels of education; above –average income level, aged between 30- 59

years old, and, women slightly outnumbering men (Eagles *et al.*, 2002). As mentioned, the principles of ecotourism are becoming more mainstream therefore participation is becoming broader than the average ecotourist described above.

An IUCN publication on tourism in protected areas (Eagles *et al.*, 2002) identifies a growing number of people are interested in sustainable tourism and ecotourism. This report identifies the following changing factors are increasing the number of people interested in ecotourism and visiting protected areas:

- Rising educational level and demand for travel;
- Aging population;
- Changing roles of women and interest in physically challenging activities and appreciate activities;
- Changes in available leisure time- more frequent, shorter vacations, and trips closer to home;
- Importance of service quality –expect guides to be knowledgeable and good communicators, want to feel welcome, comfortable, a part of the communities they visit; and are willing to pay for the desired quality.
- Changes in global communications and information technology- the internet allows easy and fast access to huge volumes of information on ecotourism, protected areas and travel options
- Growing concern for social and environmental problems

Ecotourists are believed to make informed decisions to purchase responsible tourism products. They are willing to make contributions to the conservation of natural and cultural environments, are willing to adhere to visitor codes of practice, and support ecotourism as a means of promoting the principles of ecologically sustainable development and the sustainable use and development of natural areas (Tourism Queensland, 2002).

Current snake visitors to the Narcisse Snake Dens may not be considered ecotourists but nature-based visitors with goals to view wildlife. Any new development should not remove this traditional user from the site but add to the quality of their experience. The current wildlife viewing experience at this site is an appropriate activity and may continue.

Shared Responsibility

For ecotourism to be successful there requires a shared responsibility for the development and management of the snake denning sites. Manitoba Conservation alone cannot provide the needs for community development and a range of ecological and cultural experiences. People from surrounding communities will be willing to work along with Manitoba Conservation and the Mines Branch to set priorities, manage resources and provide a quality visitor experience.

The Plan

The SEMP works by maintaining existing snake experiences at the Narcisse Snake Dens, along with some new additions, and with the development of new, different opportunities at the Inwood Quarry. This section will describe in more detail how each site works in relation to visitor experience and site design. Issues of circulation, narrative, visual character, and materiality will be discussed.

The Narcisse Snake Dens (NSD) Site

The Narcisse Snake Dens (NSD) have stirred the emotions and imagination of children (of all ages) for decades. A 2002 Manitoba Conservation survey, testing for visitor opinions regarding the NSD, found most people prefer the current level of development with minor adjustments. This plan recognises the positive values of the current level of development at the NSD, with limited facilities and visitor freedom to move about the site, and any new development should consider the current programming.

Maintaining existing facilities and experiences

To maintain the desirable experiences found at the NSD, as expressed by current users, much of the facilities will be kept the same. Maintaining the *existing experiences* includes maintaining the following infrastructure: access into the site, the main entry sign, the size of the parking lot, space for picnic tables, three pit toilets, hand water pump, the trail layout, wooden viewing platforms, fencing at the den sites, and benches found along the trails. These facilities will be maintained because they continue to function at an appropriate level, provide acceptable levels of service for current users and fits within the landscape context and concepts of ecotourism. It may be appropriate to introduce more current methods of human waste management, such as the use of composting toilets, however the toilet facilities are relatively new and replacement at this time would waste the energy and resources used for constructing these facilities. New technology should be used when the toilet facilities are ready for replacement. Figures 38 and 39 indicates what site changes are being proposed.

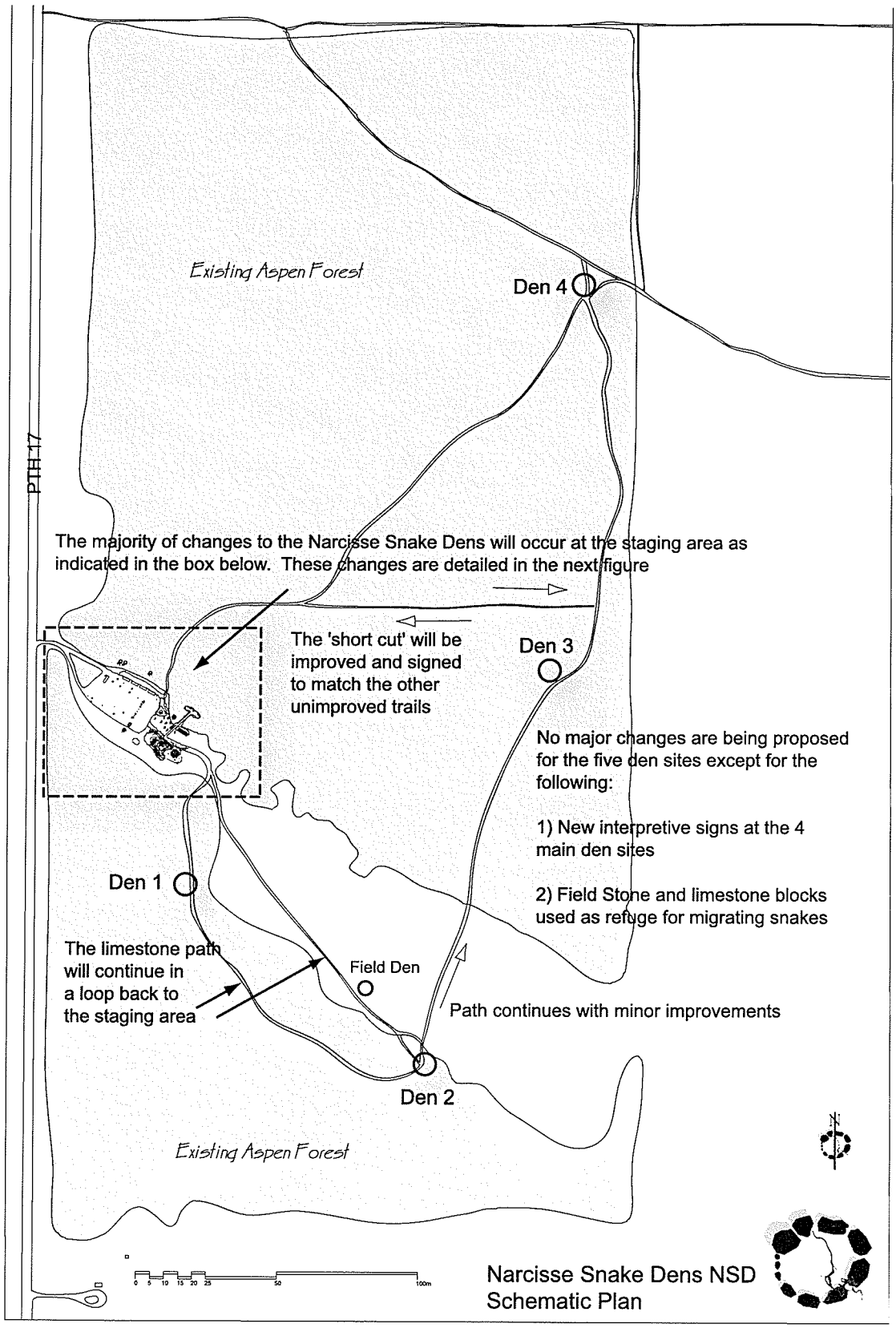


Figure 41. Proposed Changes to the Narcisse Snake Dens

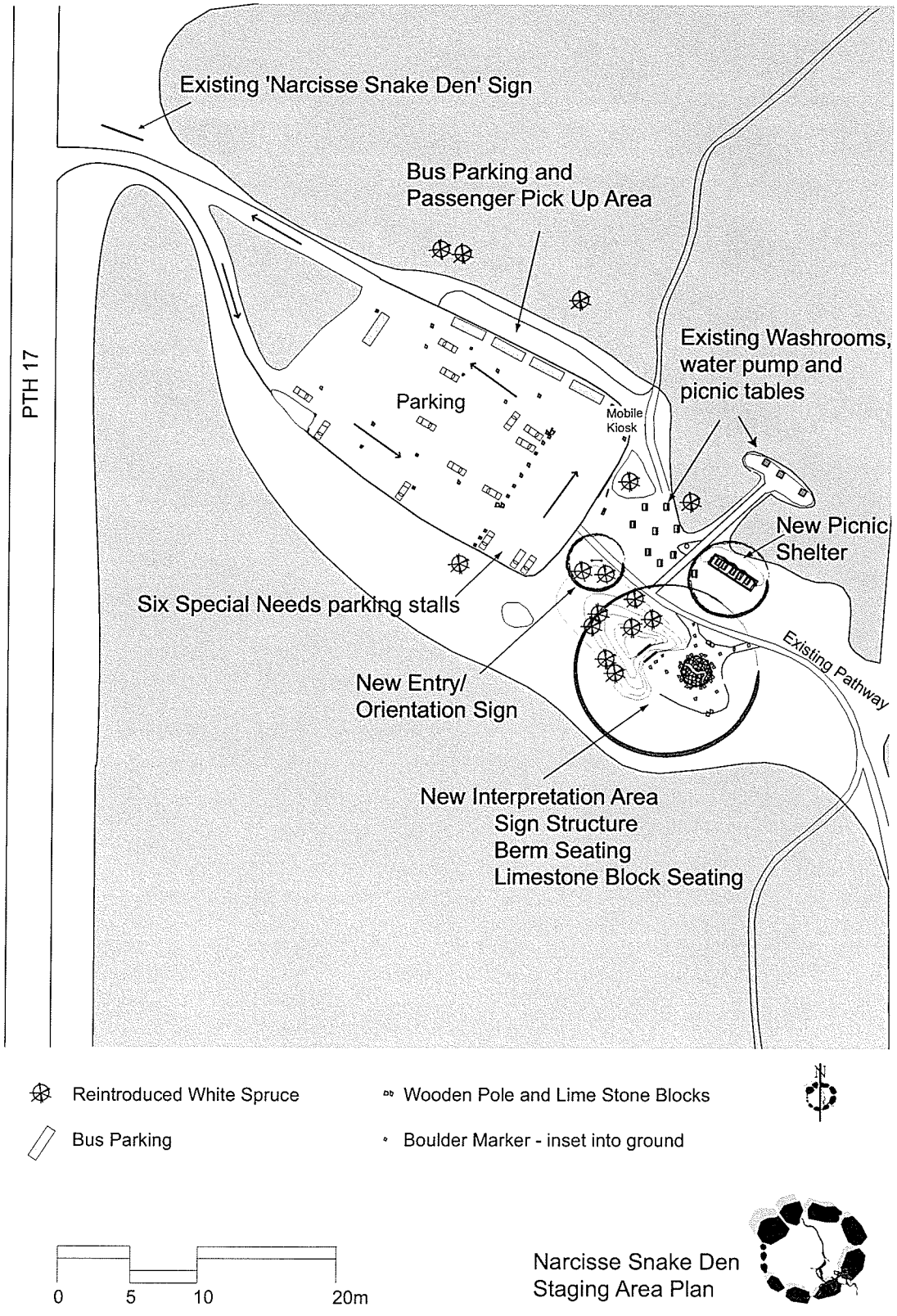


Figure 42. Proposed Changes to the Narcisse Snake Dens

Proposed Changes

1. Parking Organization

The size and circulation design of the parking lot are currently appropriate for experiencing the NSD. To develop the parking to accommodate more vehicles or introduce new surface materials, such as asphalt, is introducing a different visitor experience. More parking would allow more people at one time using the facilities and would most likely result in new perceptions of crowding and a less intimate human/nature experience. The parking area does however require new signage to promote the one-way direction of vehicle circulation and the proposed areas designated for passenger drop off, kiosk location, special needs parking and bus parking. In addition to helpful signage, it is being proposed to use fieldstone, buried three quarters into the ground, as markers identifying traffic lanes and parking areas. Fieldstone would be selected that is visible and easily driven over by most vehicles without damage to the vehicle. An additional use of wooden poles and limestone blocks to indicate the boundary between parking and kiosk/ bus turning area is also being proposed. The natural wooden poles, resembling large fence posts is a recurring theme proposed for the NSD and will provide landmarks as new vertical elements in the otherwise nondescript parking area. The limestone blocks, also repeated elsewhere on site, provide form and reference hidden materials underground. The bus parking area will also be developed with a pathway connecting to the rest of the site promoting safe access away from vehicle traffic.

2. Entry/Orientation Sign

Manitoba Conservation requested a new orientation sign since the wooden structure, currently in use, was in need of repair or replacement. The proposed sign structure is based on a new theme created for the SEMP. The idea is to develop recurring design elements that give a sense of the region, something that visitors will remember as representative of visiting the snakes in the Interlake. The theme that has been developed has been built upon the regional use of wire fencing that uses wooden posts to delineate land ownership and act as a barrier, primarily to prevent movement by large mammals including humans. Wire fences are commonplace and often taken for granted as an element we expect to see in the landscape. These fences are cultural symbols of claiming portions of the landscape and establishing boundaries and barriers to movement. Ironically the standard wire fences mostly prevent human and domestic animal access and do little to impede wild animal movement patterns such as the migration routes of garter snakes. The sign structure uses the basic materials and form of the common

wire fence. Two poles, approximately the size (diameter) of telephone poles or less, are set into the ground approximately three meters apart. The poles are approximately 3.6 meters long, with 1/3 of the pole underground and 2.4 meters exposed above ground. Steel cable (approximately 3 cm in diameter) is stretched between the poles and attached with steel anchors. The number of strands will depend upon the weight of the sign that will be attached to the cables. Approximately 3 or 4 cables will be used for this sign structure. The sign will not extend the length of the distance between the poles but will appear to float between the poles with space on either side of the sign. The dimensions of the sign will be approximately 1.35 m tall and 1.8 m wide. The content of the sign should include: identification of the site (name, managing organization) a base orientation map indicating site facilities and trails, scale bar, a description of what to expect at this site, and basic guidelines and visitor rules (a code of visitor ethics). Fieldstones will be piled and placed at the back of the base of the poles to make it difficult to walk behind the sign structure thereby preventing possibly damage to the structure.

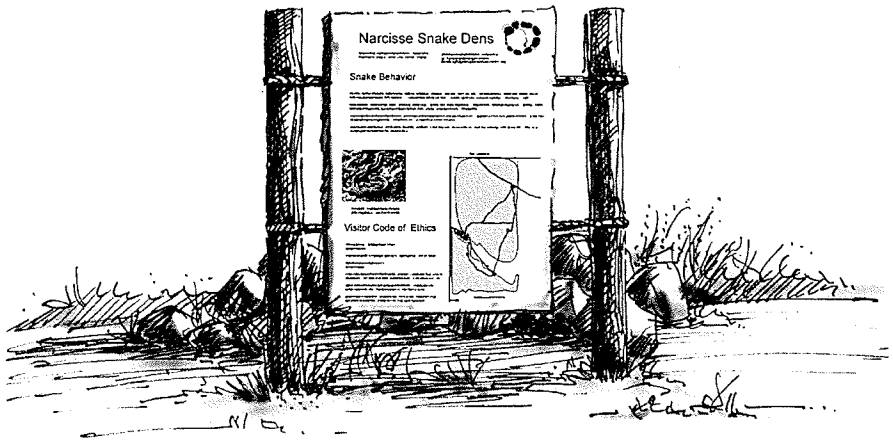
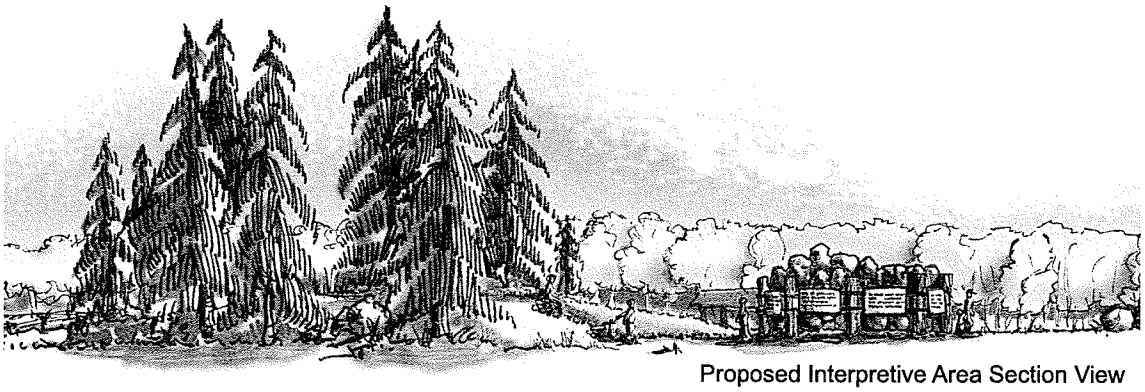


Figure 43. Sketch of Proposed Sign Structure

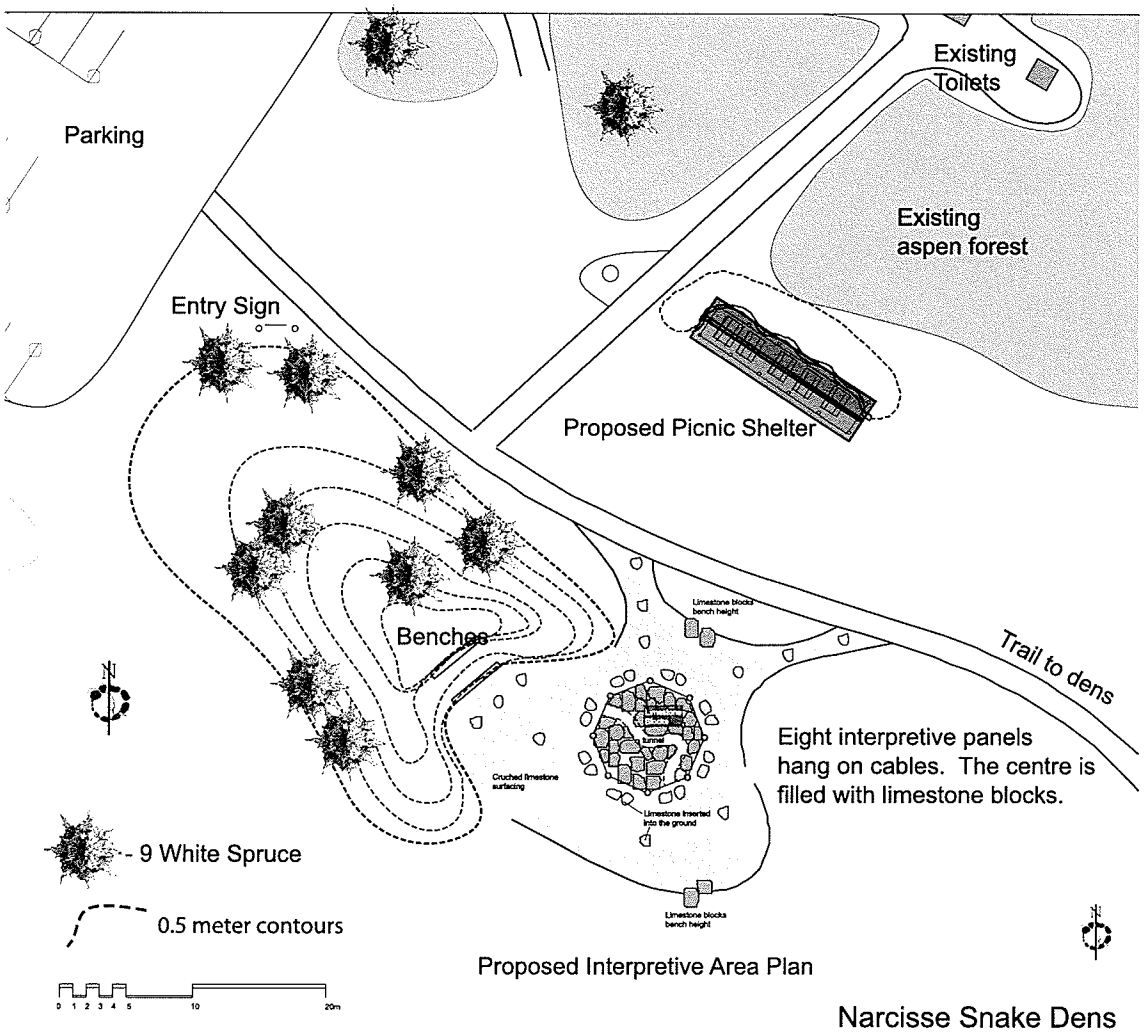
3. Interpretation Area

After entering the site from the parking area and seeing the orientation sign, the visitor has the option to use the picnic/toilet area to his/her left or continue down the main trail to the interpretation area. This area is somewhat hidden behind a berm and planted with White Spruce to provide shelter from the cooling north and northwest winds. The structure is a continuation of the wire fence concept with eight 3-meter poles and cable creating an octagon. This provides space for eight panels for interpretation material. A consultant, hired by Manitoba Conservation has developed the interpretive material that will be used on the interpretation structure. In the centre of the octagon large limestone

blocks have been assembled to give a sense of what it may be like for the snakes denning in the caves and fissures found in the limestone Karst formations. A tunnel through the limestone rubble has been planned and is accessible (if desired) where visitors can crawl through the structure and mimic the experiences of the snakes moving underground. As mentioned the berm area provides shelter from the wind, but also acts as a heat sink since it faces south. The berm has also been designed to act as a small amphitheatre with wooden seating set into the slope with limestone retaining walls holding back the slope under the seating. The ground surface around the interpretive area has been modified to withstand the physical impact of thousands of feet. Along with a crushed limestone/ earth mixture covering the ground surface, flat limestone slabs will be inserted into the ground to indicate circulation patterns and harden the surface in front of each of the display panels. The intent is not to create an elaborate pattern on the ground plane but to indicate limestone is under foot and add some site hardening to the potentially well-used site.



Proposed Interpretive Area Section View



Proposed Interpretive Area Plan

Narcisse Snake Dens
Interpretive Area

The interpretive area consists of a display structure and a small sitting area on the side of a new hill. The stucture is made of timbers and cable and filled with large limestone blocks. The blocks are arranged forming a tunnel weaving thru the center of the pile. Eight panels are attached to the cables supported by the wooden posts. The hill is sloped so people can stand or sit on the grassed area or on the two small wooden benches built into the hill.

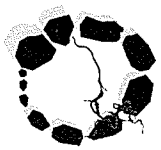
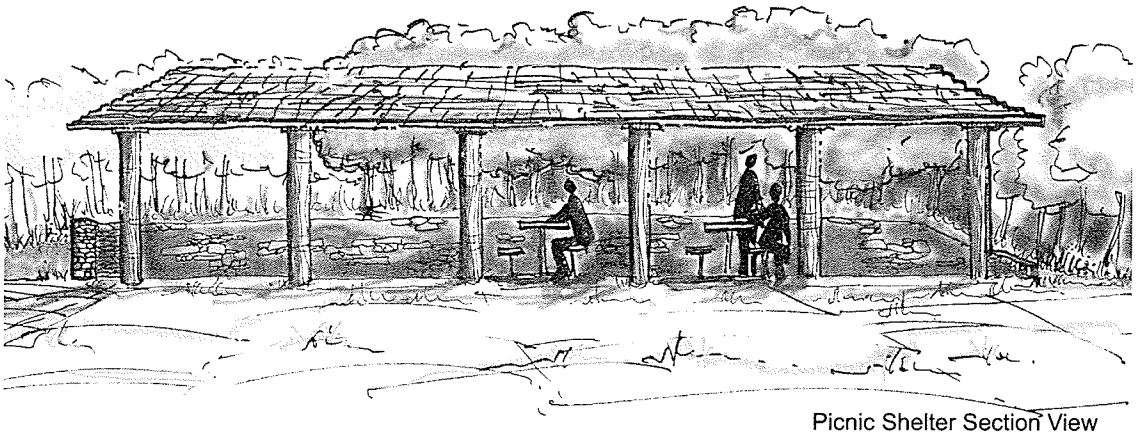


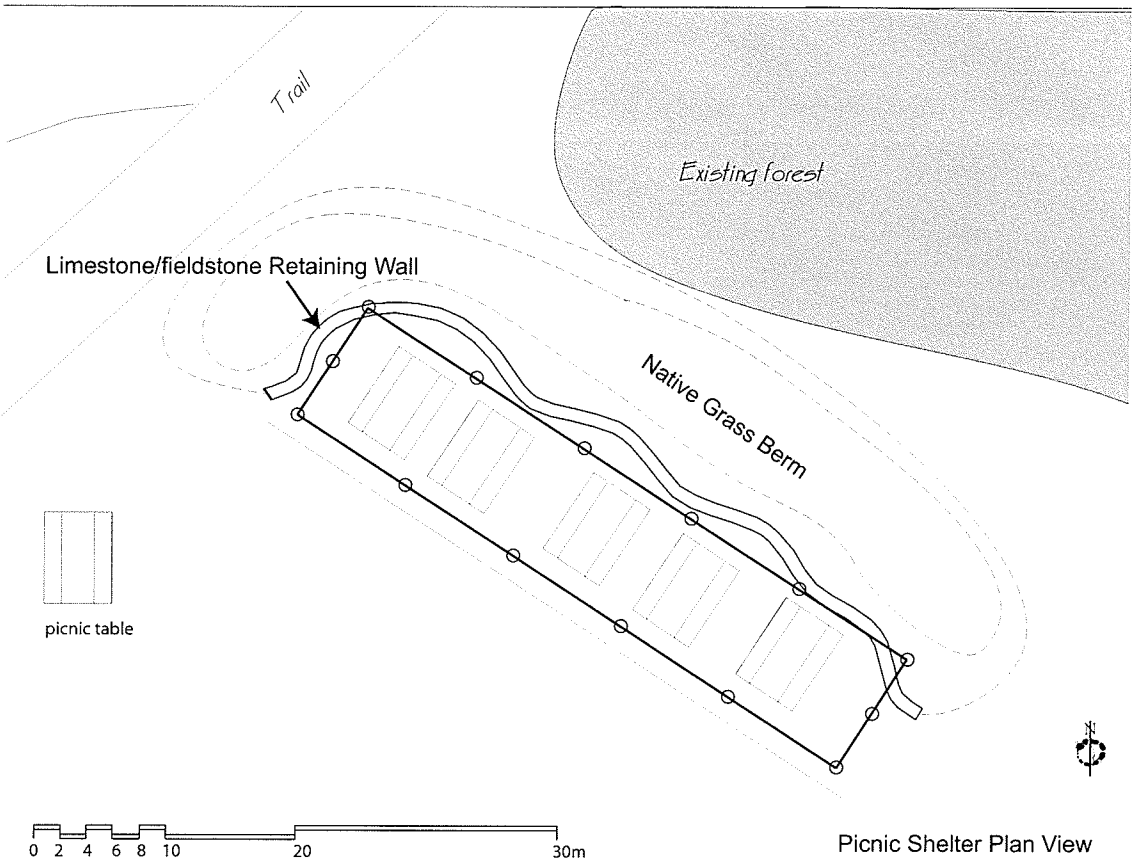
Figure 44: Plan of Interpretive Area & Cross Section of Seating and Structure

4. Picnic Shelter

A picnic shelter was requested by Manitoba Conservation as a potential site improvement that is still within the limits of acceptable change. Since much of the site design has tried to minimise the physical impact on the landscape this should also be applied to a building structure like a picnic shelter. As Figure 42 indicates the design of the picnic shelter continues with the natural wood pole theme and is situated on the edge of a berm and limestone retaining wall structure. The berm and exposed limestone rock is intended to increase thermal comfort during the cold spring days and to continue the theme of the rock and void matrix that is found under ground. The serpentine shape of the retaining wall is self-evident, to suggest a snake, but it is also a form that is stronger in structure than a straight line. The shelter design has deliberately been kept at a sketch design level and will only be further developed pending interest by Manitoba Conservation or a new SEMP committee. Decisions will have to be made to what size is appropriate (the sketch design has space for five picnic tables) and what materials will be used for roofing. The design was conceived to keep with the long horizontal lines found on site (the long vistas) therefore keeping a low profile and even giving the sense of descending into the ground. The roofing material will continue with this line of thinking and retain a simple horizontal profile.



Picnic Shelter Section View



Picnic Shelter Plan View

The design of the proposed picnic shelter is intended to fit within the existing context. The retaining wall and berm provides a subterrainian sensation and south facing aspect provides warmth from solar rays and protection from the predominant north, north-west spring winds. The low profile and situation along the existing tree line protects the long view from the parking lot to the open field. Timber construction repeats the 'wooden fence post' aesthetic also found in the entry sign and interpretive structure. The detailing of this structure should be simple and reflect local materials and the area's agricultural past.

Narcisse Snake Dens
Proposed Picnic Shelter

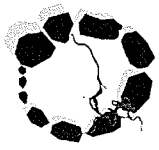


Figure 45. Plan of Picnic Shelter/ Section of Shelter

5. Trail Improvement

The trails at the NSD are in good condition. However, there are two developments that could be considered to improve the trail experience. First, the crushed limestone trail surface, which is wheel chair accessible, currently starts at the trailhead and goes to den sites one and two. The visitor then needs to back track on the same trail to return to the parking area. This plan recommends continuing the crushed limestone trail back through the open fields, near the field den and back to the staging area. The rest of the trail system is hard packed and with a little more effort can be negotiated by wheel chairs and strollers. In sections where exposed rock makes the trail surface uneven, it is recommended that soil (combination of crushed limestone and earth) be added to the trail to cover the rough sections. Seed (natural grasses, clover) can also be added to the soil mixture to help bind the soil and prevent erosion. To 'improve' the trail with limestone or other surface hardening materials (such as asphalt) would change the 'natural' aesthetic of the trails and change the nature of the experience. The adage that less is more applies here.

6. Den Site Improvements: Interpretation Signs and Snake Refuge

In addition to the interpretation area, the four den sites have also been programmed with interpretation material. The sign structures will duplicate the aesthetic of the entry/ orientation sign structure using poles and steel cable to hold up the sign panels. The structures will be placed on site so they are facing south (allowing the visitor to be warmed by the southern exposure) and sun angles are not blinding the visitor as they read the signs. Fieldstone will also be applied around the base of the poles to reduce human movement around the structures.

The den sites have used viewing platforms with railings, wooden snow fences and chain link fences to prevent people from accessing den openings and the immediate areas around the den. People have been observed walking around fences and going off trail to collect snakes. This is becoming problematic since vegetation is being trampled further exposing snakes on their outward migration. To assist the snakes, rubble piles of field stone will be placed at known migration routes so the snakes will have a place to hide and retreat from the sometimes too aggressive collecting habits of some children. The piles will consist of larger stones that cannot be moved by children. Some locations may also test a design of a 'snake stepping stone' that is made from a limestone block with channels carved into one side. Figure 43 shows the sketch design of the stepping-stone, where snakes are able to find refuge under the block while humans can walk over and on the stone.

Figure 46. Rock Piles as Refuge and the 'Stepping Stone' Sketch Design

7. Donations

The NSD are free to the public. Taxpayer money pays for the facilities, the maintenance and management of this experience. This plan suggests a donation system, using a donation box (made of steel and limestone) be implemented on site. A donation box with a sign that asks for one or a two-dollar coin is appropriate with the concepts of Ecotourism. The idea is to educate visitors that we can no longer live in a world of 'free' services. Small donations are required to help fund the services visitors are receiving. Imagine school children eagerly waiting in line to insert their 'looney' into the stone box so they can help the people who help the snakes. They could be excited and proud to make their contribution. The money received will be used to fund new development, programming and salaries for the local employment. This income helps to define this site and program as ecotourism and not just 'wildlife tourism' provided and funded by our government.

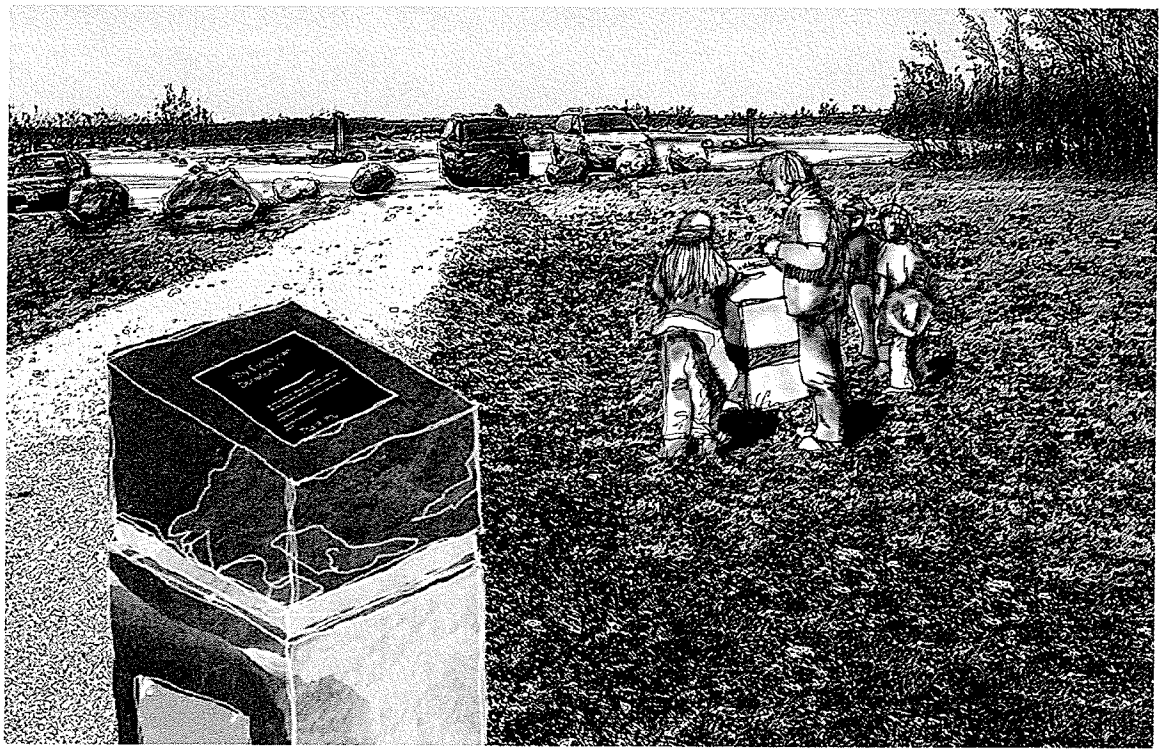


Figure 47. Sketch of Donation Box Design

8. The Experience

The NSD will continue to provide snake-viewing experiences that visitors have grown to expect from decades of visits, stories from friends and family and information found in the media. The experience is basically self-guiding where the visitor determines where and how long they spend on site. The facilities provide human comforts such as a trail system, benches for resting, and toilets. It also provides information to educate the visitor to what they are actually seeing. Local participation in the development and management of the site, collecting fees for wages and management costs, educating the visitor about the snake and it's ecology, as well as protecting the snake populations all contribute to making this an ecotourism venture.

Inwood Quarry Snake Den (IQSD) Site

Unlike the Narcisse Snake Dens, the Inwood Quarry site does not have a long and developed history of providing visitors a snake viewing experience. Visiting the quarry, outside of interested locals and snake researchers, has been minimal until recently. Word of mouth of what can be seen, and promotion by locals and the Prime Meridian Trail group have increased the popularity of this site for snake viewing. Researchers have been quite content to have this site to themselves. Few visitors meant they could go about their work without having to spend time answering questions or being affected by people wandering about the quarry. Unlike the NSD viewing platforms and fences used to protect the snakes from human access, the snakes at the IQSD site are very exposed and have a high potential to be physically harmed. The site is also being pressured to be 'rehabilitated' by the Mines Branch especially with the potential increase of people using the Prime Meridian Trail and the potential for people being hurt who access the quarry from that trail.

The following section will describe how the site is to be used, experienced and the design elements that have been developed to assist in developing this site for ecotourism. Figure 48 shows the proposed layout of the IQSD site.

1. Access and Site Protection

Access

The IQSD will be accessed by two different means. The preferred access route starts at an established location in the Town of Inwood, where people in small groups (12 people maximum) leave their vehicles and they access the quarry via the Prime Meridian Trail (PMT). This two-kilometre walk allows the guide (all trips will be guided to protect the snakes) to start the interpretation program explaining the regional context, issues of fear, and time to share the stories of the people participating in the experience. This time allows participants to leave their everyday worlds back at the car and enter into the human-nature experience. This access may give the participant a sense of accomplishment that they helped the environment by reducing their use of their vehicle and reduced the need to build large parking areas on site. The second means is to again meet at the Town of Inwood but this time people will drive to the quarry site with the guide who will control access into the site. The road will have a gate allowing only people with a key access. People who require physical assistance will travel this way and will be dropped off at the interpretation area. Others who will have paid more to drive their vehicles or who arrived by bus will park their vehicles and walk a short distance to the interpretation area. The pedestrian access along the PMT will enter the quarry area after entering through a stone gate and walking through the stunted aspen found in the area. The walkers will arrive at the same interpretation point as people who arrive by motor vehicle.

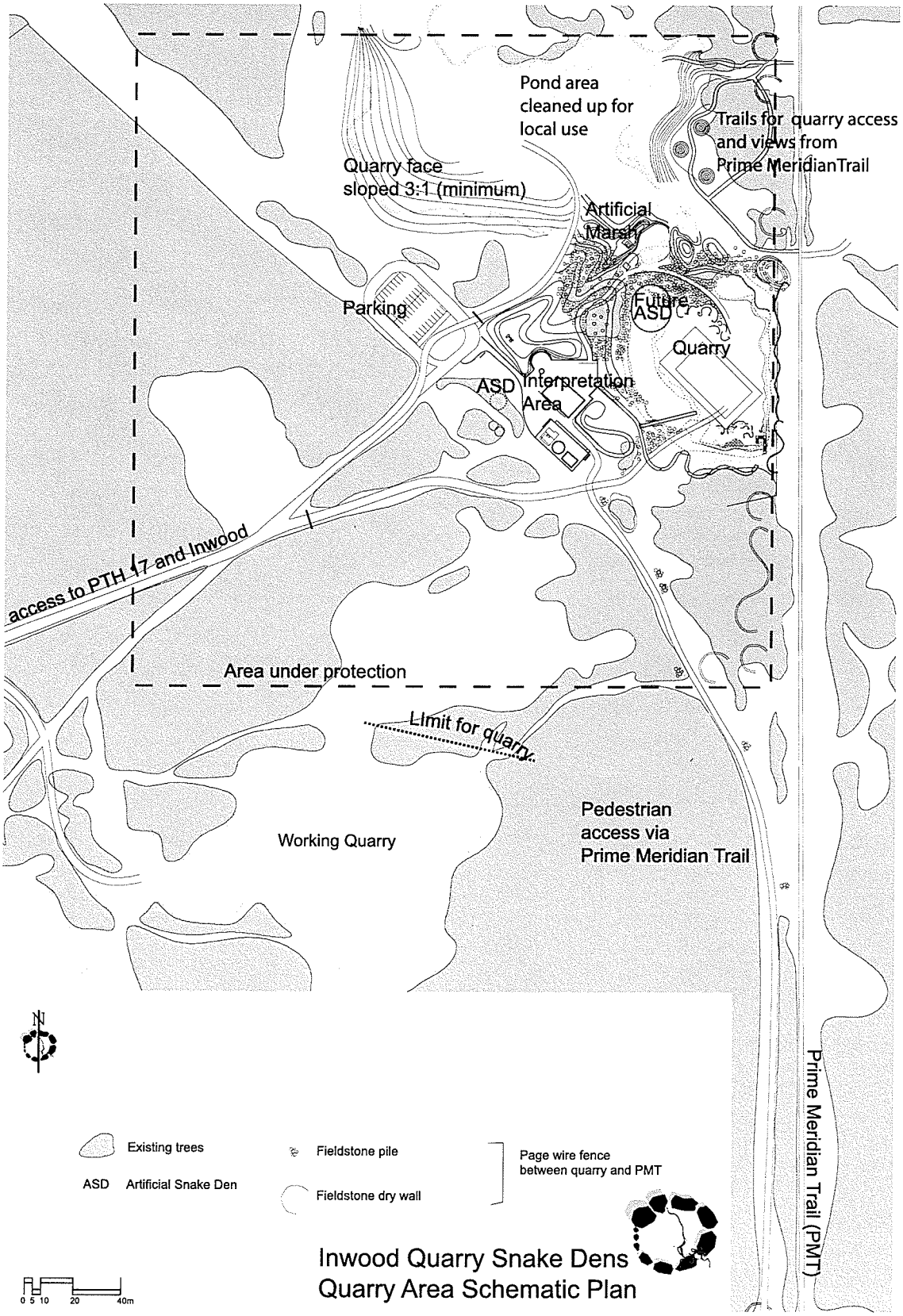


Figure 48. IQSD Quarry Area Schematic Plan

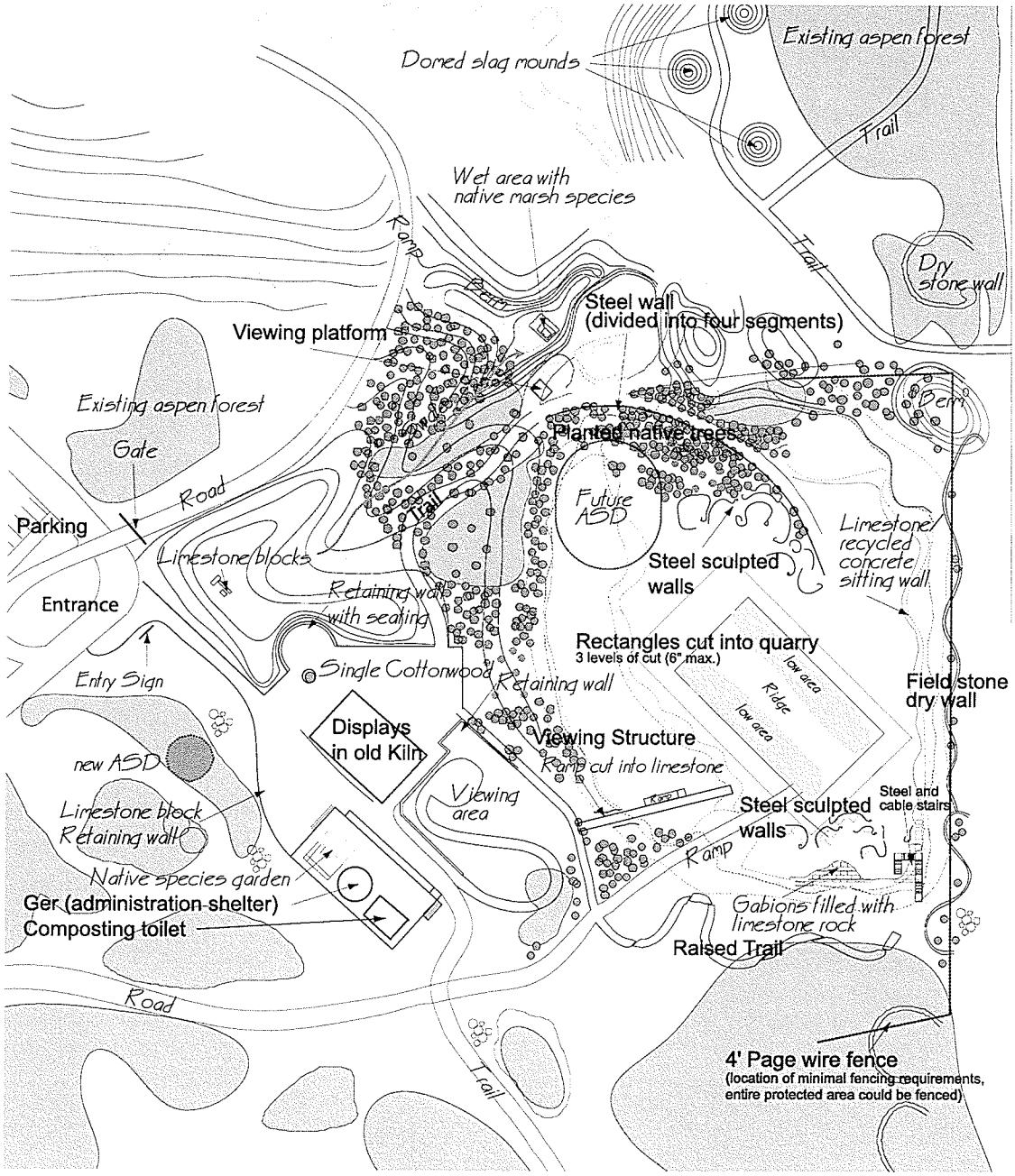


Figure 49. IQSD Quarry: Details

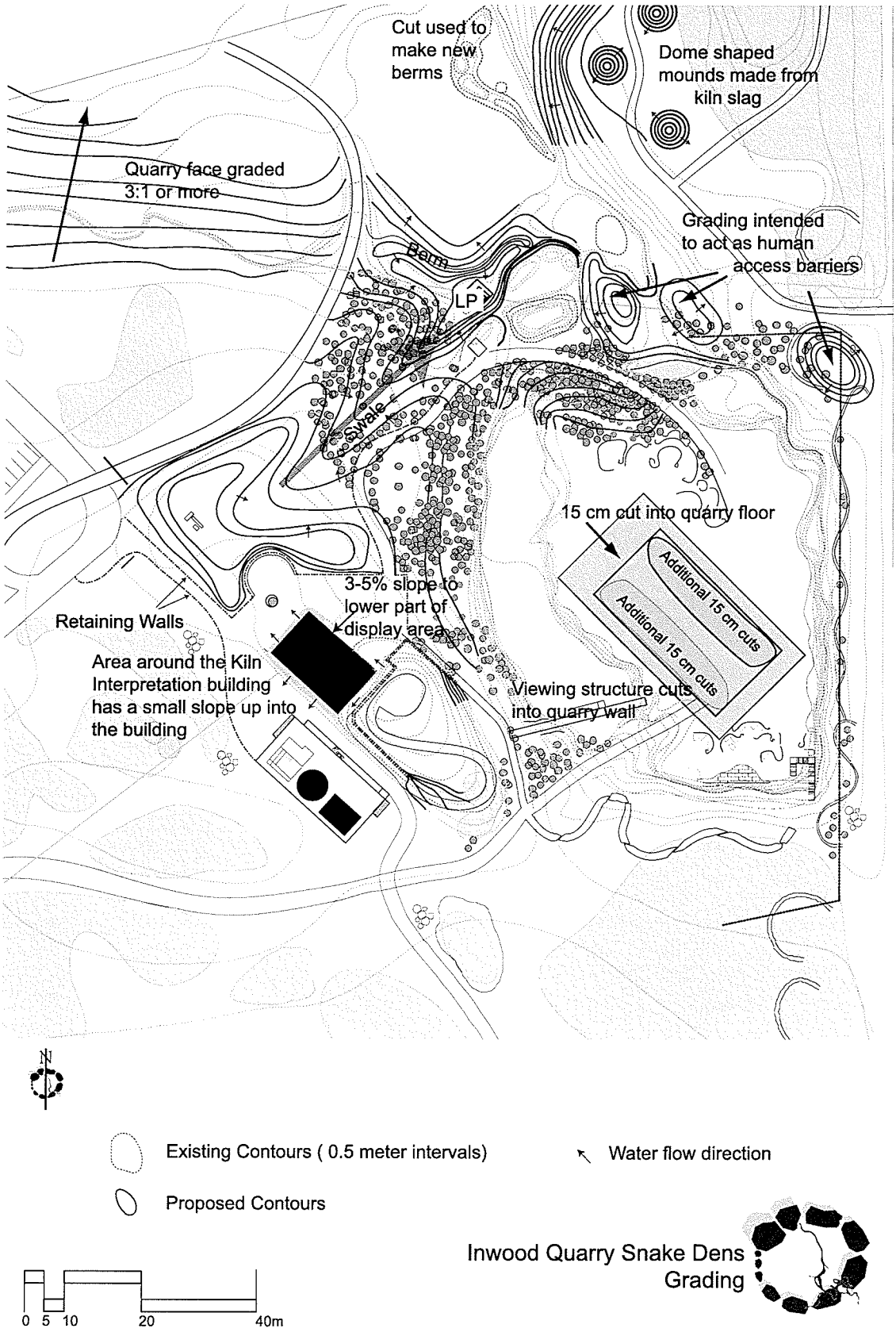
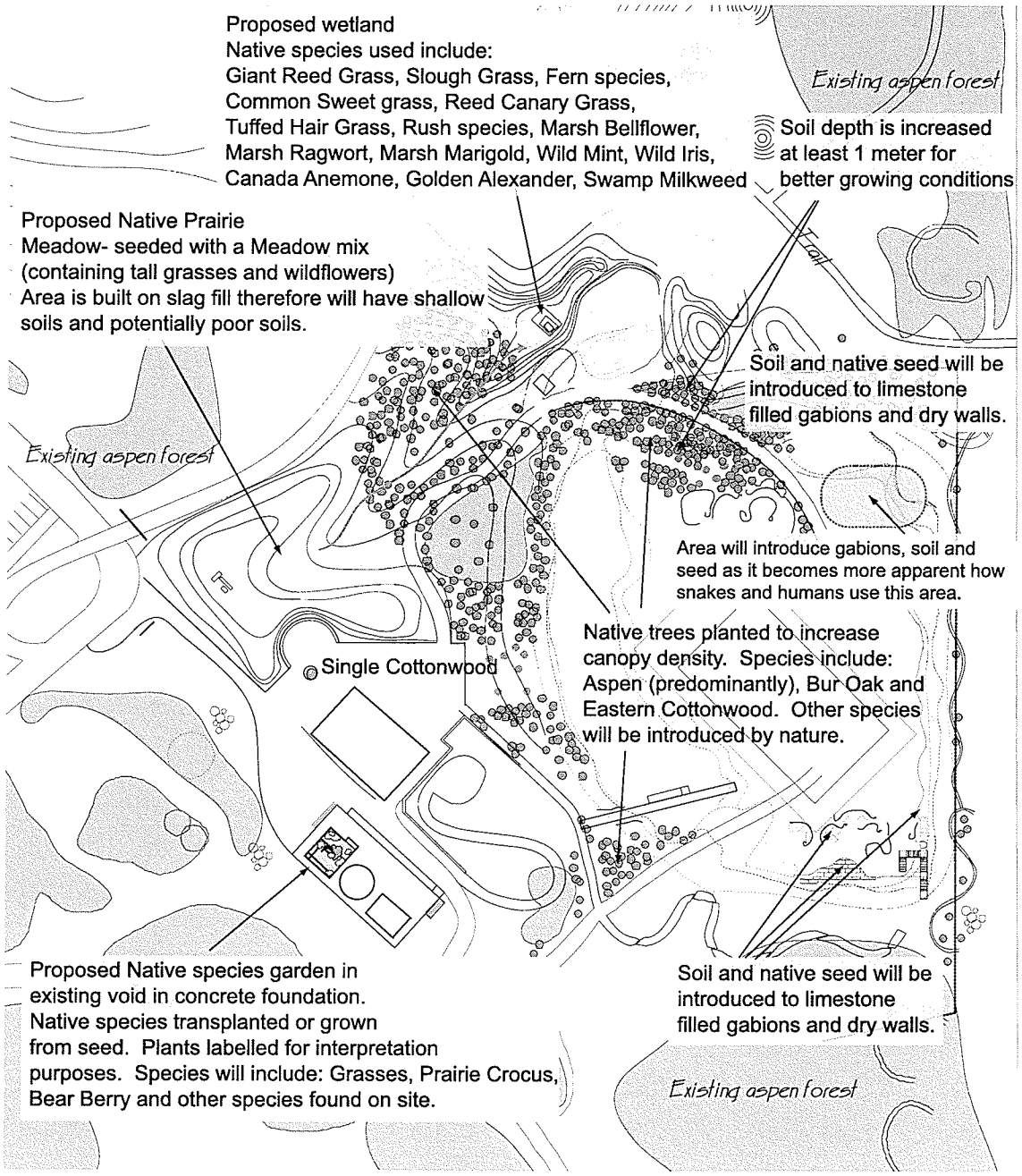


Figure 50. IQSD Quarry: Grading



Vegetation in the Inwood Quarry area will be planned and managed using the concept of Limits of Acceptable Change. Only species found in the immediate region will be introduced on site. Although native species will be encouraged, weeds and other exotic species carried naturally to this site will be tolerated. Showy exotic species will not be planted to prevent developing the site into a traditional 'garden'. Herbicides will not be used. Moss species are currently growing on limestone outcrops and attempts will be made to grow moss on the limestone and concrete walls and gabions.

0 5 10 20 40m

Inwood Quarry Snake Dens
Planting Plan

Figure 51. IQSD Quarry: Plantings

Figure 52. IQSD Quarry: Matrials and Experiences

Site Protection

To prevent uncontrolled access on to the quarry site a fence will run the perimeter of the protected area. The fence will resemble the wood post structures found at the NSD. A high tensile smooth wire fence (or page wire) will be used to prevent human access onto the site. The fence will only reach a height of approximately four feet to allow movement by deer and other animals found in the region. Signs will be kept to a minimum. Rural Manitoba has a history of using 'keep out' signs for target practice or removing them as souvenirs.

2. The Interpretation Area

Arriving at the site the visitor enters the cultural interpretation area. The interpretation area functions as the transition zone between our familiar world and the mysterious realm of snakes and serpents. The most obvious attraction is the concrete ruin of the old kiln structure. The building will be kept as a ruin, however cleaned of graffiti, removed of any hazards and a lighting system added. The area will be used as an open-air display area where visitors will move through the ruin and surrounding outdoor space viewing art and displays pertaining to snakes and serpents. A small section will also be devoted to the context of this ruin and the history of the quarry. The themes of the displays are stories, myths and cultural interpretations of human interaction with snakes. Panels are mounted to horizontal cables stretched along the walls. The panel-cable system replicates the forms used at the NSD interpretative structure, the fencing and references the industrial past of the site. A lighting system using solar panels will be used to provide lighting effects in the darker sections of the ruin. There will not be special mitigation to prevent natural process from impacting the site. Birds and other animals will be allowed to use the ruin up to the point where human health and safety become an issue. The interpretation area is not limited to the ruin but also includes the surrounding outdoor space. These spaces include a viewing area on an old ramp, a protected semi-circle cut into the ground, and a viewing platform overlooking the quarry. Circle and serpentine forms are repeated through out the quarry area. The circle represents cycles (water, life, migration) and, as depicted in the stone serpent logo, the connection of all things. Most circular forms are however are not closed and require the presence of humans to complete the idea of connection and natural cycle. The serpentine forms, are obvious, to reflect our human fascination with this form and reveal how this form is considered 'natural', 'organic', pleasing, and simply a part of our built world vocabulary.

3.Facilities

As a tourism destination certain facilities are required for visitor comfort. The old stone/ concrete foundation location provides the location for these facilities that include a temporary shelter and composting toilet. The shelter provides protection from the elements (cold, heat, rain, wind) and an on-location office space to administer programming and provide basic visitor services (food, first aid). The use of a portable structure such as a modern gher (yurt) adds a layer of unique architecture and supports the site's narrative of seasonality, mobility, and adaptability. Composting toilets, solar energy and a system of disposal on site, express the commitment of this program towards the environment and introduces alternative technology to mainstream society.

Facility development, as well as the 'beautification' of the site (i.e. flower gardens) should be kept to a minimum. The Inwood Quarry site has the opportunity to educate our culture to the demands and impacts tourism puts on the environment and host culture. By not providing services that are usually expected in our western culture, such as garbage facilities, phone service, or a drive-in roadside attraction atmosphere, there is a hope to educate the visitor of their impacts and responsibilities. This should be beneficial as a means to educate our culture to concepts of ecotourism and change expectations especially when these same visitors travel overseas and consume ecotourism there. The visitor needs to be taught travel responsibility and the Inwood Quarry location can provide this introduction.

Figure 53. Interior of Proposed Kiln Interpreataiion Centre

4.Circulation

Once the visitor has been introduced to the biological snake and mythical serpent, the next journey is to experience the snakes first hand. Leaving the interpretive area the visitor has two guided tour options. The first is a more direct route that heads south along a path to a structure that allows the visitor to ascend into the quarry and view snakes from an elevated platform. This option is for people who are apprehensive to engage with the snakes at close proximity. The experience is a more traditional 'zoo-like' experience where the visitors are a 'safe' distance from the animals, view the animals from above and have a barrier between the visitor and animals. People are given the feeling of security as they move at there own speed, have an 'escape' route to higher ground and as mentioned have the barrier of distance to the ground. This option is for people who are uneasy or have fears or phobias of engaging with the snakes. The elevated platform resembles quarry equipment (conveyance machinery) and is made of steel. If the visitor finds that they want a closer look, there is access via a ramp from the platform to the quarry ground plane.

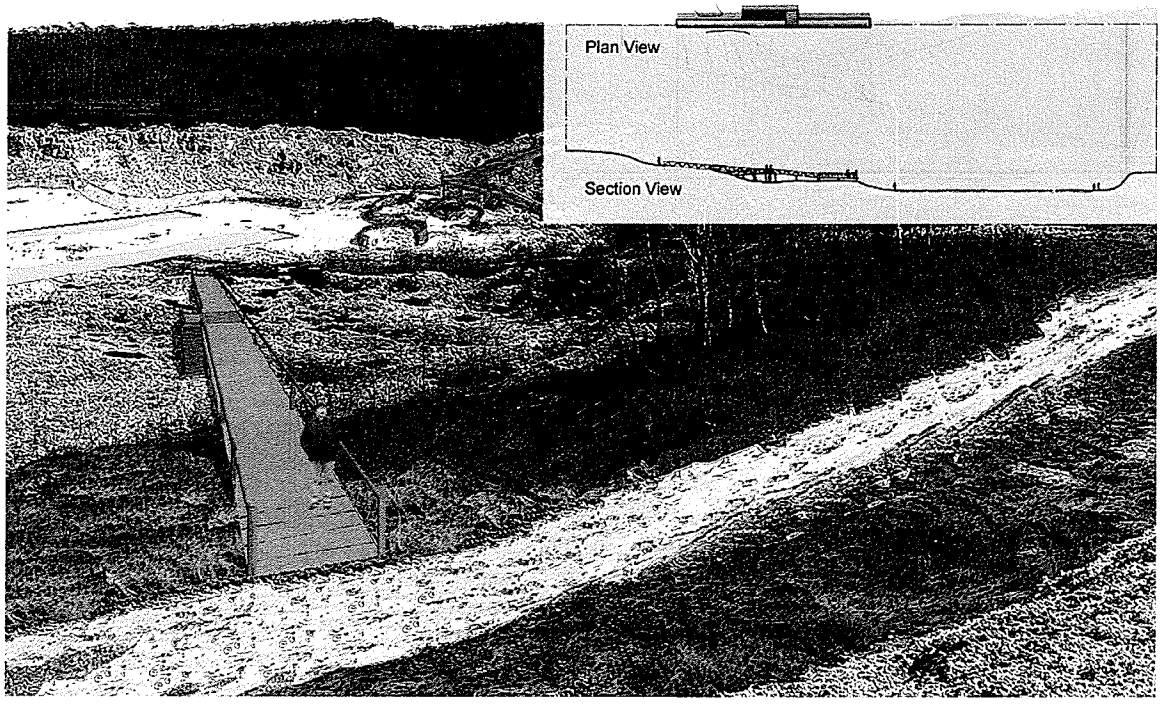


Figure 54. Proposed Viewing Platform

The second and preferred option, takes the visitor on a looped trail around the quarry with greater access to the snakes. A trail starts north of the interpretive area and winds through stunted aspen. The path actually runs along an area that has been reshaped to demonstrate surface water runoff. The swale ends in a constructed wetland. The wetland is constructed of blocks of limestone and introduced vegetation representing the wetland plant species indigenous to this region. Off the path a wooden platform is situated to allow a view of the swale and wetland. At this point the guide can explain the areas hydrology and how karst landscapes are formed. Leaving the wetland-viewing platform the visitor will continue along the path and will notice a steel inlay next to the trail. Made of Cor-ten steel this artifact starts subtlely at the ground plane but begins to rise to become a wall blocking the view to the south. The wall is broken into four segments representing the four decades the quarry was in operation. Breaks between the walls provide portals for the curious to get a glimpse of what is to come. The wall creates shade and increases in height as the visitor actually descends into the quarry pit. The intent here is to represent obvious human manipulation of the land and increase the impact by providing more contrast when the entire pit becomes visible. The contrast of being in the shade and next to a large vertical object, giving a sense of enclosure, will emphasise the openness and bright conditions of the pit when exposed. Cor-ten steel, when exposed to water, dirt and vegetation, stains, rusts and over time may form holes. The steel's patina and markings will change over time and help to explain the story of nature's impacts on our built environment.

East of the ramp lies the north-east corner of the quarry. This area has a south facing aspect and provides access for the snakes out of the quarry. Maintaining the snake's travel corridor and providing for refuge and sunning areas best serve this quarry corner. This can be accomplished by adding pockets of soil and vegetation, and piles of limestone rubble. Limestone filled gabions will also be used to aid in creating mass for snake refuge and a medium available for plant/lichen/moss introduction. The visitor will experience the biophysical complexity created from changes in microclimates and edge conditions.

Back on the main path, once the visitor has reached the end of the steel wall the view opens up to the starkness of the quarry void. Panning the view it will become apparent that to the immediate west of this location curving steel walls will draw their attention. Serra-esque steel walls create a labyrinth of sorts where visitors are drawn and moved around the curving and leaning walls. Richard Serra is an artist whose steel installations can be found internationally in galleries and, sometimes contiversially for their large rusting appearance, as public art. The observant visitor will notice that the curved walls

face south capturing the heat of the sun. The visitor is drawn through the steel past a depression in the quarry floor that may contain water (dependent on the water table level) and to the north edge of the quarry where indigenous tree and shrub species have been planted. The visitor has many choices to warm up in the sheltered spaces created by the walls or in the event of a hot day visitors may opt to seek the shaded areas also created by the walls.

The visitor has been drawn the width of the quarry to it's west side. The north-west corner of the quarry is proposed for an artificial snake den (ASD). This corner is appropriate for an ASD with a south facing aspect and potential to be physically separated from the rest of the quarry. Separation may be necessary for the safety and health of the snakes. Other research will determine the design and activities that will occur at the ASD. It is recommended though that the design of the asd should include opportunities for visitors to experience the underground dens used by the snakes.

From the north-west quarry corner the visitor looks diagonally across the quarry. The vast openness of the quarry pit is apparant and may evoke feelings of exposure, temperature change and safety. The bottom of the quarry faces are outlined with a serpentine retaining wall proving seating and a barrier to the dangerous slopes of the embankment. This seating wall is made of local limestone, fieldstone and recycled concrete arranged in changing patterns and densities of porosity. The use of old concrete assists in telling the story of where limestone has been used in the production of quick lime and as fill in construction.

As the visitor moves south out into the open quarry a distinct rectangle carved into the ground plane is noticeable. The right angles indicate the human origin of this feature. Although the depth of the grade change is minimal at 6 inches a path through the rectangle is obvious. The cut areas are filled with spring runoff water. Visitors should notice the reflection of the sky in the water as well as snakes swimming and drinking from this water source. The visitor is guided to the south end of the quarry through the pathway in the rectanglular reflective pool.

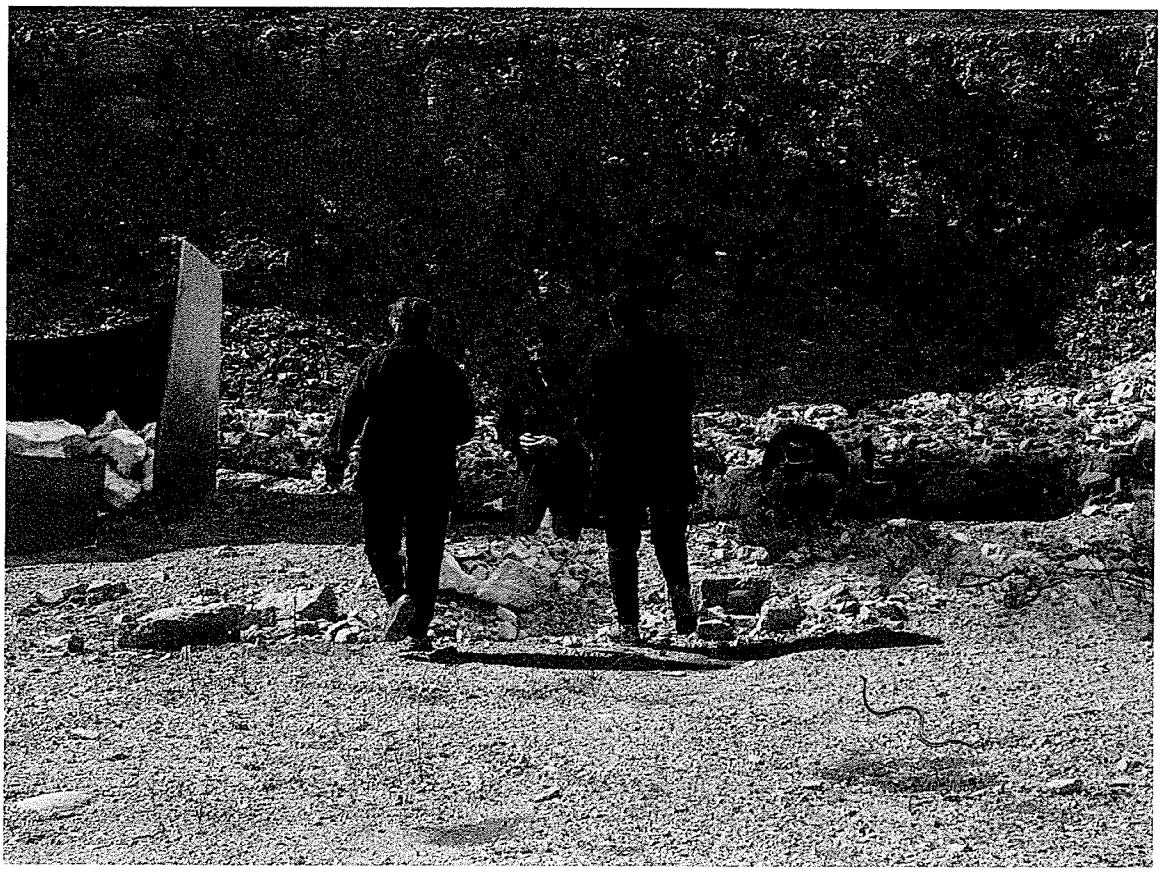


Figure 55. Quarry Experience

At the south end of the quarry the visitor is pulled towards curved steel walls similar to ones found at the north end of the quarry. However they are different. Unlike the north end walls, the south facing spaces of the south end walls contain limestone blocks and rubble. The stone is placed to create snake refuge (hiding places) and sunning areas. Visitors will walk among the steel walls and limestone piles coming in close contact with snakes and finding microclimates that also provide comfort from the potentially cooling winds and lower spring temperatures. The guide leading the tour will direct the visitors to the quarry's northwest corner. Here the concentration of mating balls and snake movement is at its peak. Researchers may be present here so the guides will limit the visitors' access to the research and will try to answer the questions before interrupting the researchers.

After watching the snakes and taking pictures the visitors will make their way to the quarry's southeast corner. Here a metal structure is noticeable, a stairway leading out of the quarry. Beside the stairway, the quarry walls have been stabilized with limestone blocks. Some blocks are arranged to form an enclosure providing an underground-like experience with fissures, limestone mass and some light seeping into the space. The stairway is similar in construction to the viewing platform with quarry machinery aesthetic. At the top of the stairs the visitor is guided to a pathway that makes its way moving in and out of the tree line at the south end of the quarry. The pathway is noticeable because it is elevated about 8" from the ground plane with a concrete edge. This edge acts as a barrier for the snakes that will use wall following behaviour to move through a traditional migration corridor. This pathway allows the visitor and the snakes to move freely using separate systems.

The pathway leads visitors back past the viewing deck, described earlier, and returns to interpretation area. Visitors can also access the lookout and loop back into the interpretive area.

Figure 56. Proposed Elevated Pathway

5. The surrounding area: pits and marshes

The other pits in this area have not been considered a part of the snake experience and not included in the design considerations. This however does not mean that these other pits should be neglected or forgotten. The north pit has a low point area that locals have used for swimming. This should be encouraged to continue with a clean up of the area and adding some large limestone blocks for sitting and sunbathing. The large lime waste piles should also remain to demonstrate the volume of quick lime that was produced on site. The white piles provide contrast to the foliage during summer and to the starkness during spring, fall and winter. The other pits need to also consider the issues of safety with steep cliffs and unstable quarry walls.

Marsh areas

The snake's summer habitat is found in marshland mostly on private land. This practicum respects private ownership and the traditional uses of the land for agriculture. However, this project will work with local residents to manage and sustain the migratory routes and summer habitat range. This may mean educating locals on the importance of the wetlands and assisting them with managing their own land to meet their own needs and the needs of the regional ecology. This will require open communication with all people involved and a commitment to balancing cultural and environmental needs. Each site, marsh area and migratory route, will be analysed and managed on an individual basis. This is to prevent imposing solutions that are not best suited to the people involved and specific site characteristics.

Chapter 13 Discussion and Concluding Thoughts

The Red-sided garter snakes in the Interlake region of Manitoba have a long history of capturing the attention and imagination of visitors. For decades, Manitobans have visited the Narcisse Snake Dens (NSD) to witness the emergence of hundreds if not thousands of snakes from their winter dens. The snakes have been dependable and cooperative participants in wildlife viewing and have added to the experience with their mating behaviour of forming large balls of tangled snakes.

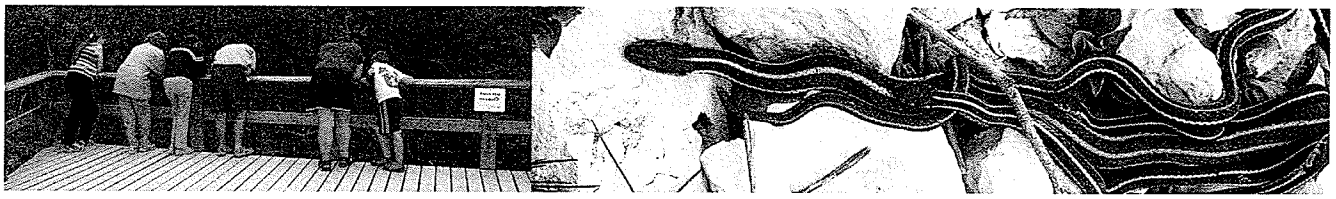


Figure 57. Snake Viewing and Mating Snakes

Not only is the visitor treated to this natural spectacle but the presence of the snakes may also draw out other emotions that have been hidden away within our socialized bodies. Although it is not known definitively if it is innate or biologically learned, most people will have some kind of emotional or physical reaction to seeing the snakes. The visitor may be fascinated and drawn to study the snakes more closely or may be repulsed or terrified by the sight of even one animal. Few animal species can stir up these latent emotions or have had as much impact on so many cultures throughout the world. Given this unique human-animal relationship, the abundance of and reliability of seeing the snakes in the Interlake, and the relative ease of access to the area, it is odd that this natural attraction has not spawned tourism development sooner. The NSD have been receiving visitors for years but the attraction continues to be a day-use recreational facility provided free from Manitoba Conservation. The success of attracting many visitors to the NSDs has led to the desire to develop new snake attractions else where in the Interlake. Some locals who have witnessed youth leaving the community and a weakening agribusiness sector, identified the Inwood quarry as a possible ecotourism site.

Ecotourism is a relatively new form of tourism that questions traditional development and experiences associated with mass tourism. Concepts of sustainable development, environmental and social responsibility, a learning experience, and nature-based travel contribute to what is meant as ecotourism. Unfortunately ecotourism is misinterpreted

and often misrepresented and used to 'greenwash' and sell various forms of tourism. Ecotourism is also often associated with 'pristine' protected areas and national parks. This connection with protected wilderness areas however is not essential and there are no reasons why ecotourism cannot exist in essentialy cultural landscapes or rehabilitated sites.

As already mentioned, ecotourism most often occurs in protected areas. These landscapes have traditionally been managed to maintain a predetermined culturally derived ecological equilibrium. A non-equilibrium paradigm has been introduced that recognises the importance of landscapes with human-induced changes in their ecosystems. The newly developed Category V Protected Landscape/Seascape in the World Conservation Union's protected area system was introduced for this reason. This paradigm permits human modifications to the landscape as long as the landscape's structure and function are maintained. The quarry site has been heavily modified but has retained ecological integrity with the existence of a healthy snake population and den in the quarry. The quarry site requires protection from any new development (including restoration) or changes that may remove the existing ecological integrity. The use of limits of acceptable change will guide how and how much development can occur. Planning and managing for non-equilibrium requires an understanding that the landscape/ecosystem will change over time, can involve human modifications and requires explanation to visitors.

Designing for ecotourism at the snake denning sites introduces opportunities to challenge traditional animal viewing techniques. Instead of providing raised viewing platforms or roadside attraction amenities (drive-in entertainment) often seen at animal attractions, this project proposes to provide a range of viewing opportunities within the realm of ecotourism. The NSD will continue to provide the viewing platform experiences that visitors have come to expect. The Inwood Quarry Snake Dens (IQSD) site is proposed to complement the NSD site and provide a different experience where visitors can be more engaged. The snakes are a hardy species that permit human presence during emergence and their spring mating. In small-guided groups, visitors do not require barriers between themselves and the snakes. Visitors can engage with the snakes as close as their curiosity and learned fears allow. The IQSD can be designed incorporating current zoo design practices of landscape immersion, cultural enhancement, habitat imitation and behavior enhancement. There is however no need to capture or hold the snakes for visitors to engage with this species at these sites. The unique landscape features of the quarry provide opportunities for new interpretive narratives. The old concrete kiln has a

character that should be sustained and is an ideal display space. It is proposed to use this space to inform visitors of cultural views of snakes and serpent myths. This space can also educate visitors about the quarry and environmental issues. The outdoor space surrounding the interpretation structure provides the necessary human comforts such as composting toilets, shelter, panoramic view, and gathering spaces with microclimatic improvements.

Near the interpretive area a drainage swale has been proposed to feed an artificial wet (marsh) area. The wet area is intentionally constructed with right angles and limestone blocks to indicate a cultural origin. The swale and marsh are visual cues assisting the interpretation of the snake's essential summer habitat. The artificialness of this landscape is intended to make the point that restoration is not necessary but there is a need to maintain or rehabilitate ecological integrity and natural processes.

The pathway system leaves the designed wet area and enters the quarry. This experience is an opportunity to view and engage with the remnants of the limestone quarry, the snakes, and interventions that express natural process and cultural narratives. Visitors will be exposed to steel walls that reflect an industrial past. The 'serpentine' shapes of these walls also form microclimates and temperature gradients that are important factors in a snake's lifecycle. The wall follows the ramp down into the quarry and is shaded by dense vegetation. The path then opens up into a south facing, bright open void. This contrast is intended for the visitor to experience changes in exposure and temperature, again factors that are important for snakes.

The sites have been designed considering ecotourism theory with thought given to choice of materials and maintenance issues. Limestone blocks, recycled bricks, steel, recycled concrete, fieldstones and wood posts are used in this design. These materials are available locally (or at least regionally) and will add to the post-industrial aesthetic that exists. The idea of 'beautifying' the sites with formal or 'wild' gardens or creating a theme park are considered inappropriate under the guise of ecotourism. It is believed an authentic representation of a post-industrial site and wild nature thriving and coexisting in this landscape would provide the necessary foundation for both a didactic and entertaining experience. The visitor is given some responsibility to behave appropriately and understand the limitations of ecotourism and the nature of the ecotourism experience. Although staff will maintain the site, visitors will play a role by removing their own garbage off site (no garbage bins will provided) and adhere to small group tours and be encouraged

to walk to the Inwood quarry site helping to reduce the amount of energy and resources consumed in their tourism behavior. Where possible, pesticides and herbicides will not be used, and vegetation succession will be left to its own accord to develop into natural communities.

The experience of visiting the snakes begins with how the experience is marketed. A website is helpful for people to find pertinent information such as location, hours of operation, cost and what to expect. However, the focus of engaging with the snakes is primary and the lived experience the main focus. There should be no attempt to simulate the experience and provide it over the Internet. The intent is to see snakes and allow the visitor to engage physically and emotionally with the hope that they leave the experience with some kind of emotional stirring, knowledge and possibly a new feeling of environmental responsibility. The experience should also be associated with the cultural attitudes that have been developed regarding snakes and serpents. Having cultural groups from the region (consider the various folklorama groups in Winnipeg) assist in the development or actually constructing the interpretive panels or art works to express snake myths and stories help to bring all communities involved together. The experience should also build upon the region's past and continue to tell the story of the quarries and local agriculture. Existing signage, where a snake gives highway directions to the facilities, also helps to create the overall experience that this is a regional, authentic attraction with history and community support. Ecotourism needs a face that is appropriate to the experience and the message that is provided. These signs do just that.

Developing the quarry for ecotourism will not be a panacea for the region's economic woes or the out migration of youth. Sustainable ecotourism-based development will however add to quality of life for locals, the larger regional community (including Winnipeg) and for visitors from anywhere in the world. Community life will be improved by developing a dialogue concerned with the protection, use and understanding of nature and natural processes and by developing pride and interest in this region. As a pilot project for community based ecotourism there are many opportunities for funding from cultural, environmental, and possibly science based foundation money. Developing a partnership in the form of a co-management agreement with the provincial government will also help establish suitable management and sustainability methods. Government and community joint management and shared responsibility as well as economic development may provide a needed demonstration project to test this form of ecotourism co-management.

The snakes in the Narcisse-Inwood area have the potential to reconnect humans with nature and with our own natural tendencies. The mere sight of a snake can trigger emotional and physical responses that seem to be hard wired in our brains. Developing the Inwood quarry and maintaining the Narcisse Snake Dens for ecotourism provides a opportunity to reconnect with our wild past and engage in the wonders of nature. This does not have to occur in wilderness but can be experienced in a less 'natural' landscape. Direct experience with snakes, although terrifying for many, may be comforting since this act and our reactions demonstrate that humans are still a part of nature. We may finally realize that respect and responsibility for nature will ultimately benefit all beings including ourselves. Snake ecotourism that allows for direct experience for visitors, benefits the local community and considers the needs of the snakes may be the development that not only helps to protect and understand the environment but helps humans to better understand ourselves.

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