Porcupines (*Erethizon dorsatum,* Ojibway*: gaag*) in the First Nations Communities of Black River and Hollow Water: Using Traditional Knowledge of Wildlife in Sustainable Forest Management

by

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A Thesis submitted to the Faculty of Graduate Studies of

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Dedication

To my mom, you believed in me when I could not, you saw my dreams when I did not, you were always there for me.

To Sebastien and Zenaide, you are my inspiration and as I finish this academic thesis I want you to know that I persevered so that I may one day encourage you to persevere in the lives that you will choose. Mes petits, vous etes mes amours a toujours.

To Susie, thanks for being there for me. And to my wonderful husband, Dameon, you have been my strength and supported me in so many ways. Thank you

Abstract

Based on concerns raised by community representatives from Black River and Hollow Water First Nations,about a local absence of North American porcupine *(Erethizon dorsatum)* this project set out to determine the cultural value of the animal, the causes of its decline and the feasibility of involving local youth in potential reintroduction efforts.

During the summer of 2004 Elders were interviewed on the cultural and historical aspects of porcupine, and students assisted in gathering data at the Ecosite level to identify potential areas of reintroduction. In 2005 a porcupine-monitoring program involving youth in Wisconsin was assessed for applicability in Black River and Hollow Water.

Based on the interviews with Elders, the reintroduction of porcupine is not advised at this time. However, the potential for youth involvement in any future wildlife or ecosystem monitoring programs appears strong within the communities.

Acknowledgements

A special thank you to Manitoba Hydro for their generous funding.

Recognition for the support provided by Manitoba Model Forest, the Elders who shared their time and wisdom, Rene Barker and Gerald Harry for helping me get to know the communities, Waneeta Bjork for her enthusiasm and to the other youth that participated in field research.

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Chapter 1 - Literature Review

1.1 Introduction

Starting with an understanding of the basics of porcupine biology and knowledge of contemporary research, this thesis combined concepts of Traditional Knowledge with interviews of community Elders and application of the Ecosite framework at the landscape level. Such an interdisciplinary approach helps better understand the situations at Black River and Hollow Water First Nations as it relates to values associated with wildlife and sustainable forest management.

1.2 Basic Porcupine Biology – *Erethizon dorsatum*

The North American porcupine *(Erethizon dorsatum)* belongs to the rodent family and has an extensive range throughout Canada. It has no significant commercial value and many people consider the porcupine a nuisance animal. However, these unique creatures continue to thrive and are common in much of their range. Researchers have studied porcupines in a variety of contexts, focusing on their biology (Roze 1989; Roze 1984; Griesemer et al. 1996; Hale and Fuller 1996) their dietary requirements (Sweitser 1996; Snyder and Lynhart 1997), their role in forest biology (Griesemer et al. 1998; Marshall et al. 1962; Morin 2002) and their relationships with predators (Lloyd and Cary 1991) such as fisher (*Martes pennanti*) (Powell 1993). Dendrochronology has also been applied as a tool to learn about past population cycles (Spencer 1964). The information gathered by researchers aids in the understanding of the biology and role that porcupine have within their ecosystem.

1.2 Basic Porcupine Biology – *Erethizon dorsatum*

1.2.1 Range

The porcupine can be found in a vast range stretching from the forests of eastern Canada and New England, to Alaska, central California and New Mexico (Bertin et al. 1967). The extensive range of this species suggests that it has the capacity to adapt to a variety of food sources and different habitats. In the New World, there are five species of porcupine with only *Erethizon dorsatum* occurring in North America.

1.2.2 Status

In Canada, the porcupine is not considered as being at risk and hence not under the jurisdiction of the National Species at Risk Act. The porcupine is also not protected under the Manitoba Wildlife Act, as it is not considered a fur-bearer (Province of Manitoba). The porcupine is frequently considered a nuisance animal because of its perceived impact on forestry and destruction of private property (Roze 1989; Gunn 1993).

1.2.3 Description

In Canada porcupines are the second largest rodents after the beaver, measuring between 600-1200 mm and weighing between 3.5 to 18 kilograms, with specimens in western Canada averaging around 9 kilograms (Wilson and Ruff 1999, Gunn 1993). The porcupine has a rounded nose with small eyes and ears that blend into the fur. North American porcupine is renowned for its barbed quills (Gunn 1993). It is estimated a porcupine has as many as 30 000 quills (Po-Chedley and Shadle 1955). They give the appearance of a ball of quills as their shoulders are humped. With short legs, the

porcupine stands on its entire foot when on the ground and leaves a distinct trail in snow. They have long curved claws that are necessary for climbing trees to reach their food source and for grooming through their quills (Roze 1989, Gunn 1993). Porcupines have naked pads on their feet to help them grasp branches when climbing. The tail is relatively short, muscular and covered with quills used to defend against predators and also aids in climbing (Roze 1989, Gunn 1993).

In Roze's (1989) study of museum specimens found numerous healed fractures consistent with falls from trees. One theory is that after suffering injuries from a fall, the quills provide enough protection for the large tree-climbing mammal to heal before returning to the relative safety of the canopy (Roze 1989).

A biological need shared with other rodents is the porcupine's need for sodium. Rodents will chew on shed antlers or locate sources of salt to satisfy their need for sodium (Bolen and Robinson 2003). Porcupines have been known to digest aquatic plants, bones and mud to satisfy their need for sodium (Roze 1989). Roze (1985) reported that 71 percent of porcupines in the low sodium environment of the Catskill Mountains would stray away from their forest habitat in search of salt from human developed areas. Salt is readily used in the production of pressed board, which the animals are then able to ingest to satisfy their salt needs (Roze 1989). When porcupines feed on buildings to quench their need for sodium, this increases the area of conflict with humans.

1.2.4 Quills for Defense

The porcupine's main means of defense are its 70-90mm barbed quills (Roze 1989). When threatened or attacked, porcupines curl up into a ball to protect themselves, exposing predators to the barbed quills. Animals that come in contact with the quills are susceptible not only to puncture wounds, but also to a risk of infection from foreign agents. Quills embedded in the area of the face or which otherwise impede the predator's ability to hunt and feed are likely to increase mortality due to starvation (Powell 1993).

One theory proposed is that quills are a method of training individual predators to avoid porcupines. By not causing death, they discourage further attacks by individual predators. If the quills themselves were to cause deadly infections in predators, those individual predators would be eliminated and others would make their way into the territory and once again attack porcupines (Roze 1989). The theory supports a learning process that would maintain a stable predator population (Powell 1993). Some dogs however may not necessarily follow this learning pattern and repeatedly attack porcupines.

1.2.5 Home Range and Denning Requirements

Because of their large range across much of North America, the habitat requirements will differ depending on location. For the purpose of this study, the information from Roze who studied porcupine in the Catskills (1984; 1989), Thiel's ongoing work in Wisconsin, and Morin's (2002) research in Canada provide the most relevant insights into habitat requirements of porcupine in Manitoba.

Porcupines are considered to be relatively solitary animals. With the exception of a female with young, they will only seek out others during the mating season (Sweitser and Berger 1998, Roze 1989). Griesemer et al. (1996) recorded den sharing in areas with few den sites available. The lack of dens was not considered to be the only factor affecting shared use of dens. In areas where dens were more readily available there was limited den sharing (Griesemer et al. 1996). Severe winter weather reduced sharing of dens, likely due to the limited travel distances of porcupines during this time. Same sex and opposite sex animals were recorded sharing dens (Griesemer et al. 1996).

A male porcupine may occupy a 70 hectares summer home range, with juveniles having a smaller range (Roze 1989. An individual male's range may overlap several of the female ranges however; females are territorial toward other females and will defend their territory (Roze 1989, Sweitser and Berger 1998). Winter ranges are smaller in part due to the snow, which negatively affects the ability of porcupines to travel and as a result they will tend to stay close to their dens and winter food source (Roze 1984, Gunn 1993, Powell 1993).

1.2.6 Habitat Selection and Diet

Morin's (2002) study in Quebec, revealed porcupines are generalists on the landscape but displayed preferences on their home range and on individual tree selection. Porcupines are considered to be seasonal specialists in their selection of feeding trees. During monitoring in Catskills, Roze found that a porcupine population fed on a minimum of ten tree species but individuals concentrated on one or two species at a time. (Roze 1989)

Marshall et al. (1962) determined porcupines feed on white spruce *(Picea glauca,* all plant names follow Scoggan 1979*)*, mature red and white pine (*Pinus resinosa* and *Pinus strobus),* trembling aspen (*Populus tremuloides)*, tamarack *(Larax laricina)* and upland brush. Nocturnal foraging generally occurs in a low-lying spruce-bog with porcupine returning to diurnal protection in upland areas away from mosquitoes (Marshall et al. 1962).

In Quebec, trembling aspen was the favoured deciduous tree (excluding fruit-producing trees). Areas impacted by humans and coniferous forests were least preferred when evaluating the porcupine's home range (Morin 2002). Jack pine (*Pinus banksiana*) is preferred food source in Ontario (Macdonald 1952 from Roze 1989).

Griesemer et al. (1998) radio-collared 50 porcupines at two sites fin Central Massachusetts from 1991-1993 to quantify habitat use. The study determined the use of deciduous trees reflected the flowering and fruiting times of the species of trees and found in the summer heat, deciduous trees provide protection from heat because of the large and dense crowns, while in winter it is thought the crowns of conifers protect against heat loss. Although recent studies in the western US indicate that conifer cover is not critical to porcupines during winter (Griesemer et al. 1998). The research project also demonstrated porcupine selection of tree species varied according to availability of species, and the selection of den types also varied according to availability. The study concluded that porcupines occupy a broader niche in the summer but become more restricted in their habitat use during the winter. A decrease in eastern hemlock *(Tsuga*

Canadensis), a tree species identified as an important winter food source and shelter, may increase the mortality of porcupines due to winter stress and predation (Griesemer et al. 1998). Porcupines have an especially difficult time travelling in deep snow. They subsequently will reduce their home range from summer to winter. Porcupines appear to select their winter range based on the availability of suitable winter food supplies in a small area (Griesemer et al. 1998, Roze 1984), This increases their efficiency by reducing the output of energy used to get to a nutrient-poor food source. In winter, they feed on inner tree bark, buds and needles (Roze 1984). Porcupine in Manitoba would most likely feed on spruce species and jack pine during the winter season (Table 1) and supplement their diet with aspen during the summer season (Table 2) (Roze 1989).

During summer porcupines in central Massachusetts feed primarily on oak *(Quercus spp)*, aspen, basswood *(Tilia Americana)* and ash *(Fraxinus spp)*. Oak is a primary source for food and cover during May through October while aspen and willow *(Salix)* were important sources of food in May. Porcupines will use a variety of tree species in the winter, although hemlock is preferred even though it may not be widespread. Hemlock may offer benefits of thermal protection, cover from predators, beneficial tree structure (animals are less inclined to falls because branches are less brittle) and nutritional qualities (Griesemer et al. 1998).

Snyder and Linhart (1997) studied the level of selectivity demonstrated by porcupine in a in a ponderosa pine (*Pinus ponderosa)* forest in the Rocky Mountains. Relative to the level of selectivity exhibited by other, more specialist vertebrate herbivores such as

Abert's squirrel (*Sciurus aberti)*, porcupine proved to be more generalist in their selection of pine (Snyder and Linhart 1997). This supports Roze's (1984) theory that proximity to active dens plays a key role in determining trees used for feeding. There was some correlation in the Snyder and Linhart (1997) study which supported the hypothesis that feeding patterns are influenced at some level by the biochemical and genetic make-up of ponderosa pines upon which porcupines fed.

The density of animals in an area also appears to affect the porcupine selection of trees to feed on in the winter season. Harder (1980) determined that the number of porcupines in an area affected winter porcupine feeding preferences. In southwestern Alberta, a study over a forty year period determined that porcupines fed more on low density stands (< 11 trees/100 square metres) when the animal population was low (Harder 1980). When the population of porcupine was more abundant, more animals fed on denser stands. This indicates that lower density stands are preferred and that forest stands with more density are also usable (Harder 1980).

1.2.7 Mortality

Winter starvation is an important cause of mortality for porcupine (Roze 1984; Griesemer et al. 1998, Sweitzer 1996). Survival in Manitoba winters would be a constant pressure on porcupine populations. Griesemer et al. (1998) found that the most frequent cause of death for porcupines in the study area was starvation associated with winter stress. In a study of the porcupine demography in central Massachusetts, Hale and Fuller (1996) determined that adult porcupines died from starvation (annual mortality rate 0.08),

injuries (0.05), interactions with humans (0.04), and disease (0.05). However, the impact of predators is an important factor impacting the mortality rate. The natural predation of porcupines would fluctuate based on changes in the predator populations (Bowman et al. 2006, Powell 1993, Earle and Kramm 1982, Keith and Cary 1991). The relationship between fluctuations in fisher population has direct impacts on the rate of predation on porcupine as a regular food source in fisher diet (Earle and Kramm 1982).

1.2.8 The Fisher

An important consideration when evaluating a specific wildlife population such as porcupine is to identify any causal relationship with predators. Fishers are adapted to hunt porcupine and are considered to be its primary predator throughout its range, (Roze 1989; Powell 1993). This medium sized member of the weasel family is low to the ground, allowing them to attack the porcupine's face, which is not protected by quills. These animals are agile climbers, and are able to climb down a tree headfirst. This adaptation allows them to force porcupines out of trees and onto the ground, where the porcupine is more vulnerable to attack (Powell 1993). For best defence, a porcupine needs a suitable place to hide its head and protect exposed facial skin. Porcupines in dens are relatively safe from attacks, especially if the den has only one entrance (Powell 1993).

There appears to be a correlation between fisher predation on porcupine and the population cycle of hares *(Lepus americanas)* (Bowman et al. 2006). Porcupine may be more plentiful during times of high population of hares as the pressure from fisher is reduced. Likewise, until the low in the hare cycle is reached and they start to rebound,

porcupine decline may be attributed to increased predation by fisher (Bowman et al. 2006). Regardless of the hare cycle, fishers are known to regulate porcupine populations (Powell 1993).

Declines in fisher because of human trapping have been identified in areas across North America. In the State of Washington, efforts have been made to list the fisher as an endangered species (Stinson and Lewis 1998). The fisher in Washington State was decimated due to over-trapping, loss of habitat and as a consequence of pest control programs affecting the species food source. It has not been trapped legally in Washington for over sixty years yet a stable population still has not recovered (Stinson and Lewis 1998).

In Michigan, intensive trapping in the 1920s decimated the fisher population with the last recorded animal being trapped in 1931 (Earle and Kramm 1982). Following its extirpation, efforts to establish a stable fisher population proved successful. In 1982, Richard Earle and Kenneth Kramm published research, which evaluated the correlation between populations of fisher with the abundance of porcupine. Their research in the Ottawa National Forest in Michigan looked at the effect of fisher on porcupine populations. The authors consider that the porcupine and fisher populations have both been deeply impacted by people. In the late 19th and early 20th centuries, intensive logging reduced available habitat. When combined with intensive trapping, the fisher population in Michigan and areas of Wisconsin was decimated. With the last recorded fisher trapped in 1931, the porcupine population grew in the 1940s to a point where population control for porcupines was initiated in the 1950s. From 1954 to 1959 as many as 6 259 porcupines were destroyed in the Ottawa National Forest (Earle and Kramm

1982). In the late 1950s and in the 1960s, fishers were released at different intervals in the study areas. The study concluded that the reintroduction of fisher had effectively reduced the number of porcupine. The authors deemed that factors such as human impact through roads, forestry and changing habitat have a minor role in the decline in porcupine; an abundance of fisher can decimate porcupine populations.

While Earle and Kramm (1982) determined white-tailed deer (*Odocoileus virginianus)* and hare population fluctuations were unlikely to affect fisher predation of porcupine, Keith and Cary's (1991) comparison of porcupine population fluctuations with those of mustelid and squirrels and the snowshoe hare cycle did find a correlation. The results suggest that two years following the decline of snowshoe hares, there is an increase in predation on porcupine and the fishers' other secondary food sources. Carnivores such as lynx and fisher become more dependent on porcupine and other prey when a primary food source is no longer available to them (Keith and Cary 1991). Though affected by the relatively short cycle identified in hares, porcupine populations are not considered to be cyclical in the same way or with the same level of predictability.

1.3 Ecosite Classifications and Decision Support System

Between 1976 and 1986, the Canada Committee on Ecological Land Classification sought to refine a national ecological approach of hierarchical land classification based on existing research (Environment Canada 2007). The seven classification levels from the largest to the smallest are ecozones, ecoprovinces, ecoregions, ecodistricts, ecosections, ecosites and ecoelements. These classification systems were put forth as tools to be used

for mapping and to support sustainable resource management and planning (Environment Canada 2007). The ecosite level is mapped to provide the land classification at a level that is useful to managers. Mapping ecosites occurs at the 10 - 1 000ha scale and generally includes description of climate, physiography, vegetation, soil, water, wildlife activity on site and cultural, economic or recreational land use characteristics of the site (Kopra and Fyles 2005). Manitoba Ecosite Decision Support System (MEDSS) allows for the inclusion of biodiversity values, areas of cultural significance and was intended for use in sustainable forest management. MEDSS is a mechanism to inventory enduring features such as slope and a variety of characteristics including forest composition to support an Ecosite classification (Walker et al. 2002). The data gathered provides insight into the landscape through a set of ecological descriptors and social non-timber values. Ecosite Classification and Decision Support System and Keys were incorporated as a system with the purpose of guiding decisions in the forestry industry while including biological diversity and cultural values present on the landscape (Walker et al. 2002). The MEDSS identifies areas of biological diversity, outdoor recreation/tourism, spiritual and culturally significance, as well aesthetic qualities (Walker et al. 2002).

Ecosites are considered at the stand-level or slightly larger. The Forest Ecosystem Classification (FEC) for Manitoba was developed in 1995 to evaluate the ecoelement level but is not sufficiently large enough for mapping purposes (Zoladeski et al. 1995). The Manitoba Ecosite Decision Support System (MEDSS) was developed in part to fill the void between the ecosection and ecoelement level. The Forest Ecosystem Classification (FEC) plots represent a sampling area of 10 x 10m (Zoladeski et al. 1995). The FEC sized plots are repeated with a minimum of two plots with 50m to 100m distance

of separation to determine an ecosite classification (Walker et al. 23002). The ecosite classification along with the identification of social and cultural values provides a tool to enhance decision making for sustainable forest management practices and approaches.

Sustainable forest management is the management of forest to provide for healthy functioning forests for the future. Applying sustainable management is an adaptive process that requires continuous assessment (CCFM 2003). Sets of criteria and indicators have been devised to provide a science-based framework to define and measure the progress at a national level (CCFM 2003). The Canadian criteria and indicators framework is based on managing ecosystems to support natural processes, acknowledging the multiple values of a forest such as the economic, social, environmental benefits derived from the forest, involving and sharing information with the public and the need for knowledge and information to provide the best practice methods in forest management (CCFM 2003). Provincial and local level indicators can be developed through consultation and are applied to address specific sustainable forest management goals. Manitoba Model Forest in conjunction with Tembec Industries Inc. Pine Falls Operation have collaborated to consult and develop guiding criteria and indicators for the Forest Management License (FML) allotted to Tembec by the Province of Manitoba (Tembec 2002).

Sustainable forest management is important for all stakeholders involved in making decisions. Burton et al. (2003) consider that sustainable management specific to the boreal forest requires a shift in our view of nature, and an appreciation for non-commercial values and innovative techniques and approaches. Stevenson and Webb

(2003) outline some key challenges and issues related to sustainable forest management and aboriginal people. These include the protection of the environment, preservation of culture, economic and social development, recognition of treaty rights and self-determination as related to natural resources, self-governance and valuing of First Nations knowledge in decision-making. Applying MEDSS to gather a broad range of data at the ecosite level supports the inclusion of First Nation values in decision-making by altering harvesting plans in specific areas and potentially creating further dialogue in the future plans of forest harvesting.

1.4 Traditional Ecological Knowledge

Berkes (1999) considers there can be ambiguity when defining traditional ecological knowledge. "Traditional" can be defined as being based in time-tested practice and wisdom. Whereas "ecology" is better applied in a holistic sense of relating the relationship of humans with their environment (Berkes 1999). Traditional ecological knowledge (TEK) can then be applied as the living and historical knowledge of aboriginal people living with their natural environment. TEK is a reflection of the indigenous understanding of the ecological processes, and also of their role within those processes. Gathering and respecting TEK is an important mechanism to value aboriginal knowledge of the environment. Similarities found with TEK and western scientific research continue to support further research and collaborations. Integrating TEK into the management of resources can empower aboriginal peoples by adapting the methods and knowledge used to make decisions affecting aboriginal people and their environment (Berkes 1999).

The United Nations Convention on Biological Diversity has accepted the potential for traditional and local ecological knowledge to contribute to biodiversity conservation as a guiding principal. Article 8 states that traditional knowledge and current practices by aboriginal people should be respected, preserved and applied to support conservation efforts (Multilateral 1993).

Berkes (1999) applies four interrelated levels of analysis in traditional knowledge and the management of systems. The first level of local knowledge of land and animals is based on life experience. Berkes' (1999) second level is Land and Resource Managements Systems, which use local knowledge of the environment and the applied approaches to manage the resource. This requires an understanding of succession and interrelated ecological processes. The third level of analysis presented by Berkes is Social Institutions, which are respected as guidelines and regulate shared use (Berkes 1999). The fourth level is the World View. The information gathered from the interviews provided some insights into how the Elders viewed their changing world. Berkes (1999) cautions that one should not apply an absolute wisdom to the way traditional people interact with their environment, since aboriginal people have caused natural resource depletions and it is not beneficial to view them as infallible. Rather this level of analysis is based on perceptions of changes that are taking place externally and within the respective communities.

Grenier (1998) considers that Indigenous Knowledge (IK) is dynamic, not only reflecting knowledge from the past, but also changing as new information becomes integrated into

the way of thinking. All members of a community including elders, women, men and children have a level of IK. It is the quantity and quality of this knowledge, which varies with each individual. IK is presented as part of everyday life. Although IK is lost naturally, Grenier (1998) considers that impacts of population growth, market-driven practices, commercial influences on lifestyle as well as other factors are contributing to its rapid decline. The Canadian residential school policy also contributed to a loss of IK. IK is subject to change because it relies heavily on oral transmission. When young people leave their communities or adopt mainstream values and lifestyles, they are vulnerable to losing knowledge that could have been passed on from previous generations (Grenier 1998).

Davis and Wagner (2003) criticize the lack of methodology applied by many of the foremost leaders in the research involving TEK. In some published research, the mechanism used to identify experts is not mentioned and in others, expert identification is noted with few details (Davis and Wagner 2003). It is then a challenge to build capacity within the field of TEK research to evolve a guideline of acceptable practices and for other researchers to further develop the methodology based on field successes. The issue is the lack of transparency of how experts are identified and the lack of rigor in determining experts. Experts in topics of resource management are not confined to older members. In researching TEK and fisheries in St Georges Bay, Nova Scotia, Davis and Wagner (2003) applied a selection process by sending a questionnaire to license holders asking that they identify experts to be included in the interview process. These recommendations were then ranked and the results provided the basis for interviews of

individual considered by their peers as experts. In this type of research topic the people considered most knowledgeable by the fishing community were in fact those currently involved in fishing and not retired or older fishermen. Davis and Wagner (2003) outline a need for researchers to apply appropriate methods in determining the experts and include their methodologies so that future researchers can learn and refine the process (Davis and Wagner 2003). Davis and Wagner (2003) consider that interviewing a minimum of five experts in a field would satisfy a sampling method to provide three independent observations for specified knowledge claims along with the demonstrable level of information saturation on core questions (Davis and Wagner 2003).

1.5 Interview Based Approaches/Methods

Elders represent not only age and experience but also the tradition of teaching and transmitters of oral history and traditional beliefs. Elders are considered as being valuable teachers within traditional aboriginal communities (Kulchyski et al. 1999). Ellerby (2001) states that Elders are being increasingly involved to address health-care needs and institutional support of aboriginal people. Ellerby outlines the importance of approaching Elders with respect, proper protocol and an understanding of their role. Elders must be recognised as providing essential leadership and knowledge about Aboriginal culture and health (Ellerby 2001). Ellerby's (2001) elaborate work on roles and qualities of Elders, defining Elders, ways to approach an Elder with questions, questions of tobacco, gifts and compensation, are important for the method of this thesis.

The methodology applied to this inquiry is reflective of the method suggested by Tobias (1997). The interviews were scheduled according to the availability of the Elder and in a location best suiting the Elder. The distinct views of the interviewees were acknowledged. There is a hazard in seeking a pattern through data analysis when the lack of pattern may be more telling of individual views (Ellerby 2001). This is relevant in reflecting the variety of views and beliefs held within a community. The conclusions drawn from data must avoid making generalisations, which relate to all aboriginal people or communities (Ellerby 2001).

Grenier (1998) provides a comprehensive methodology for researchers, which respects the participants and provides good quality data. Grenier (1998) considers in some instances structured questionnaires can provide sufficient information, but such an approach does not apply in all cases. A more casual conversation technique is useful when the interviewee may need some encouragement to participate or simply feel comfortable answering. Sometimes the interviewee will wander off topic or simply appear to not answer the question directly. Answers will sometimes come in the form of a story or a legend. Haener et al. (2001) describes the approach taken in working aboriginal people in Saskatchewan when determining value attributes of subsistence hunters. The primary interviewer lived in the community for a year and found that the gift of tobacco and time were important in developing a level of trust. Along with Choice Experiments the use of conversation style interviews allowed free flowing conversation and storytelling (Haener et al. 2001). The interviewer must be able to gently probe when appropriate and redirect the interview when necessary. The experienced interviewer

brings with him or her sufficient knowledge of the culture and of the subject in question along with appropriate language to provide the backdrop for a successful interview (Grenier 1998)

Grenier (1998) suggests group interviews are best used to reach a consensus; otherwise they tend to encourage the participation of only a few who feel comfortable speaking in groups. Paired interviews such as husband and wife are valuable as they can support each other and create a more comfortable atmosphere. Individual interviews encourage a person to feel more comfortable sharing what they know. The length of the interview should not surpass two hours (Grenier 1998). Grenier (1998) considers that much traditional knowledge is difficult to classify because the information may be presented in the form of stories, or the answers may span several topics. A recording allows the interviewer freedom to concentrate on the process while providing a lasting record of what was said. Maps can be useful tools to help people remember things and to frame the topic in question (Grenier 1998).

Baum (1977) regards the use of oral history in modern research techniques as a key component in preserving the knowledge recounted by participants. It is best when it involves the recording of an interview with a knowledgeable person, someone who speaks from personal participation or observation about the subject of interest (Baum 1977). Baum (1977) considers that good quality transcribing of interviews can add to the sense of identity for a community by valuing and documenting the knowledge held by the elder members of a community. If transcription is not well done there is potential to

create a negative perception for the community towards the project. Documenting oral history is an art, not an exact science (Baum 1977).

1.6 Objectives

This study set out to explore the lack of porcupine in the communities of Black River and Hollow Water First Nations with a focus on the perspectives of Elders on changes in the forest environment.

1. Enable Elders to share their cultural views and knowledge about porcupine in the past, present and future.
2. Involve local youth in the survey of areas of interest by applying the Student-friendly Ecosite data gathering techniques.
3. Identify potential causes responsible for the decline of porcupine and factors limiting their repopulation.
4. Determine what, if any, action should be taken to address the decline of porcupine within sustainable forest management practices.

Chapter 2 – Study Area

2.1 Introduction

The First Nations of Hollow Water and Black River are Ojibway communities located on the southeast shore of Lake Winnipeg at 51°10'48" N, 96°17'54" and 50°59'41" N, 96°18'26" respectively (p.133 in Appendix). This area within the boreal forest is considered part of the Lac Seul Upland Ecoregion and more specifically the Wrong Lake Ecodistrict (Smith et al. 2001).

2.2 Geography

The boreal forest is considered to make up one of the largest biomes in the world covering approximately 8% of the global landmass (Macdonald et al. 1998). The boreal forest constitutes the largest ecozone in Canada stretching from northern Alberta to Newfoundland. In Manitoba, with the exceptions of the extreme north along the Hudson Bay coast, and the prairie and parkland regions in the southwest, the boreal forest covers the majority of the Province.

2.3 Climate

Manitoba experiences variable continental climate with very cold and dry winters and hot and wet summers (Blair 1996). A sub-humid Transitional Low Boreal characterizes the climate along the east side of Lake Winnipeg. The mean annual temperature is in the vicinity of 0.8 °C for the nearby community of Bissett (Smith et al. 2001). The average growing season is 168 days and the annual precipitation is in the range of 589 mm with two thirds in the form of rain (Smith et al. 2001).

2.4 Physiography

The study areas falls within a transitional zone between a peat-covered lowland area to the west and the bedrock dominated Nopiming Ecodistrict to the east. The bedrock along the west side of the district along the shore of Lake Winnipeg is described as being covered with clayey and silty, glaciolacustrine sediments. Drainage is east west and two large rivers occur in the study area, the Manigotagan and the Black River, which flow into Lake Winnipeg. The slope is between 1.0 and 2.0 m per km. Within the Ecodistrict are level peat bogs, irregular slopes along the bedrock and steeps slopes in areas of bedrock outcrops (Smith et al. 2001). Wetlands cover up to 25% of the ecoregion (Smith et al. 2001).

2.5 Soils

A range of mineral to organic soil occurs in the study area. Peatlands are more frequently encountered in the western portion of this Ecoregion. These areas are characterized by poorly drained Typic (deep) and Terric (shallow), Fibrisolic and Mesisolic Organic soils covering loamy to clayey glaciolacustrine sediments (Smith et al. 2001). The eastern portion of the ecoregion is characterized by well drained Dystric Brunisols soils and bedrock. The bedrock is frequently exposed with loose stones and a coarse surface or a slight covering of soil, which limits vegetation growth because of poor water and nutrient retention (Smith et al. 2001).

2.6 Vegetation

The vegetation found in the boreal forest is not rich in diversity and is made up primarily of hardy species of pine, spruce, larch *(Larix laricina)* and fir *(Abies balsamea)*. The dominant canopy is made up of coniferous trees with some areas closer resembling mixed forest. Trees common to the area are jack pine and black spruce in areas of good drainage, white spruce, balsam fir *(Abies balsamea)*, trembling aspen and balsam poplar (*Populus balsamifera L.)* (Burton et al. 2003) Following fire and other disturbances to the forest deciduous species of hardwoods of birch, poplar, willow and alders diversify the landscape (Hare 1972).

2.7 Communities

2.7.1 Black River First Nation

The Black River First Nation is an Ojibway first nation community located on the eastern shore of Lake Winnipeg and at the edge of O'Hanly and Black River approximately 150 km northeast of Winnipeg, 30 kilometers north of Pine Falls, and 50 kilometers south of Hollow Water First Nation. The community is accessible via Manitoba Provincial Road #304. The Black River Indian Reserve No. 9 covers 809 hectares (2 000 acres).

The on-reserve population of Black River in 2006 was 460 (Statistics Canada 2006), up from 389 in 2001 (Statistics Canada 2001). No figures are given for off-reserve population. There are 135 houses on the reserve (Statistics Canada 2006). The Southeast Community Futures Development Corporation (SCFDC website 1996), lists Black River's on-reserve population as 472 as of December 1996. SCFDC also gives an off-

reserve population of 183 for a total population of 655 in December 1996. Economic activities include trapping, wild rice harvesting, hunting and commercial fishing (SCFDC 1996).

Black River has several current environmental monitoring projects and has hosted traditional knowledge workshops. In 2005 Black River Elders and youth discussed Traditional Environmental Knowledge (TEK), or, as it is now known, Aboriginal Traditional Knowledge. The community is leading an assessment of quality in rivers and streams across eastern Manitoba. People are also working to determine how forestry can best address water quality concerns in the planning and conduct of managing the forest. Spawning rapids have been improved near Black River in an effort done to enhance walleye *(Stizostedion vitreum)* spawning activity. The community also participates in a program to teach Grade 10-12 students at schools in Powerview, Hollow Water and Lac du Bonnet about climate change and its affects on the boreal forest. From June to September 2004, more than 60 students participated in field trips to learn the use of sophisticated monitoring equipment to track changes related to climate change.

2.7.2 Hollow Water First Nation

The Hollow Water First Nation is an Ojibway community located on the Precambrian shield of the eastern shore of Lake Winnipeg approximately 200 kilometers north-northeast of Winnipeg, 85 kilometers north of Pine Falls, and 50 kilometers north of Black River First Nation. The community is accessible via Manitoba Provincial Road #304. The Hollow or Hole Water Indian Reserve No. 10 covers 1 619 hectares or 4000

acres (SCFDC 1996). Economic activities include fishing, hunting, trapping and wild rice harvesting (SCFDC website 1996).

The on-reserve population in 2006 was 619 (Statistics Canada 2006), down from 622 in 2001 (Statistics Canada 2001). The SCFDC website puts the on-reserve population at 593, and the off-reserve at 489, for a total population of 1 083 (SCFDC 1996). The Hollow Water First Nation is a signatory of Treaty Five with the Government of Canada.

2.8 Treaty Five

Among the many Aboriginal groups that signed treaties with the Government of Canada, Black River First Nation became party to Treaty Five in 1878 as well as Hollow Water First Nation (Coates and Morrison 1986). Treaty Five is unusual in the history of numbered Canadian Indian Treaties, in that it was a two-part process. Treaty Five negotiations began in 1875 and were completed in 1910 when more northern First Nations were included in the Treaty. The terms of the Treaty called for 160 acres of land to be allotted for each family of five. The 30 bands that signed onto Treaty Five all received the same amount of land. This was substantially less than the 640 acres per family granted to indigenous group on the prairies in other numbered Treaties (Coates and Morrison 1986).

The government of the day was not eager to negotiate with aboriginal groups along Lake Winnipeg because it was felt the land was of marginal use for future non-native development and the communities did not require large tracts of land to support farming

but the area was of interest as a wood supply (Coates and Morrison 1986). Coates and Morrison (1986) consider that even by 19th century land values, the government gained control over the land well below cost.

Treaty Five was also unique in that some aboriginal communities requested to be included in the Treaty process. With increasing social and cultural change, some groups accepted the promise of government payments to help them through difficult times. The Black River band had accepted the treaty in 1889 but many members had been absent during negotiations. Individuals who had been away working for the Hudson's Bay Company, fishing or hunting were excluded from the process and were not given the opportunity to voice their concerns (Coates and Morrison 1986).

In July 2007, Black River First Nation announced that they were taking legal actions to reopen the terms of the Treaty (CBC 2007). Part of the basis of their legal challenge is that other Treaties provided a much larger land base for other communities (CBC 2007). A successful court decision on behalf of Black River First Nation could substantially increase their land holdings and have far-reaching implications for other communities covered by the terms of Treaty Five, including Hollow Water First Nation.

2.9 Future Land Use Considerations

There are several potential land use developments in the near future for both Black River and Hollow Water. By 2012, the road serving the communities will be extended north to Bloodvein First Nation (WFP 9 April, 2007). The provincial Progressive Conservative

Party promised to build a major Manitoba Hydro power transmission corridor in close proximity to the communities (CBC 14 May 2007), keeping with leading daily editorial opinion opinions (WFP 27 September 2005; 29 September 2005), but in opposition to the New Democratic Party, which was re-elected in 2007.

There are several other factors affecting the surrounding the areas around the communities, including cottage lot development on nearby lakes and rivers, and provincial government protection for the Manigotagan River. The Black River First Nation is also proposing what it calls an "eco-residential community," along the banks of the O'Hanly and Black rivers (Black River website, 2007), and international attention has also been drawn to the area of the East Side of Lake Winnipeg, with its current consideration as a UNESCO World Heritage Site. International timber companies also have an economic interest in the surrounding forest, as do travel companies and hunting and fishing outfitters. Mining exploration in the area is also growing.

Chapter 3 – Elders Interviews: Black River and Hollow Water First Nations

3.1 Introduction

The decline of porcupine has reportedly taken place over the last forty to fifty years in the communities of Black River and Hollow Water First Nations. Elders from each community were interviewed to provide the basis for understanding the role and value of porcupine from a local perspective. Their insights and their stories represent a living knowledge of a species that has not readily been seen at the local level for decades. Elders shared information about porcupine specific to their area, while also providing information about their views on changes in the environment. The interviews provided insight into the cultural value of porcupine and provided direction for future action to address the decline. The purpose of this chapter is to describe the Elders traditional knowledge of porcupine as shared during the 2004 interviews in the Black River First Nation community.

3.2 Method

Interviewing Elders was the principal method of recording how porcupine fit into the lives of the people when they were plentiful, the concern for their decline and associated values. At the beginning of the field season, brief presentations were done for the Black River Traditional Advisory Committee (TAC) , Hollow Water Traditional Advisory Committee to make the Elders in the communities aware of the project and its goals. Elders were either identified by community members or are members of the TAC for Black River or Hollow Water.

Posters were distributed to the band offices, and local stores as well as in the surrounding communities in areas of high traffic such as the gas stations in Pinefalls. The poster introduced the research topic and invited any interested individuals willing to share information to please contact the researcher (p. 129 in Appendix).

Between mid-June and mid-September of 2004, a total of 15 informal interviews were undertaken with Elders (Table 1 in Appendix). This resulted in approximately 8 hours of audio recordings. Elders signed consent forms to allow audio-recording of materials on a minidisk player recorded through a lapel microphone. The minidisk and lapel microphone are discreet and non-invasive, and provided an acceptable quality recording. The interviews were done in the community, most often in their homes. Elders were given a gift of a hand-made leather pouch, tobacco and an honorarium for their participation in the interviews.

The interviews were devised to allow Elders to share information about past experiences with porcupines, potential causes for their decline, cultural value of porcupine, past and future potential habitat sites and future response. The interview questions were separated into general topics. The interview questions were open ended and the process was adapted to include more familiar terms. Since Elders have different experiences and knowledge, not all topics were covered with the same depth during each interview. The interviews were transcribed, sorted by topics and clustered to identify shared ideas, similar themes and quotes were then selected as representative of shared thoughts or

unique perspectives. Transcription and clustering ensures anonymity as stipulated in the Ethics approval (Appendix). The names of Elders have also been omitted from the transcribed work, in accordance with the non-disclosure clause granted with the Ethics approval from the University of Manitoba. The analysis of the information is intended to highlight the points that were made by the Elders and ,direct quotes are intended to provide the answers in the Elders words. Where required for citing interview material with interviewer questions needed to understand context of response E=Elder and I= Interviewer

3.3 Black River First Nation - Elders Share Their Porcupine Stories

At the onset of the interviews with the Elders, it became apparent that recalling fond childhood memories of porcupines was entertaining and brought happy memories for many of them. Several Elders spoke of close interactions with the animals, which may have fostered a life-long appreciation of these creatures. When asked what porcupine experiences they would be willing to share, most Elders recalled seeing them as children, from the mid-1950s to mid-1970s. Even though they were told not to bother the animals, some Elders, as children, could not resist the temptation.

> "We used to play with them, there were so many of them at the time, there were quite a few of them. We used to make them swim across. When we were kids we played with them. We didn't know they were dangerous [laughs]."

The stories involving porcupine that were shared during the interviews incorporate many different viewpoints. The discussion about porcupine spanned beyond their decline and

expanded into the context of porcupine encounters, wildlife habitat needs, from the trapper's perspective and as an animal connected to a different time. The stories and responses shared by Elders fit together as an account of changing times for both wildlife and people. The following work is a compilation, which applies direct quotes from Elders to tell their stories in their own words. The summary and analysis of the interviews were undertaken with respect and gratitude toward the Elders who agreed to share their thoughts.

> "It was a long, long time ago. That's the time that I was going to school in the elementary and we used to walk part of the forest and before we'd come into the community. There was probably jack pine and trees like that. That's where there used to be a lot of porcupine. It never failed, you always used to see one when you walked by there."

Porcupines were remembered fondly as an animal regularly encountered by children. The Elders' shared response was that porcupine were seen frequently within the community either in the bush, along the lake, or occasionally approaching houses. Though the parents or grandparents of these children warned them not to bother porcupines, some boys seemed to have enjoyed flipping them over with a stick and tickling them.

> "There were lots all over, we used to play around with them, we would tickle them, turn them over, and tickle them. We would be giggling. They laughed. Ticklish porcupine [laughs]."

As expressed during the interviews, the Elders valued the porcupine in many ways - in the context of their past presence in the community, as an emergency food source, as a species that was interacted with and as part of the living forest. It was clear porcupine are important to people.

> "For me, any four-legged creature is important because the Lord put them here. And that also goes for herbs."

> "Important, for people... they kill them, they roast them. My father used to do that."

The porcupine was used as a supplementary food for families. Though not seasonally hunted, a family would eat an accessible and easily captured porcupine. The parents or frequently the grandparents would prepare and cook the animal. Some remembered it as quite tasty, while others did not care for it. It should be noted that the frequency with which porcupine were eaten thirty to fifty years ago was likely connected to the potentially high population which existed prior to the decline. It should not be understood here that the people in this community were dependent on porcupine but rather occasionally made use of an abundant species.

> "Well, people you know, they ate them. But now I don't see them, so I can't eat it. Especially the young generations like this. But I would like to try it. Young generations they don't care about porcupine anymore. We'd like to see them come back."

The importance of porcupine appears to be connected to their former abundance. The Elders' fondness for porcupine is a reflection of some of their earliest childhood memories of these animals. For some Elders sharing a meal of porcupine represents a strong family connection.

> "My grandfather used to make us eat porcupine when we were kids. That's why I look around for it. I figure I'll get one and see how it tastes now."

3.3.4 Importance of Porcupine as a Food Source

For people in the bush, a porcupine could prove to be an important emergency food source.

> "Yeah, I guess so because they [porcupine] can hardly move. You know if you get stuck someplace and you've got nothing to eat, and nothing to kill it with, that's the easiest target. At least you have something to eat."

According to some Elders, it was common knowledge if you were stuck or lost in the bush with no food, a porcupine could be easily killed with a stick to provide fresh meat.

> "Well, that was Indian survival, catching them in the bush. You know when the Indians go out in the bush, they get lost there. You kill them (porcupine), you can roast them. You have to burn those quills before you cook it. Because I used to watch my grandparents, how they fixed it, they'd put it right in the fire, and scrape that thing."

The Elders agreed that porcupine had been a food source for people in the area. And thirty or forty years ago, it had been their Elders or grandparents who prepared the animals and who were most open to eating porcupine.

> "Well, my grandpa used to boil it after he cleaned it. Because he used to make a big fire and he tied the leg behind... burned all those hairs. All those hairs, and he burned it and scraped it, and scraped it good. Then he took the guts out, and he cleaned it and washed it, but it was good, it was good."

Porcupines appear to have been prepared and eaten with some frequency by the families of some Elders. One Elder who lived in Fort Alexander (now known as Sagkeeng Ojibway Nation), was paid twenty cents to kill porcupine for his great-grandpa and other

Elders who ate the animals. He recalls as a child killing at least ten porcupines to bring to the Elders. This is a large number considering their reproductive rate.

Elders recalled how the animals "presented" themselves as a food source.

> "Yeah, it was an open area like that and a little path there. I guess that's why my grandpa said they were feeding us. So he killed it. It doesn't happen everyday that somebody comes to feed you."

How to Prepare Porcupine

Being that porcupines are such curious looking animals adorned with dangerous looking quills, it is understandable that the method with which to prepare this animal may have stuck in a young persons memory.

> "I watched them. My mom was helping the lady and I remember I sat there and watched them. I remember sitting on the pail, just looking at them. What they were doing was making a big fire. They singed off the quills, washed it, and peeled it. The meat is white. And after everything is clean they cooked it. The one I ate was roasted porcupine…They made it in an old cast iron stove, they made a fire in there. You open your oven, shoved it in there, and I liked it. Very good with ketchup. That was quite a while ago, I'm sixty-one now."

Though there are consistencies and clear recollections of how the animal was prepared, memories differed as to how the animal tasted.

> "Some say that you can taste the tree they used, the bitter taste. I must have been too small to notice. I ate it and I don't recall that it tasted bitter. I was about seven."

It is estimated that 70 percent of a porcupine is useable meat. (White 1953). That would mean a single 5 kilogram animal could provide 3.5 kilograms toward a meal for a family.

"My grandpa called us 'Help me to kill this, somebody is feeding us' he said [laughs]. So he killed it, and cooked it. And it was just a small one, but mind you it fed all of us. We had a big family. I had eleven of us in my family, my granny and my grandpa and my dad. There were eleven of us kids. We all ate from there, that small little animal."

3.3.5 Role of Porcupines in Ceremonies and Teachings

The interview question concerning whether porcupines were part of any ceremony or traditional teachings was presented to identify whether porcupine played a sacred role for community members, and if it did have such a place in the culture, why. There were conflicting recollections of their place in ceremony or traditional teachings. Though unsure and unable to recall with certainty, one Elder thought the animal may have been part of a ceremony, while another thought they may have been part of the clan system. It must be noted here that it could have been inappropriate for someone outside the community to be asking such cultural questions. It is possible that even if porcupine were involved in ceremonies or teaching, an outsider may not have asked the proper questions at the right time, or in an appropriate manner. It is also possible that the decline of the animals' population brought about a coinciding drop in associated cultural traditions. Some Elders noted the porcupine was a cause for a feast. When a porcupine was killed, it would be prepared traditionally and either cooked over a fire or roasted. Elders said it was a time to express thanks and gratitude to the animal for presenting itself to feed the people.

"Our great grandfather came from Bissett, my mom's dad he came from Bissett and they'd seen one they said. 'Let's have a feast,' they said when they killed that porcupine. And the next day they gave us

> something to eat. But it was nice, though. I liked it. It was a good meal, anyway. At that time, they knew how to fix things and it tasted good. Like today, all they eat is chips [laughs]."

Based on the responses to the majority of the interviews, porcupines do not appear to have been a part of any ceremony or have any particular sacred purpose for this community, but they were definitely valued as an emergency food source, and in a sentimental way as an animal seen when Elders were young children. Though they may not be associated with ceremonies or traditional teachings within living memory, they are still very much valued as a part of 'the bush.'

The Tradition of Quillwork

Quillwork does not appear to have been a widespread traditional craft in this community. Although Elders were aware of the use of quills in traditional crafts, it is remembered as being an uncommon one. Quills or porcupine needles were used by some people in the community some time ago to make designs on moccasins, boxes and earrings. There was an account of an older woman in the community who was known for making various crafts some of which incorporated porcupine quills. She passed away a long time ago and there does not appear to be anybody in the community who has maintained that particular tradition. This is not surprising if porcupine have declined in the area. Passing on a tradition of quillwork would not be a priority when the animals that provided the raw material have not been in the area for decades.

3.3.4. Porcupine Food Source Preferences

It seemed somewhat difficult for some Elders to remember what porcupines eat because it has been reportedly at least thirty years since the animals were commonly seen in the community. Trees that were associated with porcupine ranged from jack pine *(Pinus banksiana)*, spruce (*Picea*) and tamarack (*Larix laricina*), while others also thought aspen *(Populus tremula)* was perhaps occasionally used by porcupine. Paper birch (*Betula papyrifera*) was not considered as useful to porcupine.

Elders did identify that branches devoid of bark were signs of porcupine feeding areas. Porcupines would also be spotted near houses and were considered to be searching for food.

> "Oh, yeah, I used to see them [porcupine], they used to come around. Behind there, there was a bush there, and the jack pine in there as well, and that's where they were hiding out on the jack pine ridges. They eat a lot of that stuff, like fresh-grown trees or something like that."

3.3.7 Population Decline of Porcupines

Elders in Black River considered it to have been a long time since they last saw porcupine in the area.

> "I haven't seen them . . . that was the last time I saw one. I think when I was eleven years old. That was the last time."

When asked whether they were concerned over the decline of porcupines the Elders focused not on the fact that the porcupine population was low or had declined, but rather on the return of the animal. Many Elders felt that porcupine would come back in their own time as part of a cycle.

"Yeah. I'm a trapper now and I was mostly always in the bush. I've seen a lot of all kinds of animals. And there used to be a lot of porcupine around, until about thirty years ago and then they… I guess it's just like any animal. Like beaver, and all the lynx. One time they're coming and they stay around for a while and then they start to move."

"I guess those animals move, and generations—they'll come back again. So, we'll start seeing them one by one—one at a time, so maybe gradually it's coming back."

3.3.8 Porcupine Predators

Elders who had trapped or lived with a trapper identified fisher, wolverine (*Gulo gulo*) and wolves (*Canis lupus*) as major predators for porcupine.

"E1: Yeah. A fisher would kill a porcupine and probably wolverine too because they're almost the same—fisher and wolverine—they're almost the same except wolverine is bigger and stronger."

Some Elders were unsure what could kill a porcupine. Domestic dogs (*Canis lupus familiaris)* were identified as having conflict with porcupine but they were not thought to actually kill the animal.

When questioned about the fisher population, Elders felt that they too were in the process of reestablishing in the area. The concept of wildlife cycles was considered as a reason behind the population fluctuations of these and all animals.

"E1: Oh, there's a few fisher, wolverine is starting to come back. They killed one in Fort Alec this winter. Trappers, yeah. And I saw tracks here, about twenty or thirty years ago, wolverine tracks, it's just like a little bear.

E2: But it's a distinguishable track so you know what kind of animal it is. Or you wouldn't know which animal is which. "

3.3.9 Other Wildlife Population Fluctuations

When asked if there were animals which had been seen with less frequency in the area, a few Elders identified moose (*Alces alces*), caribou (*Rangifer tarandus*), squirrels (*Sciuridae*), lynx (*Lynx canadensis*), wolves, songbirds (*Passeri former*) and ducks (*Anatidae*).

In the past moose, an important historical food source for many families, had been plentiful near the community. Some Elders felt that they were beginning to come back.

> "E1: Even the moose are starting to come back. I've seen them on the road.
> E2: Yeah, we never saw them for a few years. There was one time when you'd go by in your vehicle and there would be a moose right there and they don't run away, eh? There was none, and now they're starting to see them again."

Lynx were considered to be animals that travel around depending on the food sources available to them. Their relative low numbers were associated with a cycle which can be as brief as two to three years.

> "Well, that's [lynx] a traveling animal too like all these—martins, fishers, and all that, that moves around. They trap, like this year, they have a good feed around here, they have lots to eat and then the next year there's nothing, next year they move. Two, three years, they'll be gone, they'll be a few, but two, three years and there will be a whole bunch of them again."

The decline in squirrels was connected to the lack of jack pine in the community.

Reported declines in these animals may be representative of actual population changes, or may also be the result of a perceptual change as the Elders are less frequently in 'the bush.The only animal identified as overly plentiful were beavers. The beaver was discussed at further length in the context of trapping.

3.3.10 Changing Habitat

With the understanding that several decades ago seeing a porcupine was a relatively common occurrence, it can then be deduced that there was suitable habitat to support a porcupine population in the area. Among other factors, wildlife is dependent on suitable habitat for survival. It is then important to consider how the habitat, in this instance the boreal forest, may have changed over time.

The Elders all agreed that the forest has changed. There were three major causes identified as being responsible for the changes in the forest. A visible reason for the changes in the forest was as a result of forestry activities. Cutting down trees has reduced the amount of trees around and encouraged the growth of shrubs. The main issue with forestry activities appeared to be the extent of the tree cutting.

> "Because lots of people came and cut down all the trees. Because of man. Man person, man people, man company, whatever you want to call them. Once they started cutting here our native men started getting into pulp cutting. Trees were close, you didn't have to go far to get cut. They were right outside your door you might as well say. And then they started cutting because it meant that the men were getting a few bucks for living. But then it became too much and we lost all of our nice trees. There's a few trees right across there, over there where I lived,

> there used to be lots behind and also across. There's none now. It's all shrub that's growing."

The paper mill was also cited as a cause of forest decline because of the perceived poisonous smoke that had been emitted as a result of the pulp processing. One Elder expressed concern that this smoke was causing sickness in the trees by killing the bark. The effect of the paper mill was not immediately evident in the community because of the distance from the mill.

Manitoba Hydro activities were the third factor considered by some Elders as contributing to the decline of the forest.

> "The Mother Earth is the same like us, you see the rivers and the creeks all over, that's just like veins. And the Hydro gave the Mother Earth high blood pressure like we are, that's how come our people are getting sick, because of it. Look at all those rivers, they are getting wider and wider, and it wasn't that wide, it was just narrow and now today it's just like a lake. That's how much he spoiled mother earth. That's what Hydro does. That's the Hydro that gives us the sickness. All those, he gives the mother earth high blood pressure because he gives you all those dams than what the normal sizes that we got."

Elders recalled that some twenty years ago, Hydro would spray poison under the power lines to kill trees growing there. There was one account of a group of people picking blueberries under the power lines when they too were sprayed with the herbicide. The Elders' perception of Hydro is of an imposing industry which tries to control nature. One Elder shared a story about choosing to shut down her hydro when her children were young.

> "We could protect the forest if Hydro leave it alone, leave it. Quit putting the Hydro all over. That's why they really spoiled it. Maybe the people in the city need a lot of light, but not out in the country, you don't have to put Hydro lines all over the reserves. One time here, when my boys where small, they were just kids, the biggest one was about this tall, I was trying to tell them to sleep, put the lights out. They don't want to sleep, they put the lights on again and start . . . So, I cut off my Hydro. I told them I can't pay for it because I want my kids to sleep. I want them to have rest at night. And they did it. I used to make a fire outside to cook . . . And then I used an oil lamp. They put that out and they went and play outside . . . They were playing, you can hear them laugh and run. I told them they would sleep when they have no light. The next morning, I asked him why they didn't sleep, and the oldest one said: 'it would have been nice if we don't have no Hydro because we can play in the moonlight. It must be nice a long time ago.' I thought they wouldn't like it, but they really enjoyed it. It must be nice when people don't have Hydro. And they really enjoyed it when I cut the Hydro."

The Elders did acknowledge that Hydro is now involved in consultations and that spraying under power lines is no longer being done.

The last major cause attributed to changes in the forest was fire. The big fires that consumed much of the forest surrounding the community altered the bush. The concern was that some fires are man-made and the trees take a long time to come back. Fire was also seen as a natural process that helped in rejuvenating the forest especially the berries. But fire along with the forest industry have affected the types of trees that grow near the community.

> "Oh, yeah. The evergreens are mostly gone now it's Poplar in the place that the fire went through, but in some places it comes back. But in places like here, that's about all you see now, Poplar, but before here there were trees like this all over."

Elders agreed that these changes in the bush contributed to the decline of porcupines and other animals in the area. These changes in the bush contribute to the decline in wildlife and quality of life for people in the community.

Impact of Fire on the Forest

Fire was discussed with four Elders interviewed. The general thought was that fire had impacted the forest by destroying animals and their habitat. One Elder suggested that " (fire) destroys a lot of stuff. All the things like that, not only porcupine, but a lot of things that people don't realize. Even fish get destroyed by it. The fish suffocate because of the smoke and ashes." The big fires that occurred in the 1980's left much of the bush in the surrounding area destroyed. The long lasting effects are readily seen along the highway. As the dead trees remain standing in the bog. Forest fires threaten communities along with the natural resources such as the trees the forestry industry depend on and have lasting impacts on the wildlife in the area.

> "Yeah and the fires . . . hard to run away. It's [porcupine] too slow to go around, get caught, whole lot of things going on around the fire, destroys a lot of stuff. All the things like that, not only porcupine, but a lot of things that people don't realize. Even fish get destroyed on that. Yeah, it's like they suffocate on that smoke. I went down Knee Lake that way and the fire came to where there was a lot of fishing and jacks like that. About a week later, there were some big dead fish floating."

The Future of the Forest

There were varied responses to this question. Some Elders felt that the bush would continue to disappear leaving behind barren land.

> "I think it's going to look like coming from Pine Falls, coming from Winnipeg to Pine Falls. Bald! Nothing! I don't think it will take long either. I won't be here anyway to see it. Maybe 2020."

One Elder suggested that the Creator would clean the land and remove the dams that are spoiling the bush. There was a sense from some Elders that the state of the forest was getting progressively worse because of the impact of people and industry.

> "In the future? If the Hydro keep on putting the lines on the land, it won't last long. Those dams there will be all over, and break like little pieces. And nobody is going to put through them anything in there because it's going to break because the Creator is going to clean her land once in a while."

But other Elders were more optimistic that the forest could heal itself and regenerate with some help. These Elders suggested tree planting was important in restoring the forest and that in time the forest could be better. There was concern expressed that the trees left standing along the roads masked the deforestation that was taking place beyond the view of passing vehicles.

> "They start planting trees, that takes years too. Some of them seeds go to the highway. That's the only place they're left. You go past that and there's nothing left."

When asking Elders about the fate of the forest, it is important I feel to recognize that they have witnessed many changes in their surrounding area that it is reasonable that they may feel pessimistic about its unknown future.

3.3.11 Elders Share their Trapping Perspective

Five of the Elders in Black River have trapping experience, and some are still active on trap-lines. Involvement with trapping includes direct (trapper) and indirect (cleaning and preparing pelts). This 'front-line' source of traditional ecological knowledge can be compared with historic trapping data to assist in identifying potential population fluctuations in porcupines and other furbearing animals. The provincial trapping records for Lac du Bonnet (which includes the area of Black River) supports the fluctuation in trapping frequency of porcupine predators including fisher as suggested by Elders (Figure 1. in Appendix).

Respecting traditional trapping knowledge, and first hand observations from the trappers provides unique insights into local animal populations and associated cultural values over a period of time. When discussing trapping, it became evident that in the past trapping was integral to making a living and being a part of a community.

> "Yeah, but one time everyone was [making a living off trapping]. They set our trap line up in one place and you had a section. Nobody went trapping where you were trapping and then the next and the next. And when they did leave a trap or something, you would just maybe shoot a beaver for a friend, you would just leave it and they would come and get it. That's how it was."

That lifestyle has changed much and continues to change as fewer young people are interested in trapping. Those that do trap today also approach trapping in a different way. Skidoos are used to get out into the bush rather than going by foot. For many trapping is a bonus income rather than a main source of income. For some Elders, they now have more time to trap and use the money as supplemental income.

> "Down, it [the price for pelts] came down. Trapping is good, it comes in handy for a guy who does nothing, like us old timers and they don't want to hire us or

> anything so we go out and do trapping. To me trapping is a lot of work, a lot of walking and stuff like that, and you got to know this and you got to know that and you are out all day, but still its part of life. Make a few dollars. It comes in handy, around Christmas time especially."

Elders were concerned that trapping was going to become a thing of the past. This also supported their concerns that the younger generations are not connected with the land. A few Elders did speak of some young men that were trapping and had another employment.

> "No, not at all, they're [young people] not interested at all [in trapping]. I don't know what. But there are a lot of younger guys, but still they work and they go out and go trapping. There are a few guys that I know here, young guys, they always do that, they go trapping, but they go farther up this way, and they used skidoos and stuff like that to get way out."

During the learning process of interviewing Elders, the section on trapping was refined to respect the supporting roles that women would play by helping to clean and prepare furs and supporting their partners who trapped. One Elder recalled her husband being away from April to May trapping mostly beaver.

The understanding of the population fluctuations of wildlife was a fact that was clearly understood as a natural event. The cycle that animals go from being plentiful to being rare was viewed as a part of nature.

> " Yeah, for all the years I've been trapping, I've been trapping about 50 years. I've seen a lot of things come and go."

In general, prices for pelts have gone down as those involved in the industry would attest. Trapping no longer provides enough money to be the sole income. According to the Elders still trapping, the lower prices affect what they trap. The lower price on pelts does affect the number of traps set and the frequency with which a trapper will set traps. For some the low prices have meant that they have stopped trapping all together. When asked specifically about fisher, the Elders highlighted the mobility of this animal along with the substantial change in the market value for their pelts.

> "Fisher likes traveling; it's not going to stay in one place. Like you could track it here, maybe moving east, and in a couple days time you will find them in Ontario somewhere (laughs)."

> "E: Now there's no hunting and there's a lot of fishers and so that's why they start moving. But all the animals seem to be moving.
> I: So, where are they moving?
> E: Wherever – what they eat, I guess they move with it, and they come back so many years ago. They came back."

Understandably, the interest in trapping is greater when the trappers get more money for their pelts. The value of the trappers were getting for their pelts affects not only how often and what they are putting traps out for but in some cases whether they bother trapping at all. As previously mentioned, one Elder destroys nuisance beavers rather than trap because he gets paid more and does not have to spend time preparing the pelt. The fisher pelt however was once a very valuable pelt and well worth the effort to trap.

> "Fishers, those ones, yeah because they are a good price. One time fisher used to go up to three, four hundred dollars."

"I: How have prices for fisher been?

E: Ah, forty-five dollars last year. Before it was two hundred and fifteen dollars, about five years ago.

I: Really. So five years ago they were paying you a lot more for fishers. So does that affect how you trap?

E: It affects everybody. Not only me, it affects everybody when the price went down.

I: So, does that affect how you do your trapping?

E: Yeah, you don't feel like going out anymore. "

Although, as several of the Elders alluded to how trapping "gets in your blood". Along with all the work involved, Elders who still trap gave the impression that getting out in the bush is something they really enjoy and they will continue to trap as long as they are able.

3.3.12 Gaag's return – Addressing the Decline in Porcupines

The reasons contributing to the decline in porcupine are cumulative and include, but are not limited to, changes in the forest, predation from predators such as fishers, roadkill and use as food by community members. There did not appear to be much concern over the decline in porcupine in the area. The responses to whether something should be done about the absence of porcupine focused mostly on the cycle that is responsible for the fluctuation in wildlife and that they would return in time. There was a sense from some of the Elders that porcupine were already on the comeback.

"I: Do you think fisher is part of the reason that there are no more porcupine around?

E1: Well, I don't think so. It's just that every animal is like that.

E2: A phase. For some [animals], they are around for many years and then all of a sudden the trappers notice that they're not around.

E1: I don't know, either they're moving or dying. I don't know.

E2: Or somebody is killing them.

E1: But they always come back."

Some Elders were not sure that the animal would come back because they are slow moving animals and the environment had changed.

"I don't know if porcupine will ever come back. I don't know. It's pretty hard to say. It's a very slow moving animal, and it's pretty hard for a person to judge that if it's ever going to come back or is it gone forever. It's hard to say."

"...They were driving along and when they came to 59 and the Stead Road turnoff. You know those big lights there, well, there was a porcupine sitting in the middle of the road. And [she] said "no that's a beaver" and auntie said "no that's a porcupine, look at it, it's got sharp things all over." Just like she described it to her sister and then she looked it up and : porcupine. I've never heard of anyone seeing a porcupine for I don't know how long and they did. That was just a couple of nights ago. Not last night, the night before. They saw that porcupine there right in that turnoff where the big lights are all set up there—they saw porcupine. I was going to tell you about it but I didn't get a chance."

The general consensus was that porcupine will comeback on its own, eventually.

"E1: There's still porcupine around.

E2: That's what I was going to tell you, maybe they're coming back."

3.3.13 Relocating Porcupine

The Elders were familiar with other animals that had been relocated and did not seem to oppose relocating porcupine.

> "If you want to move them [porcupine], I don't see anything wrong with getting them back. I know gradually they are coming back. You didn't see them for the longest time and now you start seeing them—one or two, so they are coming back slowly."

There were concerns expressed that the porcupine would not stay in the area where it was relocated as it moved to find what it wanted to eat and even make its way home.

> "I don't know. Probably [porcupines] are going to move someplace, because those animals are moving when they don't have anything to eat like everybody else, I should say. They move, they go to different places to find something to eat, they keep moving. And all of a sudden, it's quiet and then all of sudden, everything comes back."

Another issue about having porcupine near the community was the effect it would have on dogs. *Canine-dorsatum* conflict could quickly change views on the desirability of a local porcupine population unless a relocation area is a sufficient distance from the community. If a dog repeatedly comes home with a face full of quills, any appreciation of porcupine will likely deteriorate quickly.

> "I: Do you think the community would support a small scale reintroduction?
> E: Yeah. Except for the dogs [laughs]. Yeah, they're scared of them. Yeah, they like the smell."

On the topic of relocation logistics, Elders provided valuable insight.

> "I: How do you move a porcupine? E: Carefully!"

With sufficient preparation it was thought that the community would be open to a potential relocation.

3.3.14 Involving Youth in Potential Porcupine Relocation Projects

There was approval from the Elders to relocate animals back near the community particularly when linked with involving youth. To be successful it would be important to educate the youth as well as get support from the Elders in the community.

> "I: So, do you think if I brought porcupine back, do you think the community would support that?
> E: The older people, yeah. But the younger people probably wouldn't care less.
> I: Yeah, I thought that if I would do that I'd go to the schools and -
> E: —make a presentation at the schools. And the Elders would support it."

3.3.15 Suggested Areas for Relocation

Poplar Point (North along the community beach) was suggested by one Elder. The area is treed along the beach with a boggy area nearby and was sampled. The area is accessible by boat/canoe or by foot depending on the lake. However another Elder disagreed to the viability of this site due to the type of vegetation.

> "E1: The place to put them is where there's a lot of jack pine.
> E2: And that place you mentioned there—
> I: Poplar Point?
> E2: That wouldn't be a good place to put them because there's no jack pine. It's like a boreal forest. You would have to pick a spot where there are lots of trees, the type they live on type of thing, right?
> E1: Yeah.
> E2: Well, you can't just put them anyplace. The poor things will starve if they don't have any food.

E1: Commuter Road, where they have that little bridge. That would be a good place there. There are jack pines there all over. That would be a good spot to go where there are a lot of jack pine there and that's what they are eating: Jack pine bark."

There was some disagreement over what porcupines eat and so some difference of opinion as what areas would then be considered suitable for porcupines to return. Though some Elders considered jack pine to be an important food source others suggested Tamarack and Spruce. The area around Trans-License Road was recommended as having suitable habitat.

"E: Oh, I guess you can put them in the bush someplace around, what you call, Translicence road there or ...They eat tamarack, that's what I know. Because when I was a kid there they used to cut around Lac du Bonnet there. That's where I've seen them eat Tamarack and Spruce.
I: But not jack pine, you've haven't seen them eat jack pine?
E: I've never seen them eat jack pine, there's no markings there in the bush for the jack pine, because they make a big mark, the whole tree. So, I noticed when they eat one tree and they finish the whole tree. "

"But there was quite a few [porcupine] that time. We used to see them every summer going around. And in the bush you see where they eat and that. But that's what they eat mostly when you see a dried tree standing or spruce. Quite a bit of jack pine, but all of that burned down."

3.4 Hollow Water First Nation - Elders Share Their Stories About Porcupine

The Elders interviewed shared stories and information about porcupine (*Erethizon dorsatum*) along with broader changes they saw happening in the forest. Discussing porcupine required them to think back to when they were young children and the animals

were abundant. Frequently during the interviews the stories and opinions went beyond the theme of porcupines. The Elders often shared their thoughts about the importance of wildlife and the many changes they have born witness to in the forest. This summary is presented with respect and appreciation for the Elders who shared their time and thoughts about porcupines and many other topics.

Elders agreed that porcupines once were common in the Hollow Water area. They used to be regularly encountered during hunting trips, while trapping or even walking around the community. Local dogs would also come home with quills embedded in their faces after encounters with porcupines near the community. But according to the Elders the population has since declined over the last thirty to forty years.

> "When we lived over there by the gas station, we had a dog and he used to have those quills...We have to use pliers to pull them out. But they say when you get them in, it seems to be going in. [gestures with hands] That's why they told us not to bother the porcupine or tease them or they'll hit you with his quills."

> "Well, porcupine, there were lots here a long time ago, eh? About when I was ten years old, 30, maybe 37, 36 years ago, there were lots here. The point there with that big store is where a lot of them would move in the summertime...Well, when they came around [laughs] they [the children] would kill 'em [porcupine]. But there used to be lots in the bush, eh... There used to be a lot [porcupine] around here, now they're really scarce."

Elders also agreed that the children were told by the adults not to bother the animals. In part, this was because of the danger presented by the quills, but it also appears that the

animals were valued as an emergency food source. On land, the slow-moving porcupine could be killed with a stick to provide fresh meat for people needing nourishment.

> "There used to be a few here when I was growing up. The old people used to come and tell you 'there's porcupine over there'. And they used to go after it. It must had been really good supper for people because everyone was talking about it."

Porcupine appears to have been valued as a non-essential food source. Some of the Elders interviewed had eaten porcupine meat. One Elder described how the porcupine quills were singed off over a fire before the animal was cleaned and cooked as a stew. It would appear porcupines were not purposefully hunted but rather they provided an occasional meal for families.

> "Those old timers when they used to talk about porcupine they said that they ate porcupine. And they said it was just like—I don't know how to explain it, it was like—good meat anyway. But I never tried it myself anyway. But even [laughs] skunk they said they ate, but I don't know."

When asked about the importance of the porcupine, Elders generally responded positively. Whether viewed as being purposeful or a simply belonging to the forest, they were not seen as nuisance animals. There were concerns over encounters with dogs but porcupines were generally viewed as being important to the people and the forest. Some Elders recalled close personal encounters with the animals. There was a time when porcupines were seen within the community near homes and in backyards. One Elder remembered having killed a porcupine but not wanting to tell their father because they had been warned to not bother the animal.

Because porcupines have been absent from the area for so many years, those who saw them regularly as young children fondly remember them. Porcupines are one of the few wildlife species people can get very close to and get a good look at. In part, porcupine are remembered as a youthful connection Elders had with their environment that today's young people do not have the opportunity to experience.

> "Well, yeah, you know. I think there's nothing wrong with porcupine. If it doesn't bother you, but if you bother it, and same with any other type of animal, same as a dog, you bother a kind of dog, and right away they'll bother you, too. Same thing with an animal, a porcupine, if it's around—lots of people want to see it. I know a lot of people around here talk about porcupine. "Is any porcupine over there?" "No, no." You know, that is what they say because it's nothing seeing that. As far as I know porcupine. There's nothing wrong with that. Only if you have a dog, or if a dog goes after it. You'll get something from porcupine because our dog—I've seen them all over."

3.4.1 Importance as a Food Source

Porcupine represent an important emergency food source because, aside from being agile climbers, these animals are relatively slow moving on the ground and can be killed with a stick if need be.

> "Well, like I said before, some guy will go trapping and some get lost at least he has something to grab and eat. And that's why they're going to take porcupine because you don't have to use a gutter knife? If you want it, you kill it. It's a tasty animal."

> "They were a protected thing, like a survival animal in the bush when people had nothing to eat. Like when trappers were stuck in the bush. That's what they went after to eat. But otherwise they just left it alone, they didn't bother it."

The simplest and most efficient way to prepare porcupine appears to be to burn off the quills or use a knife to skin the animal. For the Elders, the flavour of porcupine meat varied –remembered as either tasty, wild tasting, simply not tasting very good or even a little like chicken.

> "The porcupine, they wanted to eat it, eh? Oh, they're good. It's good white meat, eh. Yeah, white just like chicken [laughs]. Nowadays there's hardly anything left. Same as rabbits, there used to be lots around here. Partridges, chickens, same thing with rats. There used to be a lot around here. Beavers—they were hardly any. Lots of ducks, in the forest. I eat lots [laughs]. When they used to go, they called it "Rice Way". The old people used to go up there and make rice, wild rice, eh? It was nice."

3.4.2 Role of Porcupines in Ceremonies and Teachings

The value of porcupine for Elders in the community does not appear to be connected to its role in traditional teachings or stories. This question was asked to determine if an appreciation for this animal was connected to traditional belief systems such as teachings and ceremonies. This does not appear to be the case. However, it is possible that they chose not to share this aspect of their culture because they did not feel comfortable in doing so. The value of porcupines to the Elders seems connected with childhood encounters and the role the animal has as an emergency food source.

There does not appear to have been a tradition of quillwork in recent history in the community of Hollow Water. The absence of quills being used in contemporary crafts is not surprising considering that porcupines have not been seen in the area in the last 30 to 40 years.

"I know that my mom used to say that they did [quillwork], not my mom, but she would know people who did that kind of work with the quills."

Elders knew that quills can be used for traditional crafts and had been used in the past and by aboriginal communities, and also recognized the quills had potential value to people from other communities.

"We've seen one [porcupine] driving to Winnipeg on the road getting killed, and after we passed it I think I should have picked it up because I think they sell them to craft shops those quills and I thought I'd picked it up on the way, but somebody else beat me."

3.4.3 Porcupine Food Source Preference

The Elders who felt comfortable responding to the question about porcupine feeding habits referred to jack pine *(Pinus banksiana)* as being the main food source for porcupine in the area. Common throughout the Canadian Shield, jack pine ridges were identified as primary feeding areas with visible signs of foraging.

Jack pine stands were found in nearby areas such as the point where the school now stands, between Manigotagan and Hollow Water, on Black Island and along the 304 north towards Bissett.

"E: Well, in the bush there, I guess, that's where they [porcupine] are. Sometimes they would come out and go to the point, eh.

I: Were there ever trees at the point?

E: Yeah, long ago. Yeah, but they were just small and then they cut them and they added lots of horses and cows. They just mow the lawn all that that hay they eat. (laughs) Yeah, you have to go and go to the ridges—the jack pine ridges and

that's where they hang around because there are lots of jack pine there. All around that way, I've seen them porcupine there.

I: Do they eat any other tress other than jack pine?

E: Not small ones, just good sized ones.

I: Do they eat aspen or poplar?

E: No, not poplar. I never—just jack pine. That's about it."

Jack pine forests are relatively common and also important for the forest industry in the area. The jack pine stands are more prevalent than balsam fir. Only one Elder considered poplar to be a food source whereas for others poplar and aspen were not considered to be food sources for porcupine. Seasonal use of food sources was not identified by the Elders.

When some of the Elders were young, their Elders had taught them how to identify the signs of porcupine. Basically, when a tree was debarked mid-way up its trunk with the white inner part of the tree visible, this was a sign that the porcupines had been feeding

3.4.4 Population Decline of Porcupines

There exists an appreciation for these animals and an appreciation that they are part of the bush and play a role in the forest. They did not regard the absence of porcupine of being indicative of major issues in the forest but attributed part of the cause for its decline as being due to their slow reproductive rate, slow dispersion/movement and as a change that happens in the forest. Elders have certainly seen many changes in their lives. Technology, social values along with the forest has and continues to change. One Elder expressed some concern over the return of porcupine and the safety of children and potential injury to dogs.

"There are so many kids now and maybe they bother them [porcupines] and get those quills."

The disappearance of porcupine on a large scale was dated at around forty years ago but several Elders had themselves or heard of people encountering the occasional porcupine. There was some belief that they are on there way back and could be in the forest but just rarely seen.

"Probably around forty years since [porcupines] started disappearing. I was so surprised to see that one four years ago.
I: And where was that again?
Well, you know how when you come onto the reserve, that first house, close to that first house. That's where I've seen them walking."

3.4.5 Porcupine Predators

Fisher (*Marti pennants*), wolverines (*Gulo gulo*) and wolves (*Canis lupus*) were identified as main predators of porcupine. One Elder suggested black bears (*Ursus americanus*) and foxes (likely Red fox; *Vulpes vulpes*) may be able to kill such a relatively small animal. One Elder considered that timber wolves would be more effective porcupine predators during the winter months. The fisher was identified by some Elders as being the primary predator of porcupine and the cause of their decline.

"As the years went by, we hardly seen any porcupine anywhere, but my dad used to tell the reason there's no porcupine is because there's only one animal that will kill porcupine, that's the fisher, because they get them from on top.
That's what my dad used to tell us, they'll get them from up because a porcupine can't turn around. But a fisher can, it's just like a squirrel, a fisher. They can jump. That's what my dad told us why there's hardly any porcupine because there was a lot of fisher back then before the 50's, yeah. But then they slowly declined to because trapping went on because there were a lot of trappers that were getting them."

3.4.6 Other Wildlife Populations Fluctuations

A general question was asked of Elders as to fluctuations in wildlife populations that they have noticed. The purpose of this question was to enable Elders to share concerns about wildlife populations in the area. Some Elders responded to this question based primarily on what they see in their immediate surroundings. Many species were considered as being in decline including but not limited to owls, squirrels, rabbits, frogs (leopard frogs in particular), beaver, mink, songbirds and skunks. Some felt there are fewer beavers, martins, lynx, wolves and rabbits but these populations were considered by some as returning to their past levels.

Elders who trap referred to their trapping experiences to support the decline in species. The animals identified as being in decline ranged from birds, small mammals, amphibians along with more traditional furbearers.

> "Less, there's less [fisher] here. Because last time I trapped, I only got one fisher. Yeah, not very much. Well, I guess, what they say they go around like, you know, sometime there's a lot. Same as martin. There were thousands and thousands around one year. All, oh, they all just went. Yeah, before you never used to see a martin. Oh, I never did when I was young. I was 13, 14 years old when I first started trapping with my old man near the Ontario border. We never used to see martin. Lately here my boys went to look at my trap line here. We went to and then we saw about 14 traps. Where were all these traps? The next year, we caught nine Martin. That's the first time I saw a martin. And I didn't even know to skin it because I never used to see it in my days a long time ago."

> "E: If you look at the time when, my dad used to tell me this before, there was no beaver, eh. And they had to bring beaver in here. Yeah, they had to bring beaver

in here. And I guess they repopulated and now there is a lot of beaver, eh. Because at one time my dad was saying, and I didn't know—I caught this animal, and I brought it home and I didn't know nothing about it, and I just didn't know what kind of animal it was and I brought it home and I showed it to my dad and he said that's a martin. And that was in the '70s. Yeah, that was in the '70s and that was the first time I ever saw a martin.

I: They came back didn't they?

E: Yeah, they came back and that was the first one I ever caught in my trap line.

I: Now are they around?

E: Yeah, they're around pretty much and they slaughtered them again that one year, two years, that was in the '80s, or the late '80s."

"Yeah, mink. My dad used to set a trap and he used to catch mink all the time. And there used to be lots of rats in the river. I don't see them now. Even hardly any beaver. And you know who I don't see that often on the road: frogs. There used to be lots of frogs. But you don't see any now. Where we used to live before, there used to be this big frog and it was about this big. It used to live right under the log. We used to tease him, poke him with a stick, he used to jump and fight. A really big frog… a green one."

3.4.7 Changing Habitat

With the understanding that several decades ago seeing a porcupine was a relatively common occurrence, it can then be deduced that there was suitable habitat to support a porcupine population in the area. Among other factors, wildlife are dependant on their habitat for survival (insert cite). It was then important to consider how the habitat, in this instance the boreal forest, has changed over time. Along with reflecting changes in habitat that may have contributed to the decline of porcupine and affect the return of porcupine to the area, the concerns expressed by the Elders may be considered representatives of factors they feel have contributed to changes affecting the forest.

Forestry activities were identified as the major change in the forest. The cutting of trees to supply the forest industry represented for Elders a loss of trees which affected wildlife who then move on to find what they need elsewhere. Trees are a primary resource that is extracted from the forest to supply the TEMBEC mill in Pinefalls. Under different management the mill has been extracting resources from the forest for the past several decades. It should be noted that some of the Elders that expressed concern over the forestry practices employed by the company as it provides needed employment to residents of the area. Some Elders did note that Tembec is having trees planted but that it takes a long time to replace the trees that are cut.

> "Less [forest], I guess, but they keep their planting trees anyway, but it takes a while to grow. They have tree planting every year, I don't know where though."

> "You can't cut pulp close anymore. You can't, you have to go far to cut pulp. And dry wood, you have to go far to get it. That winter road yeah, that's where they get the firewood. Because it is all cut, eh. They've been cutting wood here."

The areas between Black River First Nation, Hollow Water First Nation and Bissett have changed a great deal due to fires. Fire is a natural disturbance for the boreal forest, rejuvenating it by allowing other species to grow (Burton et al. 2003) . This affects porcupines as they require mature forest for winter habitat, but can feed on burned areas in the spring and summer (US Fish and Wildlife Service 2007). Porcupines likely benefit from small burns but are probably harmed by large fires (USFWS 2007).

> "Well, what I think about is the bush, you know. Look at here my trap line on the north side—it didn't burn. But all in the south side, the whole got burned. We went to the north side once looking for martin . . . trying to find him in all those

> big trees. So, we made a trial right in the middle, a long way, and laying seven traps. You want to get it. We were just getting fur, any kind of fur we could get in the trap. Lynx, but it came because of all those big trees and all that...Because around here where they had cutting here, my trap line—there's nothing. All you have is beaver because there's little poplar coming."
>
> "Yeah, there was a big fire here in 1989 and four, five years ago"

Elders reported that Manitoba Hydro used to have a practice where they sprayed chemical herbicides along power lines to control growth . This practice was interpreted by some Elders as spreading a poison that could negatively impact wildlife. The spraying by Hydro is no longer being done.

> "Well, it's probably not mostly fisher [responsible for decline of porcupine populations] because probably because of the forest being gone, eh. Because some of these animals they have to have, well, a lot of the animals have to have forest, eh. You have to have forest in order to recover, eh, and for something to eat, I guess, because some of them eat, well, moose and deer and porcupine, beaver, caribou, they eat shrubs, but the beaver will eat the poplar, just the bark, eh. Same with the porcupine, that's what they eat, the jack pine, the bark, eh. Everytime they [Hydro] did the spraying, like they did the spraying on the highway, to kill the plants, I think it did something to the animals, too."

Hydro spraying was suggested as having an unknown but possibly very negative effect on wildlife and the bush in general. This method is no longer employed but people who discuss the spraying still fear the unknown effect of the chemicals both on animals and people who consumed the berries that grow under the power lines. This lingering uncertainty about this practice is likely a result of the lack of consultation and involvement from these first nations communities. Lessons to learn.

"Hydro sprays so that trees don't grow under that. Yeah. And they don't even let people know because we goes on that winter road and we go pick blueberries, somebody was picking blueberries there and they've seen them spraying. And so when we pick blueberries, we really had to wash them."

3.4.8 The Future of the Forest

The response to the question about how they viewed the future of the forest was very impassioned. The question was phrased as a reflection to what the forest will be like for both their grandchildren, great grandchildren and also for wildlife species in the future. The responses all agreed that it would be a different forest for the next generations. Some were optimistic that in time the trees would have grown following the fires and replanting. There was concern expressed that the forest would be increasingly dominated by poplar as they considered it to be today.

"I don't know what's going to happen. I guess it will be a lot different than when I was younger."

"Well, it [forest] might change, you know. After that fire, the trees just keeps on getting bigger and bigger. It will be different, that's what I think anyway."

"Well, what they're doing now, they're talking about replanting trees—that takes time because when they start that tree planting the animals won't come back that same year. Yeah, because everything helps. See right now, all that's left with us is mostly poplar, eh. The rest is all cut out."

For some Elders the concern is that we are on a path of destruction unless the cutting of trees is soon limited. They have witnessed devastating effects to the landscape and negative impacts for wildlife species of past forest management techniques. As they

consider the future they found it difficult to be optimistic if the current trend for natural resource extraction continues.

> "Well, the way I see it, the way those guys Tembec and all that . . . Well, I think in the future if you don't leave it alone, we won't have anymore time with the animals or anything like that at all. And they don't know what's happening to the animals. Why don't they open their eyes? Look at my trap line that used to be nice hills, where the pine was and high trees, but now you go there and it's like you're in Portage la Prairie. It's wide open so how is an animal—even you, you can't grow in an open place like that or walk around, you know. What's an animal going to do in an open place like that? And they say the moose is going. Well, the moose is going to hide, you know, some place. It can't go in an open place like that."

> "Well, yeah, because there is no cover for them [animals], there's no cover for them, they—look at every time, every evening I go out and check on my traps and I always see a cub running across the road, just by itself. Where's the mother? Where's the—just by itself and in four different places I've seen a cub run across the road by itself. And then I was doing some beaver hunting for Tembec there, and there were bear hunters there that time and I ran into one cub there and I thought the mom would be behind it, but no, there was no mother behind."

Bear hunting was seen to create orphan cubs that could not take care of themselves properly. The orphan cub represents a future where the quality of life for animals is altered. Elders who trapped were concerned about the habitat being destroyed and having a negative impact on animals. They did not say they were against forestry but wanted there to be areas set aside and not disturbed

> "I: What about in the future, for generations and generations and generations, how do you think the forest is going to be in the future?

E: Oh, I don't know. That's pretty hard to answer. If they keep taking the forest, there's not going to be forest left because if they replant, it's going to take years to come back, eh. Yeah, it's going to take years before it comes back. I think they should just leave it the way it is. They've done enough, they've done enough, I think. Because look at my line there, my trap line, as an example, they cut my line when I was trapping there. I started trapping when I was fourteen and I've been going there ever since, and when I first started trapping, there was a lot of bush there. You could walk there in the bush and you could never really see an opening, it was always bush, but now when they started cutting, before they only had the power saw to cut them, that's all that they were using, and as the years went by and I went back and forth every winter to trap, and then they started getting more and more fancy equipment and all of this machinery started coming into the bush, and then there was nothing left because they were taking everything, they weren't leaving anything behind, they were just cutting everything.

I: Did they have to ask for permission to cut on your trap line?

E: Nobody asked, nobody asked any permission at all. This one trapper was blocking his to not allow any more cutting on his line, which was good because they weren't going to leave that forest alone unless someone stands up to them. But even—it was not theirs to take, but there was this one bush they left there on the road, this happened in 1992 or 1994, I can't remember, and that was where I was doing most of my trapping, that one section of the bush, and then all of a sudden when I went there, they were cutting there. And then they clear-cut that area, it was just, I think it was a two mile stretch along the road, eh. And that was supposed to be a buffer zone they said, but they took it out. And now it's wide open there now, nothing growing at all out there."

For the Elders interviewed that shared their perspective on the importance of all the animals in forest, the thought of having no animals in the bush except for crows must be very depressing. This bleak picture is not the only possibility but a warning that we have

to change the way we are affecting the forest. In considering what the future will hold, the Elders shared their fears for the future of the boreal forest around their community.

> "I: How do you think the forest is going to change in the future? For your kids and your grandkids, what do you think the forest is going to be like in the future?
> E: It all depends on how you look after it.
> I: What if we keep going the way we are going now?
> E: There's going to be nothing. Nothing. And no more animals. There's crows around now."

By including Elders' and community perspectives potential perceived detrimental affects on the forest can be addressed and included in the planning and decision making process. This mitigates the sense of disconnection from the decision making process, and has become a standardized approach to resource management in areas near First Nation communities.

3.4.9 Elders Share Their Trapping Perspective

The history and the future of trapping is a topic whose breadth goes well beyond the scope of this document. The intention of including the topic of trapping in the interview was firstly to acknowledge the ecological knowledge of trappers in the area and secondly to determine if any trends as to the decline or increase in animals including porcupines were evident to the front-line trappers. The fluctuations in trapping frequency of porcupine predators supports the changes Elders have seen on the landscape particularly as it relates to fisher (Figure 2. in Appendix).

The knowledge from trapping was included in the interviews to respect trapping as a traditional activity, which would provide valuable insight into the population of animals including major porcupine predator, the fisher. Trappers spend time in the forest and can provide insights into changes observed over time along with an understanding of animal biology. Of the seven Elders interviewed in the community, five are currently or have in the past been involved in trapping. It is the researchers opinion that knowledge of trapping applies to both direct involvement (trapper) or indirect involvement (cleaning, preparing the pelts and other support).

Trappers that spend time in the bush can see changes happen to the landscape in their trapping area and to the wildlife populations. The questions concerning trapping initially focused on what types of animals were caught along with what types of pelts were sought after. For the scope of this interview, this question opened the door for the Elders to share their personal views, trapping stories and begin the discussion on trapping. The types of animals the Elders identified as important to trapping include beaver, fisher, coyote, martin, mink, muskrats, fox, otter, beaver and lynx.

> "Well, in the winter after—well pretty much everything: beaver, lynx, fisher, martin, lynx and coyote, and timber wolves. I got a nice one this past winter, a nice timber wolf, I even took pictures of it there."

> "I: Do you want to talk a little bit about trapping? You can tell me what you remember. Do you remember the kind of animals that he (husband) used to trap?
> E: He used to trap beaver, anything they can get, otter, and fisher and those martins. They say they can be around for only a certain time and then they move someplace else.
> I: I didn't know that. So, did you help him prepare the pelts?

E: Sometimes I used to. But he used to—he had to go by plane—Aikins Lake that's where he used to trap and then they'd come home. But when he was getting older, he used to trap where he had his own line. Yeah, I used to help him, I used to help him stretch his beavers and clean them. And we used to eat beaver meat.
I: Is that what your husband did to make a living, trapping?
E: Yeah, trapping. He used to leave in the fall of October and he wouldn't come home till Christmas and then he would leave in the spring again—March—trap."

"One thing is that there is more Martin now then there was before. Last year there was a lot of martin and they suddenly faded away. Same with lynx I was saying that they faded away. All of a sudden there were few around."

"Mostly, we used to trap lynx, and mink, and little bit of fisher, I remember. We used to get too much fisher."

Trapping remains a part of the lifestyle some people in Hollow Water. Trapping has also been subject to the ups and downs of a market economy. For some Elders the low price of pelts has made trapping a less viable economic activity. In his youth, one Elder would trap martin fox and timber wolf but the low price of pelts have made it a less attractive economic activity.

"Yeah, I trapped in the springtime a bit, but I gave up because there wasn't much price. But two years ago, not this spring, but last spring, I got 25 beavers. We got 48, me and my nephew. He got 23 and I got 25. I beat him [laughs]. I'm still doing good, I think, at my age anyway."

One Elder recalled that the price of fisher was very high in the early 1950s. The high prices brought a strong motivation to trap specific species. It is possible high fisher prices brought about a population crash, thus allowing the porcupine population to boom. A

moratorium on fisher harvesting then set the stage for a return of fisher in large enough numbers to decimate the abundant porcupine population. The decline of porcupine was so dramatic that the population has yet to recover.

> "Well, we mostly trap what we can, eh? And it varies too, the price of fur, it's not that high. Sometimes—now that's why there is a lot of beaver around. They're priceless [understand no value, low price]."

Trapping is connected to the state of the environment for Elders. The animals need habitat to maintain and expand their populations. The Elders expressed concerns for changes happening to the forest and how these changes will affect the future of trapping. The Elders involved in trapping had an appreciation for wildlife population fluctuations. But many considered the loss of habitat as likely to have a long and devastating impact on wildlife and trapping. Trapping played, and continues to play, an important economic and cultural role. An Elder stated that for him growing up trapping provided important income for people who did not want to leave the community.

> "For us anyway because there is no jobs. A lot of times when my dad went [trapping], he didn't get anything. He said: 'Son, why don't you look for a job in the city.' I can't get a job, but I'll keep trying. I listened to my dad and kept trying and finally I got a job."

As the trappers get older there are worries that the younger generations are not interested in continuing the tradition. Along with losing the knowledge involved in trapping such as tracking, knowing how and where to set traps and the breadth of knowledge of the natural environment they will also loose the knowledge of how to prepare the pelts. And as these

interviews have demonstrated, trappers have a broad knowledge of the environment and wildlife population trends.

> "A lot of people are saying that trapping is going to die out once all of the old trappers are going to pass on. There's not going to be any trapping anymore. Well, probably, these young, they don't really care about trapping...Yeah, that's why I like going out in the bush. A lot of times I go out alone."

There are some young people taking up trapping as an activity but it is more in the form of supplemental income and personal interest than as a primary means of survival.

Trapping is considered generally as a resource management tool to help keep some wildlife populations in check. The species of particular concern in this community is the beaver. When populations grow too large, there is increased concern over flood damage.

> "I: Do you think trapping is important to keep the forest healthy?
> E: I think so especially beaver because they do a lot of damage. They flood the roads and they had to kill those beavers in the summer, even when the trapping is over because they build dams (laughs)."

> "Oh, yeah, because if you don't trap the beavers, they act like they own the place, the trees, and everything. They cut everything. That's why we have to kill them."

The future of trapping is unknown but its tradition represents an accumulated knowledge of the natural world. A trapper learns about the land as he or she harvests its wildlife (FCC 2006, FIC 2007).

Fishers continue to be valued by trappers for their pelts. The price for fisher pelts seems to have fluctuated from less than $50 in 2005, to more than $400 for a pelt. Trapping

fisher was compared to trapping mink. Mink and fisher were tracked down so that traps were set with the specific intent of getting the animal. Fisher can travel far and so the effort to track them was connected in part to the value of their pelts.

> "E: I know they were getting them, not that many, but they were getting them. Like every time they would say the old trappers—when they did trap one, they would follow it.
> I: They can go far?
> E: Yeah. And same with the mink. That's what they did, like a long time ago, that's what they did when they tracked them: they would follow it until it got in a hole and then they would wait and when it came out that's when they killed it. That's the same thing they did with the fisher because at that time it was worth a lot of money for a fisher.
> I: How come?
> E: Well, like 50$ for a fisher in the '50s and the '60s that was a lot of money, not like now when you get a fisher, like last year when we averaged 48$ for a fisher.
> I: The prices haven't gone up?
> E: [laughs] Yeah. There was just this one time when—I think that was in the late '80s—that's when the fishers were high. The price of fisher was around four or five hundred dollars. They killed a lot of fisher that year because there was plenty of fisher that year.
> I: And that was in the late '80s?
> E: Yeah, I think it was in the late '80s, yeah. And some of them would get [fisher], every time they would go in the bush they would bring a fisher.

Fishers were associated with a late forest succession. This connected with the concern expressed by Elders that wildlife needs bush and older trees too. Though not all Elders were currently involved in trapping, their responses connected harvesting wildlife with the importance of habitat in the bush for animals to live.

> "Oh, yeah, but the only thing again, that's why I'm saying about the trees. Fisher likes to climb trees, you know. And they come down from there like porcupine would—they go all over the tree. Big spruce, big ones there, and they go on the river, yeah."

Fishers are considered the main predator of porcupine and would have a major effect on the population of porcupine (Powell 1993, Roze 1989 Earle Kramm 1982). Understanding the fluctuations affecting fisher population would be important in understanding the potential for a maintained porcupine population. It is possible high fisher prices brought about a population crash, thus allowing the porcupine population to boom. A moratorium on fisher harvesting then set the stage for a return of fisher in large enough numbers to decimate the abundant porcupine population. The decline of porcupine was so dramatic that the population has yet to recover.

Trappers would play a critical role in helping maintain a balance in the population of fisher so as to allow for porcupine populations to become reestablished, whether through natural movement or with localized reintroduction. It would appear that the fisher are in a low part of their population cycle which would be conducive to allow a return of the porcupine.

> "Well, usually, animals they come back on their own. If nothing else gets them, that's the thing. Same with the fisher, they are slowly dying out. There were lots and you would get more when you were trapping, but there's hardly any fisher."

The cougar is an elusive mammal in Manitoba with rare occasional sightings. In 1973, a cougar was shot at Stead and more recently two cougars were killed in 2004 in the areas

of Riding Mountain National Park and Duck Mountain Provincial Forest Reserve (Watkins 2006). It is possible that cougars predated porcupine though not as a major contributor to their decline simply because these animals are considered rare.

One Elder in Hollow Water shared his experience finding a kill from a cougar during inspection of his traps and a 'near encounter'. Trappers are out in the bush and can be a source of important information about changes they see in animal populations and the forest.

3.4.10 Contributing Factors to the Decline of Porcupine

It is very possible that over time the population of porcupine will return if the cause or causes of their initial decline no longer puts pressure on the species. The success on a relocation project or a natural reoccurrence of porcupine is dependant on the major factors contributing to their decline to have dissipated. For this reason it was important to consider what the Elders thought was the causes of the population crash.

The most specific cause identified as being responsible for the demise of the porcupine population was an increase in the fisher population (Powell 1993, Roze 1989, Earle Kramm 1982). The increase in fisher may have put undo pressure on the porcupine until the porcupines were too sparse to recover.

> "Well, yeah, yeah, that's what my dad told me anyway. There was getting to be too many fisher and they were killing off all of the porcupine, eh."

Factors that may have contributed to the decline in porcupine were the milling of jackpine and the effect of large scale fires. Though as one Elder remarked to changes in

the forest were not responsible for the disappearance of porcupine because in the time when they started disappearing the forest was still for the most part intact.

> "...[t]here used to be lots of forest when they [porcupine] start disappearing. I don't know why they're disappearing."

But the changes that have taken place in the forest over the last thirty or forty years could be a limiting factor as to the return of porcupine to the area.

> "Well, yeah. You never know what they eat; maybe they eat pine or something. And if there's no pine, how are they going to come back? They have to go look for it someplace —another crop of trees like that to find to eat whatever they're going for. Because there's no more jack pine, because those people are cutting it here, the jack pine, you know."

3.4.11 Return of the Porcupine

The natural process of repopulating a porcupine population is a slow process. In the community of Hollow Water the Elders who participated in the interview process seemed confidant that the porcupines where coming back slowly. A few had spotted porcupines over the last decade or known people who had. They were familiar with the transplanting of species to aid in their recovery as had been the case with bald eagles and lynx. But they had faith that nature renews itself with time. Addressing the decline in porcupines was also understandably not particularly high on the list of priorities for the community from the Elder's perspective.

> "Well, porcupine's not good at traveling. Very slow. He travels very slow like a turtle."

Elders recognized that not only the landscape has changed since the porcupines left but so had the community. Concerns were expressed over the greater number of dogs in the community along with kids who could be hurt by an animal. A few Elders noted that the community may not be welcoming of porcupine and would not hesitate to kill them.

> "E: Well, you'd have to put them somewhere where they (people) wouldn't be—some might, when people say porcupine, they might do something. Because some people are like that when they see an animal, they want to blast it."

There were also concerns that if porcupine were relocated that they be tested to ensure only the healthy animals were released.

> "Well, yeah, you know why you have to test them. Because before you bring them here, you have to test them and well, if a porcupine is sick, and it bites you, you know, you never know. But, if it's all right, it's no bother."

Several (3) Elders noted that the fisher would limit porcupine and if we wanted porcupine back we would have to reduce the number of fisher. Fisher are a sought after pelt and from a trapper perspective a worthwhile catch.

> "The only thing we can do is trying to kill the animals that are eating the porcupine. It's the only thing we can do in the fall, later in the fall. This time they're not too good. They're not prime. You can't sell them, eh? Especially fishers, and might be an odd one a long time ago."

Other (2) Elders were not sure what if any action should be taken to recover the porcupine population. A natural return of porcupine would be best for several reasons including giving the community time to accept their return, it being a product of a natural progression by animals, who have independently found the resources they require and that a natural balance is found in time as opposed to a forced return.

3.4.11 Involving Youth in Potential Porcupine Relocation Project

The response to the question about getting local youth involved in a porcupine relocation and monitoring project was not given much support by the Elders interviewed. In retrospect, the question that was asked of the Elders reflected a preconceived concept to addressing the decline. But the Elders did consider it important to connect youth with the environment. A project such as the proposed porcupine project could be the basis for employment and skill development in natural resources management and help connect the youth with the natural environment. A project near Babcock, Wisconsin has been involving youth in monitoring porcupines a decade provided the basis for a case study to discuss the feasibility of a similar program in the communities of Hollow Water and Black River.

3.4.13 Suggested Areas for Relocation

Areas that were identified as previously having porcupine populations included the area within the community such as on the point and the area between Hollow Water and Manigatogan, Black River, Rice River and within traditional traplines. There were a few mentions of porcupine being seen near the community in the past ten years.

Elders suggested that the trees be the most important determinant as to where porcupine could be released. The jack pine ridges North along the Winter Road, Black Island, in behind Seymourville and North along Hwy 304 to Bissett were suggested by the Elders

as areas of interest. These sites were sampled to a very limited extent by applying the Ecosite data gathering method to a small number of plots. (See Table 1).

3.5 Discussion

Elders in Black River and Hollow Water remembered an abundance of porcupine in the community and surrounding areas 30 to 50 years ago. The timeline is shared with that from the population trends of porcupine in both communities. There were many similarities in the ways Elders from both communities responded about their views on porcupine. No major differences were noted between responses. That is not to say that different perspectives do not exist but merely that they were not apparent during the interview process.

The interviews' major themes were past role of porcupine, changes in the forest, wildlife population cycles and associated values. The broader scope of the interviews was meant to reflect the breadth of knowledge on the environment that Elders were willing to share and have documented.

Elders remembered seeing porcupines within the community when they were young people. Their parents warned the children not to bother the porcupine but some would tease the animal, sometimes chasing them. It was not stated specifically whether their parents did not want the children to get hurt by the porcupine or conversely that the children's harassment would injure the porcupines. Not allowing children to bother porcupines both protected an emergency food source and spared the youngsters injury

from quills. Porcupines seemed to be valued because of their role as an alternate food source rather than for specific ceremonial purposes or traditional quillwork. The Elders did not share the ceremonial significance or totemic value of porcupine. That is not to say that porcupine do not play a spiritual role but specifically the information was not shared within the scope of the interviews.

The tradition of quillwork did not seem to be present anymore in the communities. One Elder recalled an older woman in the community had done quillwork but she had passed away and the tradition had not been taken up. Quillwork which was used to decorate objects was replaced to an extent with glass beads by the 1940s (Peers 1999). It is not surprising then that the art of quillwork was not of major consideration in the value of porcupine. If porcupine were to return to the landscape the spiritual value and quillwork could also potentially be renewed. Harvesting porcupine quills can be done without harming the porcupine, in a sustainable manner. Porcupines can be captured and lightly tossed around in a blanket so as to remove the loose quills and then the porcupine is released unharmed (Thiel pers. Com).

Elders associated a value for porcupine as an alternative and emergency food source. Though not mentioned during interviews, it has been suggested by other trappers that porcupine could have also been readily used as fresh bait for trap (Jansen Pers. Com. 2004). Trappers deep in the woods could easily kill porcupine in the bush rather than having to pack-in bait. When trappers depended on snowshoes they wanted to pack as lightly as possible (Jansen Pers. Com. 2004). For trappers the porcupine would then be a

valuable resource to support their trapping efforts. But beyond utilitarian purposes, the porcupine was valued as an inherent part of wildlife in the bush.

The current value associated with porcupine is as an emergency food source but also as an animal that makes up a living part of 'the bush.' The Ojibway of Hollow Water and Black River appear to have a similar understanding as the Cree of Eastern James Bay's view of the role of the animal in the hunt (Berkes 1999). The concept that the animal controls the hunt by giving itself to the hunter is similar to a statement by an Elder recalling an incident where a porcupine came up to the house and had given itself for food for the family. The Elders in both communities shared a respect and appreciation for porcupine. There did not appear to be the sense of porcupine being nuisance animals. Perhaps in part because porcupines were part of their childhood memories and the stories associated were good memories, the porcupine would be a welcomed site for the Elders.

Close encounters with wildlife such as porcupine may contribute to people feeling connected to the forest and the animals that live there. When considering the causes of the decline in porcupine, Elders particularly in Hollow Water did not regard the absence of porcupine of being indicative of major issues in the forest but attributed part of the cause for its decline as being due to their slow reproductive rate, slow dispersion/movement and as a change that happens in the forest. Elders who trapped shared some information about the wildlife cycles that they have witnessed in the bush. They agreed that fisher was an important predator of porcupine and that this animal had also experienced population flux. The Elders who trapped were knowledgeable about

fisher biology and commented on how the increased price for fisher pelts impacted the types of fur they attempted to trap. Elders who trap consider that fishers provide economically valuable pelts for trappers. The price for fisher pelts have fluctuated as has their frequency in trapping numbers.

The peaks of fisher taken out of the Black River (considered within the Lac du Bonnet trapping area) correlate with the peaks in provincial total of fisher pelts (see Figure 1). In 1973, the Lac du Bonnet trapline area accounted for 169 fisher pelts of the 1 199 reported to the province. This accounts for 14% of fisher pelts in Manitoba. The next peak was in 1982-84 with 223 and 274 fisher pelts being exported from the area from a provincial total of 4 585 and 4 418. The fisher taken out of the Lac du Bonnet areas for those two years made up 5% and 6% of the provincial fisher pelts for those years.

In 1974, the Hollow Water trapline area accounted for 110 fisher pelts of the 1 184 reported to the province. This accounts for 9% of fisher pelts in the province. The peak of the number of fisher taken out of Hollow Water trail by a few years the first peak in the provincial data for fisher pelts (see Figure 2). The next major peak can be considered as taking place in the province for the years 1979 through 1987 as the provincial total for fisher pelts were over 2 000 per year. During this timeframe data was not available specific to the Hollow Water trapline area.

The Elders have witnessed the decline and increase of many wildlife species through time. During the interviews, trappers spoke of times when there was plenty and other

times when it was hardly worth putting out traps. Having witnessed these changes there was a trust that porcupine would naturally return of their own accord. Elders viewed the return of the porcupine as part of a natural cycle. Several Elders voiced concern over limiting factors that could reduce the chances of the repopulation talking place, such as fishers predating the porcupines, lack of bush habitat for the animals and people killing off the animals.

The views of fluctuations in porcupine and other wildlife population provided insight into general changes in wildlife populations that may help to identify potential trends. The animals mentioned as being in decline are not limited to furbearers. It may be interpreted as the Elders seeing an inherent value in animals beyond merely utilitarian uses. For the Elders there appears to be a connection between a healthy forest ecosystem and a diversity of animals.

Elders would support a reintroduction but also noted that they believe the animals are slowly returning. Much of the discussion in context of porcupine and particularly with the curriculum based questions focused on youth being disconnected from their environment (see Appendix). Unlike the Elders, youth today have not had the opportunity to meet up with porcupine as they make their way to school. It is not part of the youth's collective experience as they relate to wildlife. There have been occasional sightings in the past ten years - as one Elder expresses when she saw a porcupine between Pine Falls and Black River First Nation.

> "Yeah, we've seen them there, me and my daughter. They were big and those sharp things. Yeah. I was so happy to see that stupid porcupine [laughs]."

Whereas Elders would like to see porcupine return, youth and the community at large could benefit from efforts to reintroduce porcupine as a valued resource and intrinsic part of the bush. The importance of involving youth in a relocation or monitoring program is discussed in Chapter 4.

As changes in the forest were presented by Elders as being a direct result of over-harvesting for timber, there appears to be a disconnection with the role of forestry. The community relies to a certain extent on employment through forestry but is then left with a forest impacted by the loss of trees. This topic is interesting and is worthy of further investigation to determine how forestry and the communities needs can become more harmonious.

Chapter 4 Youth Involvement – A Case Study and Summary of Ecosite Data Gathering with Local Youth

4.1 Introduction

Elders fondly recalled eating porcupine, "playing" with them on their way to school or just seeing these animals near their community and their parents telling them to leave porcupine alone. But there was a connection to the environment that came from seeing and sometimes teasing these fascinating animals. During the interviews, Elders in both communities expressed concern that youth were not connected with the environment. Elders were asked to identify areas near their communities which they felt represented potential habitat for porcupines. The Ecosite concept complemented this project as it provided a framework within which to describe potential habitat sites of interest and to document non-timber values on a manageable scale. Youth from both communities were selected to apply a modified Ecosite framework to gather information about the sites the Elders had suggested. Local youth aged 14 to 24, gathered information at sites with spruce, tamarack, pine and balsam fir.

An on-going project in Wisconsin has had success involving youth in the monitoring of a recovering porcupine population. The Sandhills High School Independent Study Porcupine Program provides the basis for a case study to evaluate the feasibility and value of creating a similar project in Manitoba. Since 1996, Wildlife Biologists from the Sandhills Outdoor Skills Center (SOSC) in Wisconsin, USA have delivered a High School Independent Studies program focused on gathering data on the resident

porcupines. The Porcupine Project is managed by the Wisconsin Department of Natural Resources (WDNR) and has had maintained success attracting high school students from the surrounding communities (Thiel, pers. com. 2005). This project has been active for 12 years, in part because of strong leadership and on-going interest from the junior and senior students (Thiel, pers. com. 2005). This program is structured specifically to involve youth in gathering data on porcupine. The Sandhills High School Independent Study Porcupine Program provides the basis for a case study to evaluate the feasibility and value of creating a similar project in Manitoba.

4.2 Methods

4.2.1 Ecosite sampling methods

Ecosite Classification and Decision Support System and keys were developed with the purpose of guiding decisions in the forestry industry to include recreational, social and cultural elements. An Ecosite is evaluated at the manageable stand level or slightly larger but the data is gathered using a sampling unit of ten metres by ten metres with two sites preferably 100m apart to reflect the stand level (Walker et al. 2001). The sampling size allows visually evaluation from the soil level to the super canopy and the second plot supports the similarity of characteristics to determine an Ecosite classification (Walker et al. 2001).

The process of gathering data was adaptive. The original Ecosite data sheet was altered and simplified to create the Student-friendly Ecosite field sheet(p.136-137 in Appendix). The Student-friendly Ecosite data sheet contained only necessary information for soil, forest composition, understory and ground cover to help identify the likely Ecosite of a given sampling area. As sampling was confined to boreal forest sites, frequently

encountered plants and trees were listed with their common names on the altered versions of the data sheet.

The Ecosite keys were adapted to enable someone without formal training in botany or ecology to gather information with minimal field support (p.134-135 in Appendix). The system's original keys were altered by changing some of the symbols (arrows changed to green circles and red hexagons), the type was made larger and the use of specific terminology was limited (see Manitoba Ecosite Classification Field Operation Manual in Appendix). Adding symbols and increasing font size helped make the key more intuitive to someone with little or no experience applying keys. Measurement at breast height of the larger trees was taken in place of tree core samples. Percentage cover was done for the tree species at the various canopy levels. To evaluate plant species cover, a system was devised using a series of symbols to indicate species frequency. A comprehensive ranking system similar to Braun-Blanquet was used (Braun-Blanquet 1932). For example a backslash indicated the plant was found, adding an opposite backslash to make an x indicated it was widespread and a circled x indicated that this species was dominant on the site. This approach allowed the information to be continually altered during the exploration of the site without erasing or crossing out information. The accuracy of an estimated percentage of ground cover was reduced, but the approach was intuitive and needed little pre-training.

In Black River, a brief presentation was done for the youth employed by the Green Team project. These students are hired for the summer to do work around the community such as painting, cutting grass and other tasks. The group expressed much interest and many

signed up to work in the field. Four people between the ages of 14 and 25 were selected randomly from Black River First Nations. On multiple days in August 2004, they gathered Ecosite data. In Hollow Water, a young woman was recommended during a Traditional Advisory Committee meeting and became the sole field assistant for that community. Various means of transportation were used to access sites such as canoe, all-terrain vehicles, and hiking. All data gathering was done in a single day. A global positioning system was used to record locations.

Ecosite sampling sites were selected based on being representative of the area and a second site between 50 and 100 m was selected randomly or based on terrain constraints. Sites were selected in areas that Elders from both communities proposed and within tree stands that had specific tree species present. The areas were accessed primarily by foot, by boat/canoe and all-terrain vehicle when required.

In Black River, there was disagreement over what porcupines eat, resulting in differences of opinion on suitable potential locations for their return. Though some Elders considered jack pine an important food source, others suggested tamarack and spruce. Efforts were made to visually select stands with either jack pine, tamarack or spruce was present in the areas near Trans-License Road, Spooks Creek and Poplar Point north from the community beach. Elders in Hollow Water suggested trees be the most important determinant as to where porcupines could be released. The jack pine ridges north along the Winter Road, Black Island, an area near Seymourville, and another area north along Provincial Road 304 to Bissett were suggested by the Elders as areas of interest.

4.2.2 Case study – Sandhills Porcupine Monitoring Project

A porcupine monitoring program was evaluated as a learning method of a context-dependent project to provide insights into the value and feasibility of developing a similar program. In February 2005, the researcher traveled to Babcock, Wisconsin for a week to observe and participate in an on-going porcupine monitoring project at the Sandhills Outdoor Skills Center operated by the Wisconsin Department of Natural Resources. This project was selected based on the similarities shared with a proposed relocation of porcupines.

The research SOSC is primarily done during the winter months when animals are less mobile and more easily observed. The SOSC project relies on local volunteers from the nearby high schools to set traps and gather data about a population of porcupine. Students who volunteered with the program were engaged in informal discussion concerning their thoughts about the monitoring program. Dick Thiel, the wildlife biologist for the Center shared data reports and his personal insights on the program. There was opportunity to observe the students and participate in the data gathering activity.

4.3 Ecosite Sampling Results

Local youth aged 14 to 24, gathered information at sites with spruce, tamarack, pine and balsam fir. The field season was brief but demonstrated that the youth were capable and willing to be involved in hands-on information gathering.

The most common Ecosite descriptors found in the sampled areas were E-4 jack pine – conifer on dry to moderately fresh sandy soil, E-5 Jack pine – spruce mixed wood on sandy soil, followed by E-20 hardwood – balsam fir, spruce mixed wood on fresh fine loamy to clayey soil (Table 2 in Appendix.). The E-4 descriptor is characterized by a canopy dominated by jack pine. The stands of jack pine can be young and directly related to the impact of fire. E-5 is a jack pine and spruce dominated stand with secondary species being most frequently aspen, white birch and balsam fir. Both types of Ecosites occur on soil, which is sandy, unlike E-20, which has fine loamy to clayey soil. E-20 also contrasts with hardwoods such as trembling aspen, birch and balsam poplar being dominant, while a smaller portion of the site has softwoods such as jack pine and black spruce. E-20 differs also because of its rich understory of shrubs, notably hazelnut and mountain maple, which could be of seasonal interest to porcupine. Other surveyed sites were attributed Ecosites classifications of E-2, E-3, E-8, E-13, E-17, E-21, E-22 and E-24 (Ecosite Descriptors p.139-148 in Appendix). The diversity in dominant types of tree species at many sites provides possible useful seasonal species for generalist herbivores such as porcupines. The sampling was limited in scope and should not be considered as the only sites available or useful to porcupines. The sites are however indicative of the diversity of species present within the boreal forest.

4.4 Case Study: Observations from SOSC

Students at SOSC worked directly with all aspects of the porcupine program. The expectations for the students were well defined and included setting traps, gathering data, hauling equipment and generally participating in the research (Thiel Pers. Comm. 2005).

In informal discussion with students in Sandhills, they stated that the experience has given them an appreciation and understanding of porcupine and other wildlife. Though some received high school credit for their participation, they were all involved because they chose to be, and because they were committed to the project. A few of the students intend on continuing their involvement as they go off to college and will be writing papers on the topic (Thiel pers. com. 2005). Students were keen on encouraging other students to get involved through word of mouth and through presentations (Thiel Pers. Comm. 2005).

During informal group discussions with students, they expressed how much they valued their time spent outdoors and saw it as an important motivator for participation (Thiel pers. com. 2005). As a result of this project, students spent more time outdoors during their school day, learned about wildlife and gained experience gathering scientific data. The program provided some students with an alternative way to gain school credit while experiencing time outside in this nature park type setting. During the first week in February 2005, of the 11 students volunteering at Sandhills nearly half of them were young women. The porcupine monitoring project was interesting to some young women and may increase their likelihood to pursue a career in science or in fields such natural resource management.

4.5 Discussion

4.5.1 Value of Involving Youth in Monitoring Porcupines

Some of the Elders interviewed considered that today's youth are missing a connection to

the land and not interested in trapping. Providing youth with different opportunities to experience their natural environment could involve youth with varied interests. There is currently an educational curriculum in Manitoba geared to getting youth outside the classroom to learn from Elders about traditional ways. The "Reconnecting with the Land Youth at Risk Conservation/Education Program" was announced in Manitoba in December 2005 (Fur Commission of Canada 2006). The specific goals are to take aboriginal students outside the classroom to learn about traditional activities such as trapping from Elders and other experienced people (Fur Institute of Canada 2007). This project was undertaken following recommendations by Wabanong Nakaygum Okimawin (WNO) process (formerly known as the East Side Planning Initiative). The WNO is made up of representatives from 16 First Nations and communities on the East Side of Lake Winnipeg, working with the province to develop a broad area plan for the area (Government of Manitoba News Release 2005).

The Fur Institute of Canada (FIC) has assisted in program development in the Northwest Territories to address similar concerns over youth not connecting with their natural environment and a loss of knowledge being transferred to youth from Elders (Government of Manitoba News Release 2005). The approach of the FIC is to get youth into the outdoor classroom and increase academic success through this accredited land-based program. Manitoba Education has approved the four modules, which are hunting, trapping, fishing and community studies (FIC 2007). "Reconnecting with the Land" curriculum is aimed at youth 16 to 30 (FIC 2007), a group similar to the 14 to 24 year olds involved in Ecosite data gathering. A wildlife monitoring project, whether it be

porcupine or other wildlife of interest could build on the four modules and provide another outdoor application for youth to gain experience and encourage future career choices. Being involved in a project of this nature could provide youth with future interest in a career within the field of natural resources and represent capacity building for the community.

The Porcupine Project in Sandhills has been successful because the students have maintained interest in the program. Having reached its ten-year mark, Thiel recognizes that the porcupines are novel research animals able to tweak and sustain the students' interests. (Thiel Pers. Comm. 2005). The Porcupine Project has provided students with the opportunity to learn hands-on wildlife ecology and data collection. Some of the students who have gone on to post-secondary studies are in the process of analyzing the porcupine data and further pursuing the research initiated at Sandhills (Thiel Pers. Comm. 2005). The success of a wildlife monitoring project involving youth is not restricted to the recovery of a species but as is demonstrated in Sandhills it is that the students enjoy being outdoors walking, snowshoeing and learning about ecology in the field rather than in a classroom setting. Involvement in a porcupine monitoring program by youth can foster an appreciation and respect for wildlife and the natural environment.

4.5.2 Could a Project like the Sandhills Porcupine Monitoring Project be Done Along the Eastside of Lake Winnipeg?

There are many similarities concerning the decline of porcupine in Sandhills that are shared with Black River and Hollow Water. Fires and fisher are considered to be the

primary causes for their decline. Sandhills is experiencing a return of porcupine to the landscape. Thiel considered the situation as being the basis for an interesting research species that was suitable for a project within the scope of High School Independent Studies. When the Porcupine Project was undertaken at SOSC, the porcupines in Sandhills were known to be in the process of recolonizing. For the past twenty years, the porcupine population has been increasing though population density is still not believed to have reached capacity (Thiel Pers. Com.2004). The project gathers information to increase knowledge about porcupine biology and keep records on estimated population fluctuations.

The boreal forest found on the eastside of Lake Winnipeg shares some characteristics with the landscape and wildlife in Sandhills. Some of the same tree and animal species are shared between both locations. The SOSC is located on the edge of a forested area with low, sandy uplands of oak, aspen, jack pine, small grasslands and marshy areas (Thiel 2003). Wildlife found near the center include a small bison *(Bison bison)* herd, monitored whitetail deer herds along with other small mammals, ruffed grouse *(Bonasa umbellus)*, Canada goose *(Branta canadensis)*, and several varieties of waterfowl, shorebirds, songbirds and birds of prey. Notably this area is home to the Sandhill cranes *(Grus Canadensis)* and of course porcupine (WDNR website, Thiel 2003). However the boreal forest is a fire driven ecosystem, which is actively harvested in many parts, with exposed Canadian Shield and many wetlands (Burton et al. 2003). Unlike Sandhills Outdoor Skills Center, which is contained by a fence, the terrain in both the communities of Hollow Water and Black River are enormous and challenging to hike through. The

landscape along the banks of Lake Winnipeg, the many marshes and bogs and the thick bush are difficult to get through. Tracking animals would prove very challenging because of the terrain. Porcupines do not travel large distances particularly during the winter months (Roze 1984, Sweitser 1996). But until relocated animals establish a home range it would be very difficult to track them. During the brief field season, we used All Terrain Vehicles, a canoe and canoe with a motor to get to the selected sites. There are inherent risks in traveling in the bush, which would have to be considered. Monitoring a wildlife species such as the porcupine is more challenging within such a rugged terrain. The East Side of Lake Winnipeg represents a very large area and each community is buffered by crown land. Comparatively, SOSC is located on 9,150 acres of fenced wildlife management area with restrictive harvesting exclusive of administrative rule (WDNR 2005). The vastness of the land involved were this type of program undertaken on the East Side would have to be taken into consideration. SOSC has a relatively controlled space with the entire area being fenced in and accessible by road. In the rugged terrain along the East Side of Lake Winnipeg, the use of radio telemetry and collars on animals would be required to initially track the animals until their habitat can be mapped based on seasonal movements.

In Sandhills, the monitoring season is done in the winter season in large part because the porcupines are more easily located. Winter travel would be feasible in Hollow Water and Black River, however it would be difficult if the animals were at a distance from the communities. Winter fieldwork would require planning to ensure the youth researchers' safety in cold weather with large expanses to monitor. Fieldwork would need to be done

ideally with snowshoes but would likely require snowmobiles to travel the greater distances.

The students involved in the Ecosite data gathering ranged from 14 to 24 whereas the students involved in the Porcupine Project in SOSC are between 16 and 18 years old. When participating in the project students are expected to demonstrate an interest in science, and to be responsible, motivated and serious about their work (Thiel pers. Com). The program attempts to promote understanding and appreciation for Wisconsin's wildlife resources, and increasing public awareness of wildlife and wildlife management (WDNR Website). The students involved in a monitoring program or field data gathering would be gain hands-on experience outside a classroom setting. The students in SOCC gained applied research skills through having hands-on experience in wildlife data gathering (Thiel pers. Com). The students at SOCC also demonstrated a keen interest in wildlife and the natural environment. Students involved in Ecosite gathering in Black River and Hollow Water were enthusiastic and very capable at gathering data. Indicators for success for a youth program of this nature would include the quality of data gathered and be based on whether youth want to get involved, gain knowledge from the experience and become more involved in their natural environment.

The students who helped in the field in Black River and Hollow Water were quickly able to actively participate in all aspects of data gathering. They eventually learned names and identified species of plants and trees, as well as soil descriptors. They crosschecked the MBEC site type with the Forest Ecosystem Classification for Manitoba to determine if

the descriptors resembled what had been observed in the field. There is no doubt the students were capable of gathering this type of data and would be capable of the kind of work being done in Wisconsin. They were interested, enthusiastic and enjoyed being out around their community. For some, this was the first time venturing into areas within a few kilometers of their community. By applying the Student-friendly Ecosite framework, youth were given the opportunity to learn aspects of botany, estimation and applied mathematics through data analysis. They also became more familiar with the land surrounding their respective communities. A porcupine monitoring could feasibly be undertaken in either or both study communities if there is sustained support from the community.

4.5.3 Potential for Youth Involvement in Black River and Hollow Water First Nations

"But now, even those kids don't know what porcupine is."

Elders from both Black River and Hollow Water expressed concern that the youth of today were not connected with their natural environment. A program of the type offered at Sandhills, whether it be to monitor porcupines or other species, would offer an opportunity for young people to get involved and experience the outdoors. Potentially this program could be combined with coursework if local schools were supportive or be affiliated with the "Reconnecting the Land" curriculum, which has been accredited by Manitoba Education (FIC 2007).

Along with this there is a component of physical activity that would help to promote healthy living. A field data-gathering program or monitoring program could provide an alternative way to increase physical activity. For the communities of Black River and Hollow Water, programs that support building connections between youth and the natural world are important. These communities will likely experience more change with an announced extension of an all-weather road connecting to more remote communities in northeastern Manitoba.

4.5.4 Practical Approaches to Monitoring Porcupines

The trip to Wisconsin provided valuable insights into some practical approaches specific to monitoring porcupine. The project at Sandhills has been on going for ten years and they have experience working with porcupine to draw on if a similar project were undertaken.

In earlier research in Sandhills, radio telemetry was used to track the movements of two radio-collared animals. The technique was consistent with the approach used by Marshall et al. (1961). The battery pack is charged for 6 months but is changed every 5 months. Issues with radio-telemetry were primarily with the collaring of animals. The collars were cutting into the animals' necks. To avoid this several different approaches were tried. The most successful has been to use a dog shaver to trim away a 10 cm circumference of quills around the neck and then use padded collars.

The project gathers much of their data during the winter months with students providing support for the fieldwork. Students are involved in gathering field equipment, setting traps and transcribing data. The biologist takes a primary role and the students take turns with the transportation of equipment and taking field notes.

Understanding where porcupines den is essential to tracking these animals and gathering data. When the animals are up in trees or moving they would be next to impossible to get even basic data from. In Sandhills, Thiel has developed a very thorough understanding of den habits and has mapped most of the existing dens through the years. Approximately half the den sites are found in rock den structures. In Sandhills, rock outcrops are characterized by multiple holes and are limited to a couple of hectares on the property. The other half of the dens consisted of tree hollows, dense shrubs and fallen trees. The standing live trees used for dens are generally between 46.9 cm and 78cm in diameter with the majority of the trees measuring between 50 and 55 cm across. The dens measure from 1.5 to 2 meters off the ground and the entrance ranges from 11 to 21cm in diameter (Thiel pers. com. 2004). The hollowed tree dens are characteristically older white pine that are scattered throughout the landscape but are among tree clusters. Most dens are found within tree trunks with others in rock outcrops and forest debris. The dens were determined to be active when knocking on the hollowed trunk resulted in a rustling sound from within.

Traps are set near dens where animals were seen or where signs of activity had been identified. The traps are medium sized and are used to trap raccoons and skunks. With

guidance from Dick Thiel as to where to set up the traps, four students proved to be very adept at setting the medium sized trap. Straw was placed to provide for insulation and a tarp was used to cover the trap providing for darkness, which the animals are accustomed to in their dens. The darkness also allows for reducing stress while the animals are captive. A few meters of chicken wire fencing encircled the tree den to funnel the animals into the traps. Data was gathered as to the time and location where the traps were set along with specific details as to how the trap was set. The sites were accessible from a service road. Students used snowshoes when traveling larger distances to set traps. Students using a large plastic sled hauled the gear.

When an animal is trapped for the first time it is transported to the Centre for processing. The porcupine is given a few hours to acclimatize (warm up). A cone-shaped transfer mechanism is used to secure the animal for sedation. The transfer mechanism is covered and placed directly against the cage as the door is unlatched. The animals seek the darkness and generally, move voluntarily into it. An important point is to ensure that the animals move in forward facing. The animal is then secured with wooden rods and two metal u-shaped rods threaded through the back of the cage against the animal's rump. Once immobilized, Thiel administered Telazol to sedate the animals. The tranquillizer drug lasts from 30 to 90 minutes. After approximately three minutes, the animal's eye movement and body response is checked to ensure proper sedation. The cone-shaped transfer mechanism is then unhinged and the animal is ready for processing. A lotion is applied to the eyes to ensure moisture retention. Handling of the porcupine requires the use of welder's gloves to reduce the chance of being stuck with quills. Data on the animal

is then collected quickly. This includes sex, approximate age using dental information (size of premolars relative to molars and dental wear), parasite load (0- none, 1- light, 2- high). Half a dozen loose quills are collected for DNA analysis. The PIT tag is then injected between the shoulder blades and the number is set into the animals file for future identification. Porcupine are then kept in the trap overnight, fed apples and covered with a tarp to reduce stress. The animal is given a file number, a PIT tag number and the students also get to name their porcupine. Physical handling of the animal is limited to that which is required for the purpose of data gathering.

Trapped porcupines are scanned using a wand scanner to see if it is a recapture (presence of PIT tag). The wand is inserted through the cage mesh and the tip is placed near the shoulder blades of the animal. A number is displayed on the wand if the animal has been captured previously. Animals that already have Passive Integrated Transponder tags (PIT) tags are identified with a code, weighed and released on-site, with information on the location of the capture being documented. Loose quills are collected for DNA analysis and as the animal is released, it is sprayed with spray paint to create an easily visible identification method. The traps and fencing are then removed and hauled out. If animals are seen up in the tree or heard in their den the empty traps are left for a few days but monitored daily. Once back at the Center, the quills gathered for DNA analysis are cut with the end attached to the porcupine being put in a vile. A high school student will be doing the DNA analysis that could lead to some interesting data about lineage and dispersal.

4.7 Conclusion

Though the porcupine relocation and monitoring did not come to fruition in these communities, the experience of applying the Student-friendly Ecosite data gathering proved to be a useful activity. The application of the Ecosite framework provided an existing method for gathering data at the stand level and at the larger Ecosite level. The scale was manageable and could be done with on-site training with local young people. The alterations to both the data sheet and the keys seemed to be practical. The field season and number of areas sampled were limited but demonstrated that the youth were capable and willing to be involved in hands-on information gathering. Ecosite data gathering could be done as a high school activity to educate young people about their boreal backyard. This component could be offered to teachers as a tool to teach about biodiversity and help connect youth to their natural environment. To support local values, the terms used in Ecosite could be translated into Ojibway or other languages to provide an applied use of the language

The youth that were involved in the field research in Hollow Water and Black River were able and willing. The youth could benefit from involvement in projects of compiling forest inventory and wildlife monitoring. With ten years of experience at SOCC, the program has worked through difficulties and gained expertise in monitoring porcupine and involving youth. If a monitoring program were to be put together for either relocated or naturally restored population, cooperation and information sharing between programs such as SOCC would be hugely beneficial

A program similar to the Sandhills Porcupine Project could be successful in both communities if it is done with support from the community, involves Elders and has long-term goals. Involving youth would provide them with an opportunity to experience "the bush" and learn valuable skills. There are some obstacles for outdoor research involving youth along the East Side of Lake Winnipeg because of the challenging terrain and climate that would need to be considered. As Elders expressed during the course of interviews, there is a need to help youth connect with their natural environment. Any wildlife monitoring or ecological inventory programs that are developed should be specific to the goals and objectives set out by the community to respect and integrate cultural and traditional values.

Chapter 5 – Conclusion - The Decline and Return of Porcupine in the Areas of Hollow Water and Black River

5.1 Porcupine in Black River and Hollow Water First Nations

Based on concerns raised by community representatives from Black River and Hollow Water First Nations about a local absence of North American porcupine *(Erethizon dorsatum)* this project set out to determine the cultural value of the animal, the causes of its decline and the feasibility of involving local youth in potential reintroduction efforts.

During the summer of 2004, Elders from both communities were interviewed about the cultural and historical aspects of porcupine. The Elders shared much information respectfully acknowledged as indigenous knowledge. Indigenous knowledge is understood to be knowledge of the natural environment acquired over time, providing insights into the traditional or historic perspectives and future management of natural resources (Grenier 1998). Elders concluded that porcupine had been plentiful between 30 and 50 years ago and had since experienced a drastic decline in numbers. There were multiple causes suggested as potential contributing factors to the decline in porcupines in both communities. The literature supports the impacts of multiple factors including predation by fisher, which would have contributed to the decline of porcupine near both communities. Elders were sincere in their reminiscences of the porcupine and its value for them. Elders clearly stated that porcupine belong in the "bush" and like all flora and fauna they make up a functioning ecosystem.

5.2. The Decline of Porcupine

Discussions and interviews with local area residents were the primary source used to authenticate the decline of porcupines in their respective areas. Elders from both communities discussed a past abundance of porcupine, multiple changes that they have seen in the bush and concerns over the future of their youth and the natural environment.

Both the communities of Hollow Water and Black River reported having regular sightings and interactions with porcupines approximately 40 to 50 years ago. Over time, the porcupine population has declined to the point where they are no longer visible to community members in the form of direct sightings, tree scarring or dogs with imbedded quills (Elder interviews 2004). The exact timeline for their decline is not specific, which is understandable since porcupine was not a primary food source or a key species for the communities.

The porcupine population has substantially declined in both communities (Elder interviews 2004). Many factors may have contributed to the decline in porcupines in the areas of Black River and Hollow Water. It can be assumed that multiple factors were cumulative and negatively impacted porcupine populations. Possible factors include difficult winter seasons (Sweitzer 1996), increased predation as a result of predator/prey cycles (Sweitzer 1997, Lloyd and Cary 1991), large fisher populations (Earle and Kramm 1982), changes in the forest landscape (Elder interviews 2004) and human impacts (Roze 1989). Population change may also be the result of a natural cycle, as the Cree of James Bay believe (Berkes 1999) which was further compounded by external factors.

Porcupine are vulnerable during the winter months, as their food source does not supply them with an abundance of calories (Roze 1989). Sweitzer (1996) studied the impact of predation on porcupines that fed in open areas during the winter season in the Great Basin Desert. The study suggested that porcupines choose to feed in higher risk areas such as open grassland and areas dominated by shrubs such as juniper when they face starvation (Sweitzer 1996). The combined effects of cold and snowy winters may then increase the level of predation since the animals become increasingly vulnerable as they feed in higher risk areas of their habitat (Sweitzer 1996). It can be presumed then that animals weakened by starvation are also more easily preyed upon as they experience the debilitating effects of malnutrition. In the northern climate such as the boreal forest this would be a reality for porcupine and many other species.

The interviews with Elders in both communities revealed a shared belief that porcupine were plentiful in the 1930s and 1940s. The decline was determined as having begun in the 1950s continuing through to the 1970s. The decline was seen as the absence of porcupine in the communities and nearby area. When the porcupine population was peaking they were seen with some regularity within each community, near houses and as the children were playing outside or on their way to school.

Dendrochronology has been used to study the fluctuation in porcupine populations by Spencer (1964) in New England. The research concluded that porcupine populations experience natural fluctuations over extended periods. Unlike the lynx-hare cycle, which

has been classified as a ten-year cycle, the porcupine may be more vulnerable to various factors, which could account for unspecific cycles (Keith and Cary 1991). The dendrochronological research presented evidence of feeding scars that supported a cycle of high population between 20 and 40 years in Mesa Verde (Spencer 1964). Notably, the research indicated a high population in the mid-1930s. Berkes (1988) in his research with the Chisasibi Cree people of James Bay found that there existed local traditional knowledge of animal cycles, including porcupine. Porcupine were plentiful in the 1960-1970 and began their decline in 1970s (Berkes 1988). There exists similar timelines for porcupine population expansion and decline from distant areas. The dendrological research presented a cycle of 20 to 40 years. No specific time frame was given for the TEK cycle from James Bay (Berkes 1988).

5.2.1. Impact of Predators

The impact of predators on the decline of porcupine is most notable when considering the fisher (Earle and Kramm 1982). The history of fisher in the area has potentially been a major factor in the population cycles of porcupine.

> "There was this one time when—I think that was in the late '80s—that's when the fisher *[market values]* were high. The price of fisher was around four or five hundred dollars. Yeah, I don't know, that's the time they were back here. They killed a lot of fisher that year because there was plenty of fisher that year. Yeah, I think it was in the late '80s, yeah. And some of them would get, every time they would go in the bush they would bring a fisher." (Elder from Hollow Water)

Earle and Kramm (1982) evaluated the impact of fisher on porcupine populations in Michigan. Their research concluded that although other factors such as human impact

through roads, forestry and changing habitat have a minor role in the decline in porcupine, an abundance of fisher is especially hard on porcupine populations.

Manitoba's provincial trapping records indicate a brief spike in fisher being harvested in 1954 with 1 189 fisher pelts and then returning to 524 the following year (Figure 4. and Figure 5. in Appendix). A substantial spike in fisher harvesting began in 1972 with the number reaching over 1 000 annually, through until 1997 with a high of 4 585 in 1982 (the exception is in 1976 when 911 fisher were harvested). The large number of fisher being harvested over the decade from 1979 to 1988 represents the height of the peak with a total of 31 802 animals being harvested for an average of 3 533 annually, which is well above the total average of 755 which is calculated when the years 1979 – 1988 are excluded. The increase in fisher pelts began in 1972 fits with the timeframe for the beginning of the decline in porcupine as described by the Elders in both communities.

Other potential predators that have been recorded include other mustelids such as martens, minks, ermine and weasel, cougar (*Felix concolor cougar*), red fox (*Vulpes vulpes*), lynx (*Lynx Canadensis*), bobcat (*Lynx rufus*), wolverine (*Gulo luscus*), great horned owl (*Bubo virgianus*), coyotes (*Canis latrans*), wolves (*Canis lupus*), bear (*Ursus americanus*) and eagles (*Accipitridae*) (Roze 1989, Gorog and Myers 2000).

These other predators could have contributed to the decline of porcupine in the study areas. It is interesting to consider that the connection has been made that during the low part of the hare cycle, predators may feed more heavily on porcupine and smaller mammals (Lloyd and Cary 1991). Predators which feed on snowshoe hare will switch

their food sources once the hares become scarce. Two years into the hare decline, squirrel (*Sciuridae*), skunk (*Mephitis*) and porcupine begin to see a decrease (Lloyd and Cary 1991). The Manitoba provincial harvest data as it relates to lynx indicates four spikes in the number of pelts being harvested. These spikes are for the years 1923 when the number of pelts harvested doubled to 4 939, 1959 -1963 with an average of 5 557 lynx pelts harvested, and 1968-1972 with an average of 5 768 and in 1977-1983 with an average of 4 029 lynx pelts harvested. Excluding these years of high lynx harvesting, the average number of lynx pelts harvested in the province of Manitoba is annually 871 as compared to an average for the sixteen years of high harvest levels with an average of 5 229. The spikes are substantial and could be a contributing factor in reducing the population of porcupine in the study areas to a level where they have not rebounded as of 2004.

In the Great Basin Desert, Sweitzer et al. (1997) determined that with a change in the environment due to agriculture there were fewer mule deer available as a food source for mountain lions. A stable population of porcupine were nearly extirpated during the course of three years as the mountain lions preyed on them (Sweitzer et al. 1997). Porcupines fill a niche as a backup food source for larger predators. As there are shifts in predator prey cycles porcupine may be targeted as prey more frequently and more intently. It is likely that the decline of porcupine is the result of the impact or several predators including lynx and fisher reacting to cycles in prey availability.

5.2.2. Impact of Multiple Factors

Roze (1989) identified the major causes of mortality for porcupine to be winter stress, disease/parasitism, injury, predation and human impacts. Winter stress would be an on-going stress for animals that live in the boreal forest of northeast Manitoba. Winter would likely be the most predictable pressure that could be compounded with other limiting factors. The presence of scabies has been connected to the incapacitation of animals which contribute to their death. Scabies is considered a newer type of parasite to porcupine with the first outbreak being noted in western Massachusetts in 1958 (Roze 1989). It is not known if scabies contributed to the decline of porcupine in Black River and Hollow Water areas.

Human caused mortality is an important limiting factor. Killing porcupine is common practice as a result of destruction of personal property or the concern over future damage (Hale and Fuller 1996). Collisions with vehicles reduces population and may affect migrating animals as they travel to new areas. Road kill occurs with more frequency in spring and fall seasons as porcupine feed on road salt (Roze 1989).

The use of porcupine for either food or trap-bait has been noted during the interview process. During difficult times the added mortality from people harvesting porcupines would have reduced the populations found nearest to the communities. First Nations people have historically eaten porcupine meat when other meat is scarce (Goodchild 1999). The method of preparing the meat ranges from burning off the quills then roasting it in the ashes or boiling it. The porcupine's importance as a food source lies as much in

the ease with which it can be killed using a club or a stick. Regular use of porcupine as a food source would limit the population growth particularly in areas near communities.

Additive factors that have contributed to the decline, it would be reasonable to assume, would include human impact through harvesting and collisions with vehicles, potentially scabies or other parasitic infestations and long cold Manitoba winters. Those natural causes combined with changes in the forest through both fire and forestry may have resulted in a population too affected to be sustainable. The history of decline of porcupines in the Sandhills Porcupine monitoring project appear to be similar to those experienced in Black River and Hollow Water. The impact of fire and logging had a cumulative effect both considered to have had negative effects on habitat required for porcupine (Thiel pers. com.). These are some of the same effects reported by Elders in the community as having altered the forest landscape and affected wildlife populations.

5.3 Community Perspectives

5.3.1 Black River

As summarized in the interviews from Black River Elders, the reasons contributing to the decline in porcupine are cumulative and include, but are not limited to, changes in the forest due to fire and forestry activities, predation from predators such as fisher, road kill and use as food by community members. The fires in late 1980s in the area of Black River First Nation consumed much of the forest north of the community and to this day boggy areas have dead trees standing. Though the forest is regenerating, the impact would have added pressure to wildlife populations that would have scattered. Previous to

that the forestry industry had been harvesting in the forest along Translicence road and by the community in the nearby area. The Elders from Hollow Water did not attribute the lack of porcupine as being a direct result from a single major issue but as part of this animal's biology as being slow moving and unable to get away from fires or predators.

> "I guess those animals move, and generations—they'll come back again. So, we'll start seeing them one by one—one at a time, so maybe gradually it's coming back." (Elder from Black River First Nation)

5.3.2. Hollow Water

The Elders interviewed in Hollow Water did not regard the absence of porcupine as being indicative of major issues in the forest. The decline of porcupines was perceived as a natural fluctuation seen in the forest because of their modest reproductive rate and slow dispersion/movement. The changes in the forest that had taken place such as increased timber cutting and fires were considered as contributing to the decrease of wildlife in the area.

An Elder from Hollow Water had brought forth the issue of the decline in porcupines and the possibility of restoring the animals through relocation. This concern was expressed during a Manitoba Model Forest meeting formed the basis for this research project. After interviewing Elders in the community, it was clear that there was a perceived decline of porcupine, the community Elders valued the animal and they also believed it would return on its own. This shared belief was respected. Relocating porcupine when Elders believed they were returning would have imposed a cavalier sense of ecology when the

community represented by Elders had clearly stated their understanding of resilience within the bush as it cycles.

5.4 Return of the Porcupine

Why would it be desirable for porcupine to return to the area along the East Side of Lake Winnipeg near the communities of Black River and Hollow Water? In other areas in the province, porcupines are destroyed as nuisance animals. This is in part due to the perceived impact of porcupines on forestry or more specific destruction of property (Gilbert 2006, Gunn 1993, Roze 1989).

Why would porcupine be valued in Black River or Hollow Water First Nations? In discussing with Elders what their thoughts were about porcupine the answers were sincere. It seems the most powerful reason to want porcupine back in these areas is because they belong in "the bush." They have the right to be and play a role in the boreal forest. Other aboriginal groups such as the Lake Superior Ojibwe share the appreciation for this animal as they too expressed concern over the decline of porcupine (Gilbert 2006). The porcupine population along Lake Superior also appears to have peaked at the same time as in Hollow Water and Black River. The peak was in the 1950s as young forests and reduced presence of predators particularly fisher created ideal porcupine conditions. However in Michigan, an organized effort was undertaken by wildlife and forestry agencies in the 1950s and 1960s to cull the porcupine. Between 1955 and 1965, several releases of fisher were done in the Wisconsin and Upper Peninsula of Michigan in an effort to reduce porcupines and restore a fisher population devastated by over hunting.

Currently porcupine are still present on the landscape of Lake Superior. They consider that much remains to be learned from porcupine even as there are many more changes that will continue to influence the future of the animal (Gilbert 2006). Knowing that other communities have shared concerns and values is empowering and can create a network for learning from each other's experience.

The decline in porcupines in Sandhills was related to habitat destruction (Thiel Pers. Com. 2004). The Sandhill forest had been destroyed by fire in the 1930s. The forest had been under substantial logging prior to the fire. The forested area to the northwest, approximately 60 kilometers away, had not succumbed to fire and provided the source population which gradually dispersed back into the area. It is believed to have taken approximately 40 years to get to the point where the population of porcupine began to recolonize the Sandhills area. Dispersal of porcupines is not clearly understood but it is evident that the Sandhills population is not a closed population and in time the porcupine continue to repopulate the area (Thiel pers. Com 2005).

The appeal of relocating a species such as porcupine is that the issue of no longer having porcupine on the landscape is immediately addressed. When deciding on a methodology for the approach to this research project it was deemed responsible to interview Elders as the first step. The Elders from both communities shared a sense that the porcupines would return naturally and in their own time. The Elders were not opposed to relocating animals but expressed their preference for natural repopulation. A natural repopulation would be also a way to know that the forest ecosystem has returned to a certain balance. For the Elders the return of the porcupine will be an indicator that "the bush" can provide

for these animals and that the animals returned of their own accord. Though trans-locating porcupines is feasible it is not recommended as the best approach for these communities at this present time. Perhaps at a later time, if the porcupine do not return, relocating animals will be a reasonable course of action.

5.4.1 Relocation Issues and Suggestions

If porcupine relocations were undertaken with the band counsel, community and Elders support, it would be preferable that someone from within the community take the lead role in the relocation effort. The youth that were involved in the field research in Hollow Water and Black River were capable and willing. The youth could benefit from involvement in projects of compiling forest inventory and wildlife monitoring. A program similar to the Sandhills Porcupine Project could be successful in both communities if it is done with support from the community, involves Elders and has realistic goals. A relocation and monitoring project that involves youth could complement the Reconnecting the Land curriculum (FIC 2007). Involving youth would provide them with an opportunity to experience "the bush", learn valuable skills and provide capacity building for communities who will continue to experience changes to their landscape through the development of the east side of Lake Winnipeg.

If relocating porcupines was undertaken in Black River and Hollow Water, Thiel suggested that a goal of relocating a dozen animals would be sufficient with future animals being released as they become available. He supported the idea that a document be circulated to Conservation staff requesting contact if problem porcupines are reported

in other areas. These animals could then be used as source animals. Releasing a sufficient number of animals would be important in creating a sustainable population. Areas of concern would be to provide genetic variability, allow for potential mortality and increase the chances that they will reproduce. In Thiel's opinion, a soft release where animals were acclimatized to their new surroundings would be preferred. A source population should be obtained from the nearest population source to reduce stress by providing similar habitat (Thiel. pers. com). Although being a generalist able to feed on many different types of trees and plants, (Roze 1989, Snyder and Linhart 1997) relocation would create an added stress. The animals should also be taken when they do not suffer from winter weight loss (Thiel pers. Com., Sweitser 1996). If animals are trapped during the winter season they should be processed and housed until the release in the spring. Porcupines are relatively easy to house and feed using apples and other available food sources. A concern with porcupine is the weight loss they experience during the winter season. Juveniles are not suitable candidates for relocation because of increased vulnerability combined with weight loss and stress. If a mother and her young were captured for relocation, the young would likely die.

It is important to know with some degree of certainty that porcupine remain locally extirpated prior to translocating animals (Vinkey et al.) as indicated in interviews with local elders, trappers and community members familiar with wildlife on the landscape. This is especially true if source animals are to be taken from a significant distance from the area of relocation. Although the concept of not introducing different genetics unnecessarily was done with fisher, the same guiding principles should be applied to

porcupine (Vinkey et al. 2006). If not for genetic reasons than their parasite load should be considered as a determining factor. A seemingly healthy animal can carry a variety of parasites. Roze offers the example of a single animal that had tens of thousands of nematodes, a thousand plus lice, four hundred tapeworms and an assortment of ticks, fleas, mites and tongue worms (Roze 1989). Many of these parasites are transferred from mother to offspring. External parasites such as ticks and lice and internal parasites such as round worms, tape worms and tread worms are plentiful but do not affect the general health (Gunn 1993). But stress from translocating could make the presence of parasites take its toll on the health of an animal.

To avoid transmission of disease or parasites a veterinarian with wildlife experience would be required to ensure the animal's good health. The animals would have to be housed for a period of time although this would be an opportunity to invite community members to come see the animals. This would be an interesting experience for children and youth. This connection with the community would be essential for a project like this to succeed. And it may be the only opportunity to view the animals because once released they may stray far from the release site.

Releasing too many animals could create a backlash, as people could potentially have negative experiences as a result of conflict with porcupines. As porcupine gnaw pressed board on a house (Roze 1985) or imbed quills in the family dog (Elder interviews 2004), it would not take long before porcupine are considered pests and destroyed. These animals have not been in these areas for many years and there return to the land must be

done with community support (Elder interviews 2004). It would be necessary to have a local contact to deal with negative encounters or remove animals from undesirable areas.

5.4.2. Recommendations for Suitable Habitat Areas

The scope of this project did not gather sufficient data to make recommendations to rank suitable habitats sites for porcupine in the event of a relocation. The Ecosite sites that were sampled are relatively few and give only a glimpse at the forest. The process of gathering the data was valued as an activity to involve youth but was not done extensively enough to provide the basis for recommendations. Further inventory of sites in consultation with the community and in consideration for future community projects would be required to determine suitable habitat sites specific to each community.

5.4.3 Natural Repopulation

Elders in Black River were fairly confident that the porcupine would return on its own. In 2004 a porcupine had been seen along Stead Road, and another one was reportedly removed from a business in Lac du Bonnet (Jansen pers. com.) and so the repopulation could come from southern areas to make their way to the area near Black River. The natural repopulation could continue north on to Hollow Water over time. Animals expanding from the north or the east could also repopulate the area in Hollow Water. Only time will tell if the animals return on their own to the boreal forest near the communities of Black River and Hollow Water First Nations.

5.5. Conclusion

In discussion with Elders, the point was rightly made that although the Elders would be glad to see the return of porcupines it would be essential to get support from the community in general. Whether the animals are relocated or reoccur naturally, the schools are an effective way of encouraging tolerance and curiosity about porcupine.

Some creative resources include locally written books such as "Nanabosho and Porcupine" (McLelland and McLelland 2006) and the musical artistry of Howard Kaplan in "The Ex-arboreal Porcupine Blues" (Kaplan 1995 see appendix) are creative and age appropriate ways of introducing porcupine to young children. Elders could be invited to participate and share their stories of porcupine. The audio-record of the interviews from this project provides a background to the topic and a community resource for the future. The involvement of youth could also be in monitoring the animals as they establish themselves. The Porcupine Project in Wisconsin could provide some collaboration as they have resolved some of the methodological issues that may be encountered and provide a protocol for involving youth. Application of the Manitoba Ecosite Decision Support System could aid in gathering specific information related to monitoring of an introduced population or naturally returning population of porcupines. The Ecosite Decision Support System could be altered and used as a tool to gather specific ecological inventory for the community by community.

An interdisciplinary approach is recommended when considering what to do regarding the decline of porcupine in the First Nations communities of Black River and Hollow

Water. The decision to relocate porcupines should be based on a thorough understanding of porcupine biology, habitat requirement, and potential issues and should be done under the guidance from the Traditional Knowledge of Elders and community support. Currently the Elders interviewed in both communities proposed that the porcupine would return naturally.

Whether porcupine return to these communities by relocating them or return naturally, it would be useful to involve the community members in getting reacquainted with the porcupine, a neighbour who has been away for a long time. In the event that repopulation of porcupines occur in the study area, this document could serve as a resource documenting there past abundance along with their decline and support the sustainable management of this boreal species.

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APPROVAL CERTIFICATE

07 April 2003

TO: **Monique Nault Wall** (Advisor R. Baydack)
Principal Investigator

FROM: **Wayne Taylor, Chair**
Joint-Faculty Research Ethics Board (JFREB)

Re: **Protocol #J2003:061**
"Addressing the Decline of Porcupines in the Little Black River and Hollow Water First Nations Areas"

Please be advised that your above-referenced protocol has received human ethics approval by the **Joint-Faculty Research Ethics Board**, which is organized and operates according to the Tri-Council Policy Statement. This approval is valid for one year only.

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.

Please note:

- **if you have funds pending human ethics approval, the auditor requires that you submit a copy of this Approval Certificate to Kathryn Bartmanovich, Research Grants & Contract Services (fax 261-0325), including the Sponsor name, before your account can be opened.**

- **if you have received multi-year funding for this research, responsibility lies with you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval; otherwise the account will be locked.**

The Research Ethics Board requests a final report for your study (available at: http://umanitoba.ca/research/ors/ethics/ors_ethics_human_REB_forms_guidelines.html) **in order to be in compliance with Tri-Council Guidelines.**

Interview Consent Form

Please check one of the following:

I accept the use of video-recording _____

I accept the use of audio-recording _____

Hand written notes are acceptable _____

None of these are acceptable to me _____

*Participant Signature:*_____

Date _____, *2004*

With respect,

Monique Nault Wall – Researcher
Ethics protocol # j 2003:061
Faculty of the Environment
University of Manitoba

Have you seen porcupine or signs of porcupine?

You are invited to share your stories and your insights about porcupines in the areas of Black River, Manigotagan, Seymourville and Hollow Water. Your information is important to help us understand why there are fewer porcupines and what's important to know about these animals.

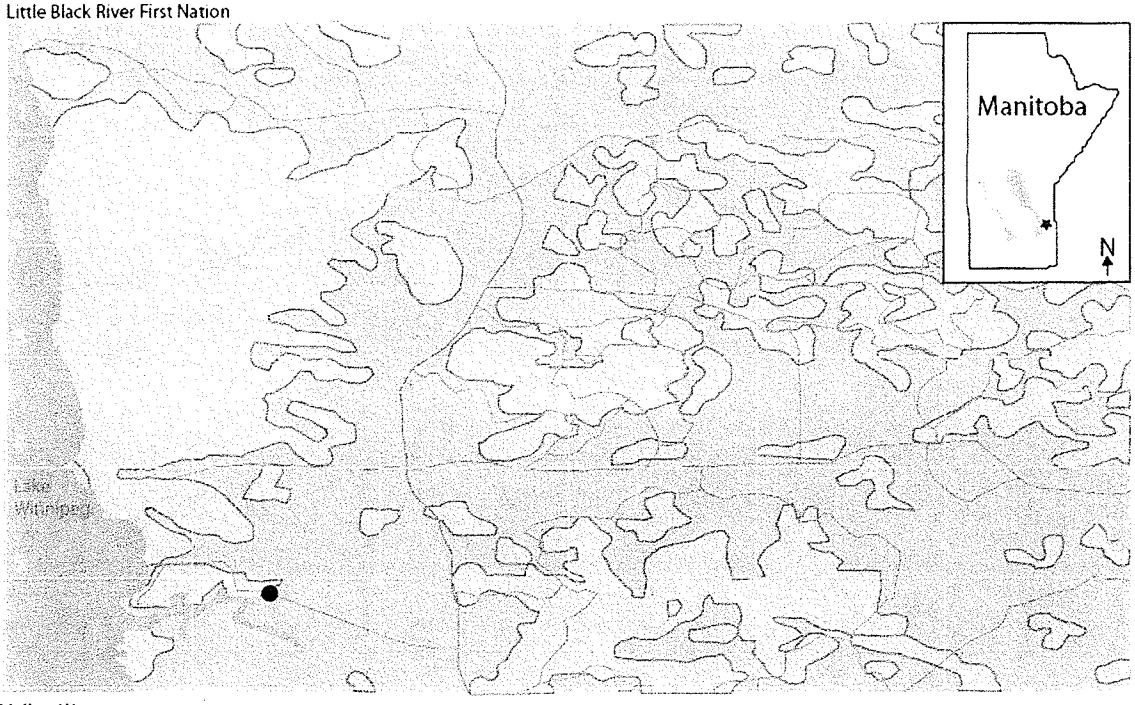
PLEASE Contact Monique Wall at [redacted]

Table 1. Schedule of Interviews with Elders in Black River and Hollow Water First Nation in 2004

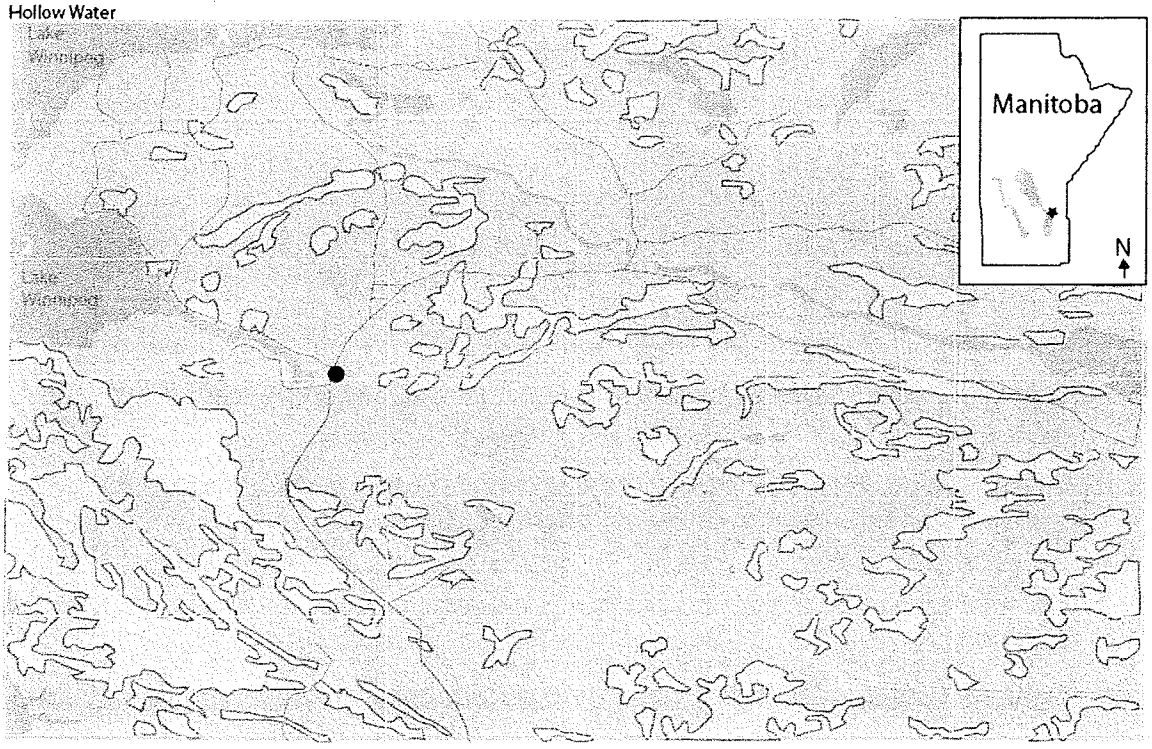
Date	Black River First Nation	Hollow Water First Nation
June 29	Orton Ramsay Flora Jane Houston	
June 30		Flora Williams William Laferine Randall Bird
July 6	Christina Bird	
July 7	Irvine Harry	
July 9	George (Henry) Abraham Myrtle Abraham & Stanley Thickfoot	
July 13		Alice Moneas & Henry Moneas Eugene Bear
July 14	Ron Harry	

Location of Little Black River and Hallow Water in Manitoba

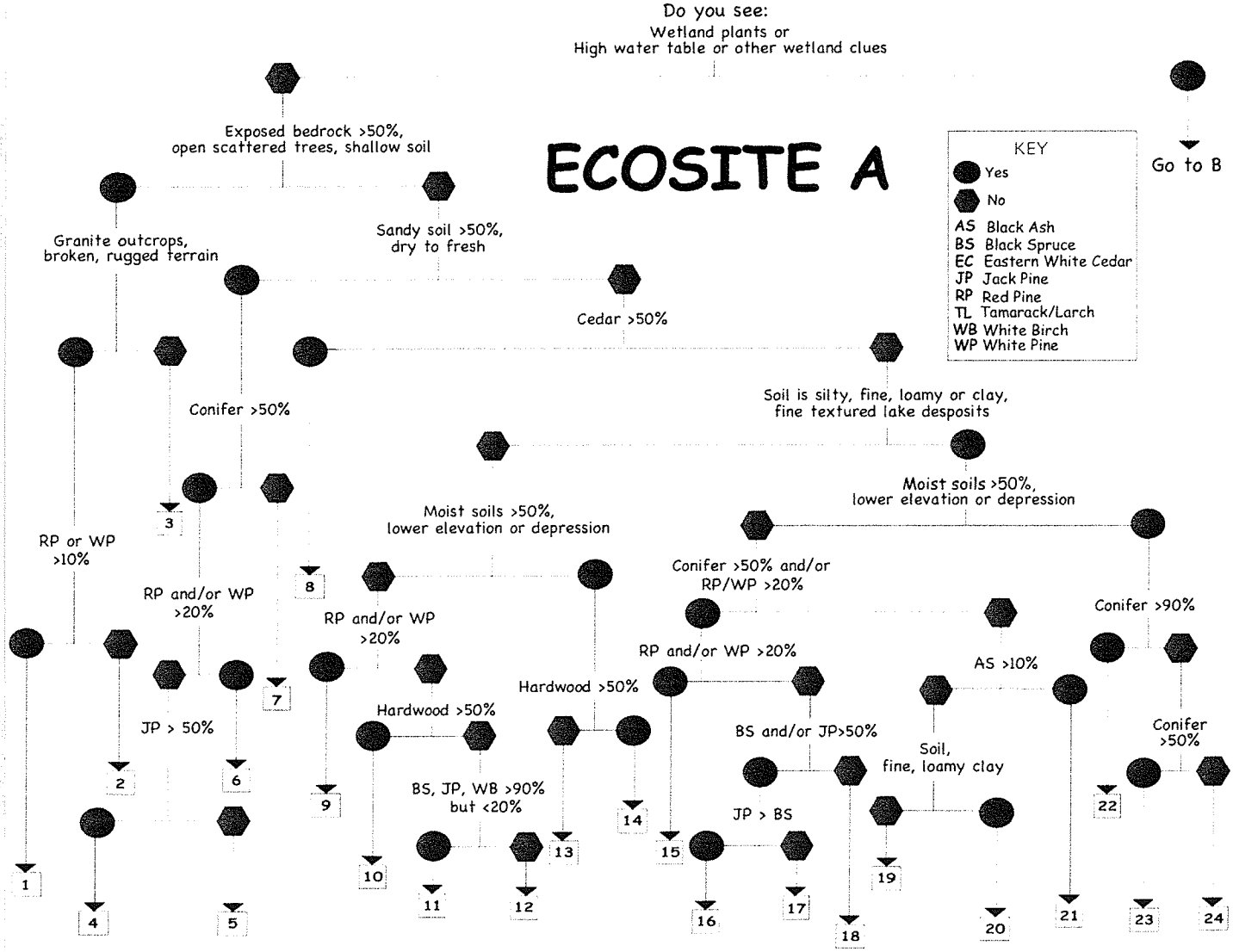
Little Black River First Nation



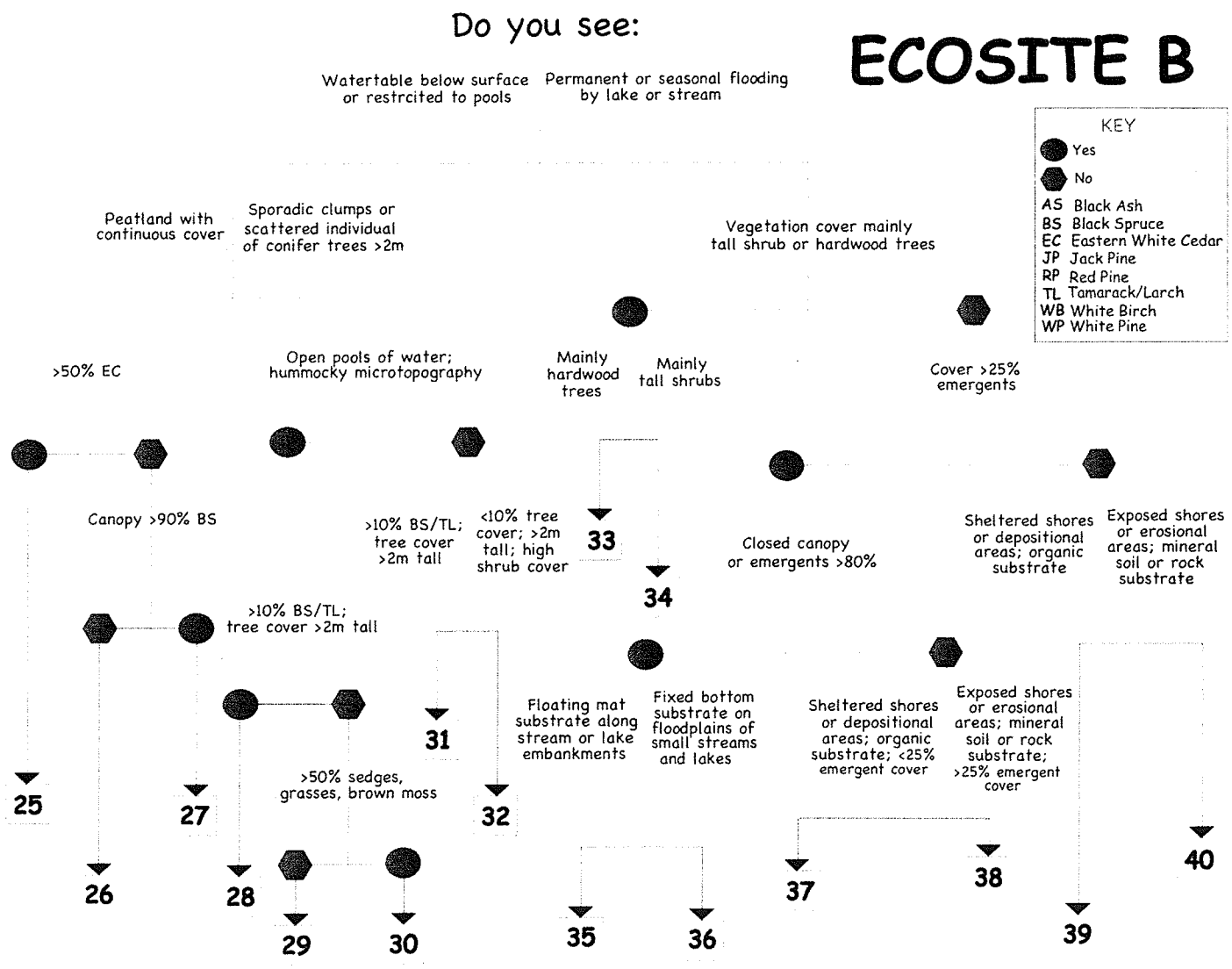
Hollow Water



ECOSITE A


Do you see:
Wetland plants or
High water table or other wetland clues
Go to B
KEY
Yes
No
AS Black Ash
BS Black Spruce
EC Eastern White Cedar
JP Jack Pine
RP Red Pine
TL Tamarack/Larch
WB White Birch
WP White Pine
Exposed bedrock >50%, open scattered trees, shallow soil
Granite outcrops, broken, rugged terrain
Sandy soil >50%, dry to fresh
Cedar >50%
Soil is silty, fine, loamy or clay, fine textured lake desposits
Conifer >50%
RP or WP >10%
RP and/or WP >20%
JP > 50%
Moist soils >50%, lower elevation or depression
RP and/or WP >20%
Hardwood >50%
BS, JP, WB >90% but <20%
Moist soils >50%, lower elevation or depression
Conifer >50% and/or RP/WP >20%
RP and/or WP >20%
Hardwood >50%
BS and/or JP>50%
JP > BS
Moist soils >50%, lower elevation or depression
AS >10%
Soil, fine, loamy clay
Conifer >90%
Conifer >50%
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

ECOSITE B


Do you see:
Watertable below surface or restrcited to pools
Permanent or seasonal flooding by lake or stream
KEY
Yes
No
AS Black Ash
BS Black Spruce
EC Eastern White Cedar
JP Jack Pine
RP Red Pine
TL Tamarack/Larch
WB White Birch
WP White Pine
Peatland with continuous cover
Sporadic clumps or scattered individual of conifer trees >2m
Vegetation cover mainly tall shrub or hardwood trees
>50% EC
Open pools of water; hummocky microtopography
Mainly hardwood trees
Mainly tall shrubs
Cover >25% emergents
Canopy >90% BS
>10% BS/TL; tree cover >2m tall
<10% tree cover; >2m tall; high shrub cover
33
Closed canopy or emergents >80%
Sheltered shores or depositional areas; organic substrate
Exposed shores or erosional areas; mineral soil or rock substrate
34
>10% BS/TL; tree cover >2m tall
Floating mat substrate along stream or lake embankments
Fixed bottom substrate on floodplains of small streams and lakes
Sheltered shores or depositional areas; organic substrate; <25% emergent cover
Exposed shores or erosional areas; mineral soil or rock substrate; >25% emergent cover
31
>50% sedges, grasses, brown moss
25
27
32
26
28
29
30
35
36
37
38
39
40

SFDS 7 - Mainplot 1

Team Names:	Plot Number:	Date:	MBEC:
Northings:	Eastings:	V/W type:	
Problems/alternatives/comments:			

Species		Canopy Layer Cover %									
Abbr.	Name	Supercanopy		Canopy		High Understory		Low Understory		Seedling #	
		%	#	%	#	%	#	%	#	%	#
BA	Balsam Poplar										
BF	Balsam Fir										
BO	Bur Oak										
BS	Black Spruce										
AE	American Elm										
JP	Jack Pine										
TA	Trembling Aspen										
TL	Tamarack Larch										
WB	White Birch										
WS	White spruce										
MM	Manitoba Maple										
GA	Green Ash										
AS	Black Ash										
Total Cover Trees Only											
		Canopy+3 m		Canopy; average height		Canopy-3 (3-10m)		Canopy-6 (3m)		.5 m	

Understory Components

Shrubs	%	Shrubs	%
Beaked Hazel		Saskatoon	
Bearberry		Seneca	
Bog Laurel		Snowberry	
Choke cherry		Speckled Alder	
Currant		Twinflower	
Green Alder			
High-bush Cranberry			
Honeysuckle			
Low-bush Cranberry			
Labrador Tea			
Leather Leaf			
Mountain Maple			
Raspberry			
Roses			

Herbs	%	Herbs	%
Blueberry		Peavine	
Bunchberry		Strawberry	
Canada Anemone		Wild Sarsparilla	
Dewberry		Wintergreen	
False Solomon's Seal		Yarrow	
Goldenrod			
Grass			
Horsetail			
Lily of the Valley			
Mint			

SFDS 7 - Mainplot 2

Team Names:	Plot Number:	Date:	MBEC:
Northings:	Eastings:	V/W type:	

Tree Ages		
Core	Species	Age
1		
2		
3		
4		

Mosses/Lichens	%
Feather Moss	
Reindeer Lichen	
Stiff Club Moss	
Sphagnum Moss	

Groundcover

Deciduous Leaf%	
Coniferous Needles%	
Water%	
Rock%	
Bare Soil%	
Wood%	

Soil Texture: Surface

Sand (S)	
Loamy sand (LS) to sandy loam (SL)	
Sandy clay loam (SCL)	
Silt (SI) to silt loam (SIL)	
Silty clay loam (SICL)	
Silty clay to clay (C)	

Soil Texture: 30cm depth

Sand (S)	
Loamy sand (LS) to sandy loam (SL)	
Sandy clay loam (SCL)	
Silt (SI) to silt loam (SIL)	
Silty clay loam (SICL)	
Silty clay to clay (C)	

Landform and Soil

Topographic Position	Crest	Upper Slope	Mid Slope	Lower Slope	Toe	Depress	Level
Topographic Form	Planar	Concave	Convex	Ridge	Trough	Hummock	Complex
Parent Material	Moraine	Glacial Fluvial	Fluvial	Eolian	Glaciolacustrine	Organic	Rock

Soil Moisture	Very Dry-Dry (Xeric)	Dry (Submesic)	Wet (Mesic)	Wet (Subhygric)	Very Wet-Wet (Hygric)
Drainage	Very Poor-Poor	Imperfect	Moderately Well-Well	Rapid	Very Rapid-Rapid
Nutrient Status	Very Poor	Poor	Medium	Rich	Very Rich
Humus Form	Mull	Moder	Raw Moder	Mor	Peaty Mor

Downed Woody Debris		
DBH cm	Line 1	Line 2
1-4		
5-9		
10-18		
19-35		
36+		

Decay Class

D1-bark, twigs, hard
D2-bark, no twigs, hard
D3-s/bark, hard dry, bleach
D4-no bark, soft, bleach
D5-crumbs, peaty

Attribute	Comments
Trail (tire, foot)	
Tree stand/bait	
Litter	
Parked car	
Campsite/firepit	
Tree cut	

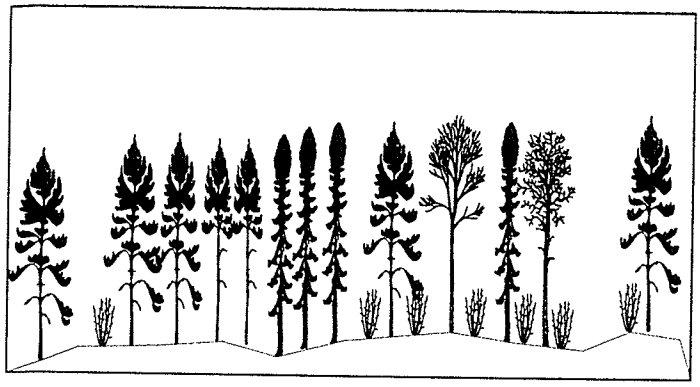
Table 2. Black River and Hollow Water First Nations Ecosites Sampled with Associated Vegetation Types from the Forest Ecosystem Classification for Manitoba Field Guide 1995.

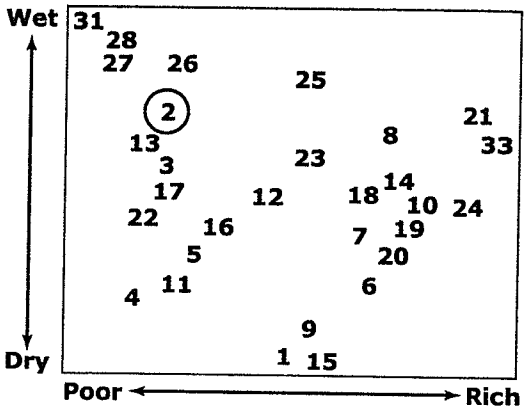
V-Type	2	3	4	5	8	13	17	20	21	22	24	Total
2									2			2
6								2				2
7								2				2
8								1			2	3
16				1								1
17				3								3
18				2								2
19					1							1
24			2									2
25			4									4
26	2	1										3
27							3					3
30						1						1
Total	2	1	6	6	1	1	3	5	2		2	29

E-2 • Jack pine-black spruce on very shallow soil rugged terrain features

General Description: Canopy dominated by open jack pine stands mixed with black spruce in moist depressions. Soil is very shallow with frequent exposture of bed rock. The shrub and herb layer is typically poorly developed with a high lichen cover. The characteristic V-types of Ecosite 2 are primarily V-26, with occurrences of V-24 and V-25. A transition toV-30 and V-31 occurs in wet depressions in the rock.

Overstory Species: *Pinus banksiana, Picea mariana, Populus tremuloides, Picea glauca, Larix laricina, Thuja occidentalis, Populus balsamifera, Betula papyrifera.*





Common Understory Species:

Shrubs: *Arctostaphylous uva-ursi, Vaccinium angustifolium, Vaccinium myrtilloides, Alnus crispa, Juniperus communis, Vaccinium vitis-idaea, Spiraea alba, Rosa acicularis, Shepherdia canadensis, Rosa acicularis, Ledum groenlandicum, Picea mariana, Vaccinium vitis-idaea, Alnus rugosa.*

Herbs: *Maianthemum canadense, Agrostis hyemalis, Oryzopsis pungens, Oryzopsis asperifolia, Cornus canadensis, Aralia nudicaulis,Smilacina trifolia, Cornus canadensis, Mitella nuda, Calamagrostis canadesis, Equisetum scirpoides.*

Mosses and Lichens: Mosses: *Pleurozium schreberi, Hylocomium splendens, Dicranum polysetum, Sphagnum spp.;* Lichens: *Cladina rangiferina, Cladina stellaris, Cladina mitis*

Forest Floor Cover: Wood 20%, Moss/Lichen 50%, Conifer litter 5%, Needles 10%, Humus 5%

FEC Forest Composition: Common: V26; Occasional: V30-V33; Rare: V19.

Soil/Site Characteristics

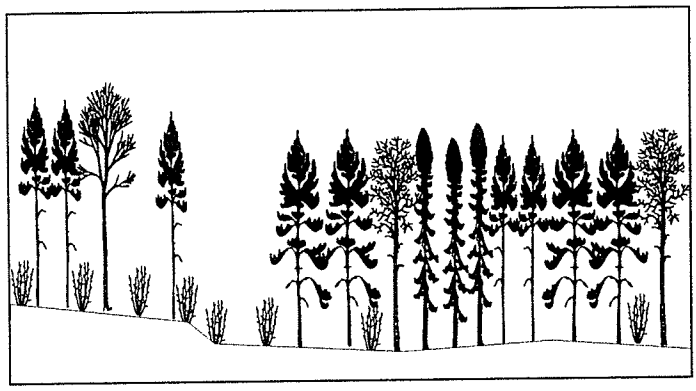
Soil Types: Common: SS1 - SS4; SS5, SS6, SS9.
Organic Layer (LFH): Common: (6-15 cm), (15-26), Occasional: (> 40).
Surface texture: c.sandy, f.sandy, c.loamy, f.loamy, clayey, no-soil, organic.
C Horizon texture: clayey, c.sandy, f.sandy, no-soil, organic
Moisture-Drainage: dry, wet, well, rapid, poor.
Deposition and Landform: lacustrine, glaciofluvial, organic. Generally rough topography with frequent exposure of bedrock.

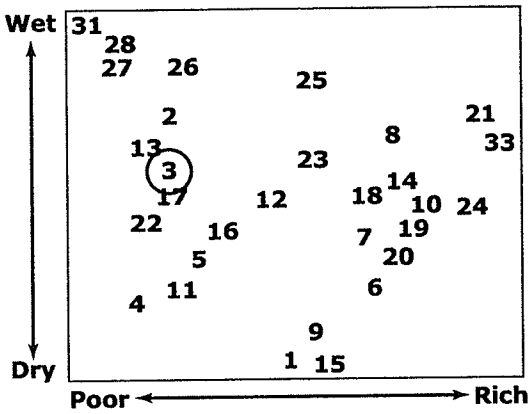
Comments: This ecosite consists of stands that are of fire origin and generally young on a predominantly granitic substrate . However, rough topography results in varied degrees of fire intensity, leaving pockets of vegetation with little combustion loss. Canopy development is therefore fairly heterogeneous with multiple layers in some locations. The lower slope of this toposequence may transition to lowland black spruce with occasional occurrences of tamarack or white cedar.

E-3 • Jack pine-black spruce on very shallow soil flat terrain features

General Description: Open or close canopy jack pine dominated stands with black spruce and trembling aspen often as co-dominants. Bedrock is frequently exposed and/or shallow soils (< 10 cm). The shrub layer is usually poorly developed but often dominated by blueberry. The Ecosite is primarily composed of V-25 and V-26, with the occurrence of V-24, V-31, V-30, and V-29. Feather moss is characteristic of moister sites. These stands are often young even aged and of fire origin, with increased spruce and fir invasion over time. Characterized by rapidly drained, coarse textured shallow soils over a limestone bedrock.

Overstory Species: *Picea mariana, Pinus banksiana, Populus tremuloides, Picea glauca, Betula papyrifera.*





Common Understory Species:

Shrub layer: *Arctostaphylous uva-ursi, Vaccinium angustifolium, Vaccinium myrtilloides, Linnaea borealis, Picea mariana, Juniperus communis, Rosa acicularis, Shepherdia canadensis, Alnus crispa, Rubus pubescens, Diervilla lonicera.*

Herbs: *Cornus canadensis, Maianthemum canadense, Oryzopsis asperifolia, Aralia nudicaulis, Galium boreale, Fragaria virginiana, Trientalis borealis.*

Mosses and Lichens: Mosses: *Pleurozium schreberi, Hylocomium splendens, Dicranum polysetum (rarely Sphagnum spp.);* Lichens: *Cladonia spps, Cladina mitis, Cladina rangiferina, Cladina stellaris*

Forest Floor Cover: Wood 15%, Moss 55%, Broadleaf litter 5%, Conifer litter 10%, Needles 10%, Humus 5%

FEC Forest Composition: Common: V25,V26; Occasional: V30 - V33, V24; Rare: V19.

Soil/Site Characteristics

Soil Types: Common: SS1, SS2, SS3, SS4; Occasional: SS5, SS6, SS9.
Organic Layer (LFH): Common: (1-5), (5-15); Occasional: (> 40 cm)
Surface texture: c.sandy, c.loamy, f.sandy, silty, no-soil.
C Horizon texture: c.sandy, clayey, f.sandy, f.loamy, no-soil.
Moisture-Drainage: Moisture: dry, fresh; Drainage: well, rapid.
Deposition and Landform:glaciofluvial, morainal, lacustrine, aeolian. Generally flat to slightly rolling topography of sediments of a glaciofluvial or morainal origin, deposited in a thin layer over a limestone bedrock . Periodic bedrock exposure and vertical cliff faces may be encountered.

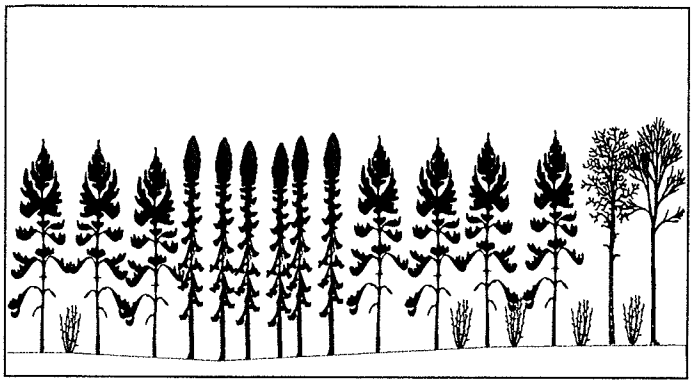
Comments: These sites are characterized by rapid drainage on thin soils overlying a calcareous bedrock. Sites of this type are most common in the northern portion of the interlake by Grand Rapids, Manitoba. Local pockets and sink holes may develop into bog vegetation associations (e.g. *Sphagnum spp.* with *Picea mariana*).

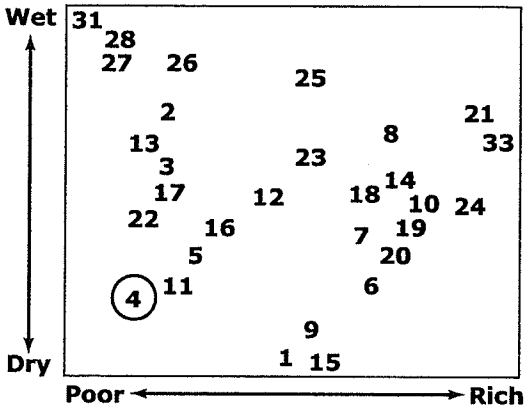
E-4 • Jack pine – conifer on dry to moderately fresh sandy soil

General Description: Canopy predominantly jack pine with occasional mixed woods species such as aspen and birch often codominant with black spruce in wetter areas. The shrub-herb layer varies from rich to poor with green alder and Canada dogwood dominant at the richer sites. Characteristic V-types comprising Ecosite 4 include 15, 16, 24, 26, and occasionally 30 where there is a predominance of black spruce. This ecosite transitions to EC 26 on organic soil. This Ecosite type is characteristic of fire regenerating stands and is generallyyoung. Soils are dry to moderately fresh well-drained and sandy.

Overstory canopy: *Pinus banksiana, Populus tremuloides, Picea mariana, Picea glauca, Betula papyrifera*

Overstory Species:





Common Understory Species:

Shrub Layer: *Vaccinium myrtilloides, Linnaea borealis, Arctostaphylous uva-ursi, Rosa acicularis, Alnus crispa, Vaccinium angustifolium, Vaccinium vitis-idaea, Picea mariana, Viburnum edule, Diervilla lonicera, Juniperus communis, Amelanchier alnifolia, Rubus pubescens.*

Herbs: *Maianthemum canadense, Cornus canadensis, Oryzopsis asperifolia, Aralia nudicaulis, Elymus innovatus, Fragaria virginiana, Petasites palmatus, Agrostis hyemalis*

Mosses and Lichens: Mosses: *Pleurozium schreberi, Hylocomium splendens, Dicranum polysetum, Ptilium crista-castrensis;* Lichens: *Cladonia spp., Cladina mitis, Cladina rangiferina, Cladina stellaris.*

Forest Floor Cover: Wood 5%, Moss 70%, Broadleaf litter 5%, Conifer litter 10%.

FEC Forest Composition: Common: V24, V25, V26; Occasional: V28, V29.

Soil/Site Characteristics

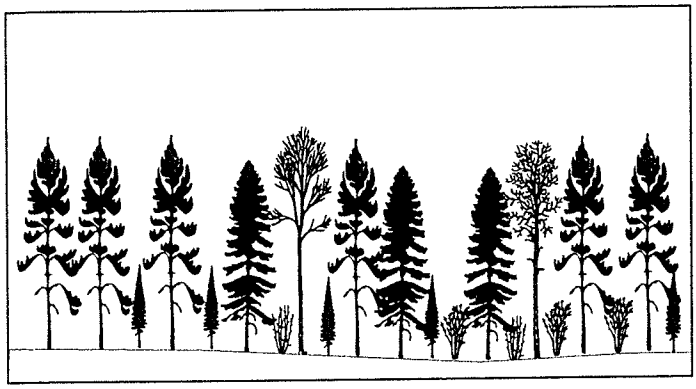
Soil Types: Common: S1, S2; Occasional: SS5
Organic Layer (LFH): Common: (6-15), (16-25).
Surface texture: c.sandy, f.sandy, c.loamy, f.loamy, silty
C Horizon texture: c.sandy, f.loamy, silty, f.sandy, c.loamy
Moisture-Drainage: fresh, dry, moist, rapid, well.
Deposition and Landform: lacustrine, morainal, aeolia. Generally flat to slightly rolling topography of coarse sediments with lacustrine origin.

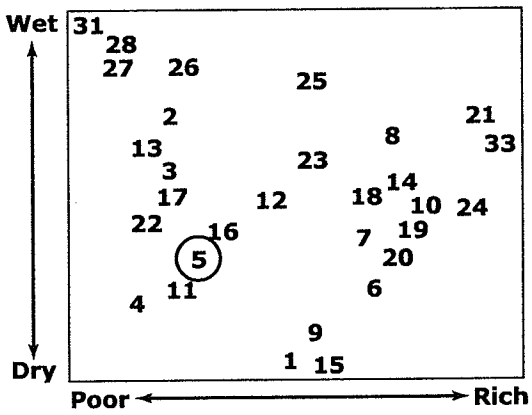
Comments: Jack pine stands with an often single generation between fire intervals. Because of the dry conditions, fuelwood accumulation makes these sites subject ot catastrophic fires.

E-5 • Jack pine –spruce mixed wood on sandy soil

General Description: Jack pine and spruce with mixed woods consisting primarily of aspen, but white birch and balsam fir form a secondary component. Herb and shrub layer is typically rich. The primary V-types are V-15, V-16, V-17 and V-18. In older and moist sites , white spruce replaces jackpine (V-28 and V-29). As these stands mature black spruce may replace most species. This ecosite occurrs on sandy soils.

Overstory Species: *Pinus banksiana, Picea glauca, Populus tremuloides, Betula papyrifera, Picea mariana, Populus balsamifera.*





Common Understory Species:

Shrub layer: *Alnus crispa, Rosa acicularis, Linnaea borealis, Rubus pubescens, Diervilla lonicera, Picea mariana, Viburnum edule, Vaccinium myrtilloides, Ledum groenlandicum, Arctostaphylous uva-ursi, Vaccinium vitis-idaea, Abies balsamea.*

Herbs: *Cornus canadensis, Aralia nudicaulis, Maianthemum canadense, Aster ciliolatus, Petasites palmatus, Fragaria virginiana, Lycopodium annotinum, Epilobium angustifolium, Oryzopsis asperifolia, Geocaulon lividum, Mitella nuda*

Mosses and Lichens: Mosses: *Pleurozium schreberi, Hylocomium splendens, Ptilium crista-castrensis, Dicranum polysetum;* Lichens: *Cladina mitis, Cladina rangiferina, Cladina stellaris.*

Forest Floor Cover: Wood 5%, Moss 65%, Broadleaf litter 15%, Conifer litter 10%, Humus 5%.

FEC Forest Composition: Common: V15-V18; Occasional: V26 -V29; Rare: V10.

Soil/Site Characteristics

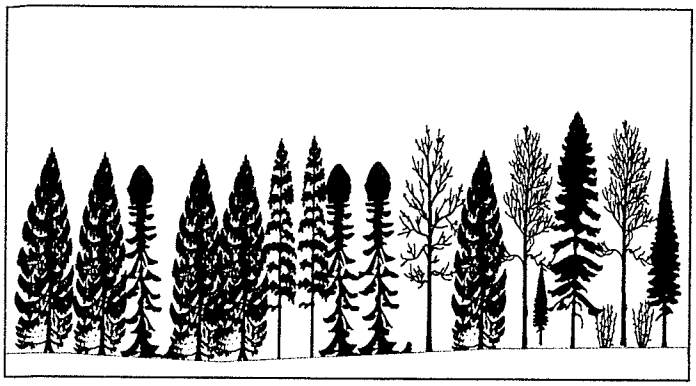
Soil Types: Common: S1, S2; Occasional: SS5.
Organic Layer (LFH): Common: (6-15 cm), (15-26).
Surface texture: c.loamy, f.sandy, c.sandy, f.loamy
C Horizon texture: f.loamy, f.sandy, c.sandy, silty
Moisture-Drainage: Moisture: dry, fresh; Drainage: well, rapid
Deposition and Landform: lacustrine, morainal, glaciofluvial, aeolian, fluvial. Generally flat to slightly rolling topography of sediments with lacustrine origin.

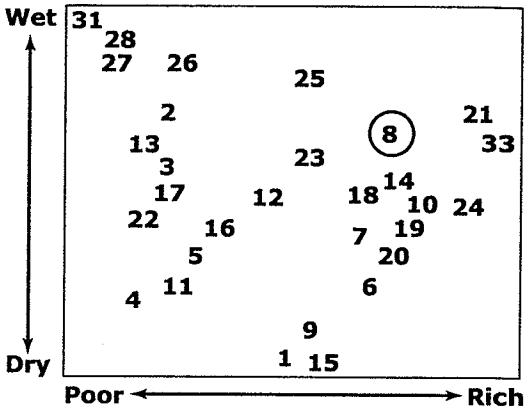
Successional Relations: Black spruce feathermoss communities are relatively stable in the abscence of fire because of continuous recruitment of black spruce into the canopy. In jack pine dominated stands (V28), forest composition is considered to be successionally intermediate between V27 and V29.

E-8 • White cedar on fresh to moist, coarse to fine loamy soil

General Description: The canopy is usually dominated with a mixture of eastern white cedar and tamarak with some hardwoods (black ash, balsam poplar). Balsam fir and white spruce dominated sites are occasional. Diversity in the herb layer is usually high except in moss dominated areas. This Ecosite is primarily characterized by V-19 with occasional occurrences of V-types 20 and 21 in areas of poor drainage (tamarack dominated often). Hardwood dominated richer V-2 sites may also occur and are often dominated by Black ash. This Ecosite is successionally mature with a strong regeneration of cedar. Occurring on wet to moist well-drained sandy to loamy soil, with thin organic deposits.

Overstory Species: *Thuja occidentalis, Picea glauca, Populus tremuloides, Populus balsamifera, Abies balsamea, Larix laricina, Picea mariana, Fraxinus nigra.*





Common Understory Species:

Shrubs: *Thuja occidentalis, Abies balsamea, Rosa acicularis, Corylus cornuta, Cornus stolonifera, Linnaea borealis, Rubus pubescens, Alnus rugosa.*

Herbs: *Cornus canadensis, Aster ciliolatus, Petasites palmatus, Maianthemum canadense, Carex spp., Fragaria virginiana, Mitella nuda, Caltha palustris, Calamagrostis canadesis.*

Mosses and Lichens: Mosses: *Hylocomium splendens, Climacium dendroides, Mnium spp, Drepanocladus uncinatus, Sphagnum nemoreum;* Lichens: *Peltigera polydactyla.*

Forest Floor Cover: Wood 5%, Moss 25%, Broadleaf litter 35%, Conifer litter 20%, Needles 10%, Humus 5%, Water 5%.

FEC Forest Composition: Common: V19; Occasional: V1, V2, V13, V20, V21.

Soil/Site Characteristics

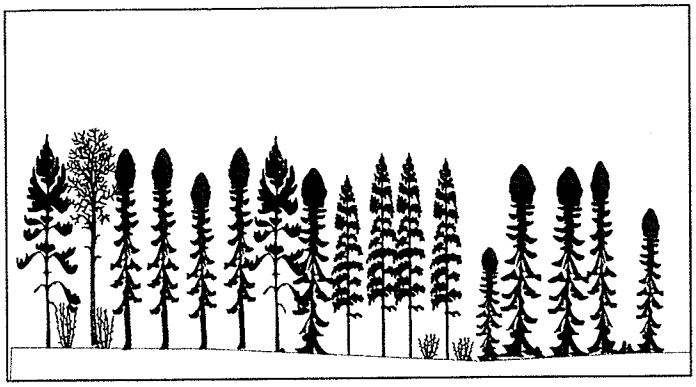
Soil Types: Common: S3, S4, S6, S9, S10; Occasional SS7
Organic Layer (LFH): Common: (6-15 cm), (16-25); Occasional: (> 40 cm).
Surface texture: sandy, f.loamy, clayey, f.sandy, c.sandy
C Horizon texture: f.loamy, c.sandy.
Moisture-Drainage: Moisture: moist, wet; Drainage: poor, v. poor.
Deposition and Landform: lacustrine, organic, glaciofluvial, morainal. Generally flat to slightly rolling topography of sediments with lacustrine origin or from organic accumulation. Usually at a lower slope position and adjacent to morainal deposits where ground water seepage occurs.

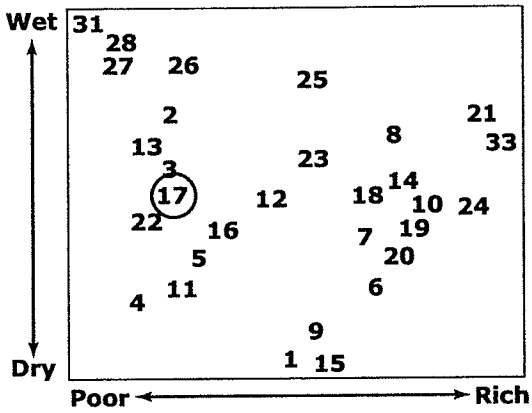
Comments: This ecosite is successional stable because of the high shade tolerance of eastern white cedar, which allows for continuous recruitment in the absence of fire.

E-17 • Spruce – Jack pine/Feathermoss on fresh fine loamy to clayey soil

General Description: Canopy dominated by black spruce and jack pine with scattered occurrences of trembling aspen. Occasional birch and white spruce may also occur. The shrub-and herb-layer is typically sparse with continuous feather moss mat. Ecosite 17 is primarily dominated by V-17, and from V-27 to V-29. Occasional occurrences of V-15 and V-17 with increased Jack pine and rich understory may be observed. In wetter areas, V-30 and V-32 with small pockets of tamarack and cedar may occur. Black spruce dominated sites are successionally stable. The soil is well drained to wet and fine textured loamy to clayey.

Overstory Species: *Picea mariana, Pinus banksiana, Populus tremuloides, Betula papyrifera, Populus balsamifera, Larix laricina*





Common Understory Species:

Shrubs: *Linnaea borealis, Picea mariana, Rosa acicularis, Alnus crispa, Ledum groenlandicum, Rubus pubescens, Vaccinium myrtilloides, Vaccinium vitis-idaea, Viburnum edule.*

Herbs: *Cornus canadensis, Aralia nudicaulis, Petasites palmatus, Fragaria virginiana, Aster ciliolatus, Mitella nuda, Lycopodium annotinum, Maianthemum canadense, Smilacina trifolia, Geocaulon lividum, Equisetum arvense, Carex disperma.*

Mosses and Lichens: Mosses: *Pleurozium schreberi, Hylocomium splendens, Ptilium crista-castrensis, Dicranum polysetum, Sphagnum magellanicum, Sphagnum fuscum.*

Forest Floor Cover: Wood 5%, Moss 65%, Broadleaf litter 10%, Conifer litter 15%, Humus 5%.

FEC Forest Composition: V18, V27, V28, V29; Occasional: V15, V17, V30, V32

Soil/Site Characteristics

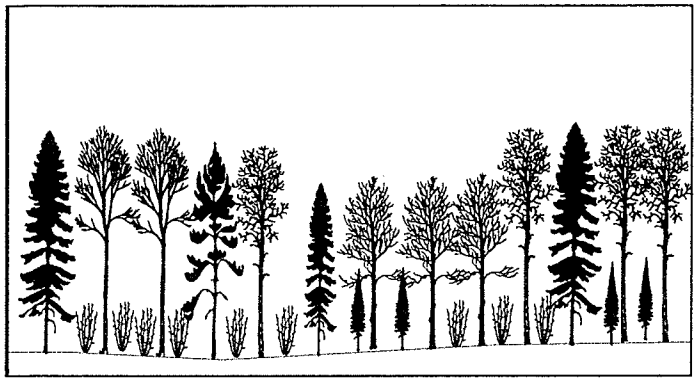
Soil types: Common: S5, S6; Occasional: SS7, SS9.
Organic Layer (LFH): Common: (6-15 cm), (1-5); Occasional: (16-25 cm), (26-35 cm)
Surface texture: f. loamy, c. loamy, silty.
C-horizon texture: clayey, f.sandy, f.loamy.
Moisture-Drainage: Moisture: fresh, moist; Drainage: well.
Deposition and Landform: lacustrine, morainal, organic. Generally flat to slightly rolling topography of sediments with lacustrine origin.

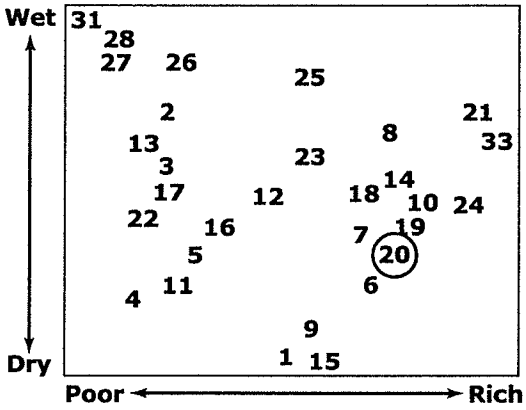
Comments: Upland black spruce feathermoss communities are relatively stable in the abscence of fire because of continuous recruitment of black spruce into the canopy. In northern Manitoba, this ecosite replaces jack pine on well-drained upland sites. In jack pine dominated stands (V28), forest composition is considered to be successionally intermediate between V27 and V29.

E- 20 • Hardwood – balsam fir – spruce mixedwood on fresh fine loamy to clayey soil

General Description: Canopy is dominated by predominantly hardwoods like trembling aspen, birch and balsam poplar with a scattered occurrence of softwood species. A rich shrub and herb layer characterizes the understory. The primary V-types associated with ecosite areV-4, V-5, V-6, V-7, V-8 and V-9, where hardwoods form the canopy. Occasional V-13 and V-14 also occur with white spruce pockets in the canopy and/or balsam fir in the sub-canopy. The shrub layer is mostly tall shrub such as mountain maple, hazelnut and green alder. Softwood form a larger constitutent in mature stands. The soil is well drained moist fine loamy to clayey.

Overstory Species: *Populus tremuloides, Betula papyrifera, Populus balsamifera, Picea glauca, Picea mariana, Pinus banksiana, Abies balsamea.*





Common Understory Species:

Shrubs:*Rubus pubescens, Corylus cornuta, Acer spicatum, Rosa acicularis, Abies balsamea, Viburnum edule, Linnaea borealis, Diervilla lonicera, Alnus crispa, Cornus stolonifera, Amelanchier alnifolia, Vaccinium angustifolium.*

Herbs: *Cornus canadensis, Maianthemum canadense, Aster ciliolatus, Petasites palmatus, Clintonia borealis, Streptopus roseus, Viola renifolia, Fragaria virginiana, Pyrola asarifolia, Mitella nuda, Mertensia paniculata, Schizachne purpurascens.*

Mosses and Lichens: *Pleurozium schreberi, Brachythecium spp., Hylocomium splendens, Drepanocladus uncinatus, Plagiomnium drummondii, Rhytidiadelphus triquetrus, Dicranum polysetum*

Forest Floor Cover: Wood 5%, Moss 10%, Broadleaf litter 65%, Conifer litter 20%, Needles 5%,

FEC Forest Composition: Common: V4, V5, V6, V7, V8, V9; Occasional: V10, V13, V14; Rare: V1, V3, V11, V12.

Soil/Site Characteristics

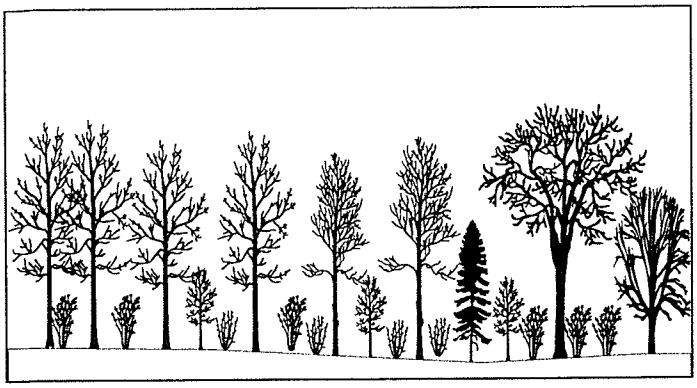
Soil Types: Common: S5, S6; Occassional: SS1, SS2, SS7.
Organic Layer (LFH): Common: (6-15 cm), (1 -5); Occasional: (16-25 cm).
Surface texture: loamy, f. loamy, silty, f.sandy, clayey.
C-horizon texture: c. loamy, c. sandy, f. loamy, clayey, f.sandy.
Moisture-Drainage:Moisture: fresh, moist; Drainage: well.
Deposition and Landform: lacustrine, morainal, glaciofluvial. Generally flat to slightly rolling topography of sediments with lacustrine origin.

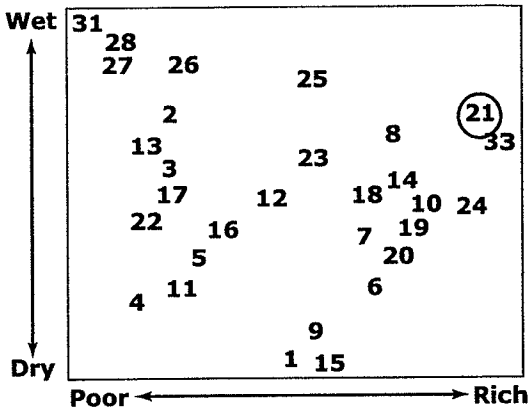
Comments: Generally successionally young sites with a large hardwood component in the canopy. Increasing abudance of softwoods is associated with increasing site age. Predominantly birch dominated stands occur on south facing slopes of the Duck Mt. and may be assigned to this ecosite.

E-21 • Black ash hardwood on fresh silty to clayey soil

General Description: Canopy dominated by black ash, elm, manitoba maple and occasionally trembling aspen. The shrub and herb layer is typically rich to poor., with rich sites developing a 'gallery forest' physiognomy. Ecosite 21 is characterized primarily by V-2, with occasional occurrences of cedar dominated V-19. In drier areas, V-1 may occur, and is associated with balsam poplar and trembling aspen in the canopy. The soil silty to clayey characterized by wet to saturated flood plains along watercourses, often with an accumulation of organic matter in the upper soil layers.

Overstory Species: *Fraxinus nigra, Acer negundo, Ulmus americana, Populus balsamifera, Fraxinus pennsylvanica, Populus tremuloides, Betula papyrifera, Thuja occidentalis, Picea glauca, Picea mariana.*





Common Understory Species:

Shrubs: *Corylus cornuta, Rubus pubescens, Rosa acicularis, Cornus stolonifera, Acer spicatum, Ribes triste, Prunus virginiana, Fraxinus nigra, Thuja occidentalis.*

Herbs: *Aster ciliolatus, Cornus canadensis, Carex spp., Fragaria virginiana, Petasites palmatus, Aralia nudicaulis, Carex Intumescens, Calamagrostis canadesis, Caltha palustris, Mertensia paniculata.*

Mosses and Lichens: Mosses: *Brachythecium spp., Mnium spp, Hylocomium splendens, Climacium dendroides, Plagiomnium drummondii*

Forest Floor Cover: Wood 5%, Moss 5%, Broadleaf litter 50%, Needles 25%, Humus 10%, Water 5%.

FEC Forest Composition: Common: V2; Occasional: V1, V19

Soil/Site Characteristics

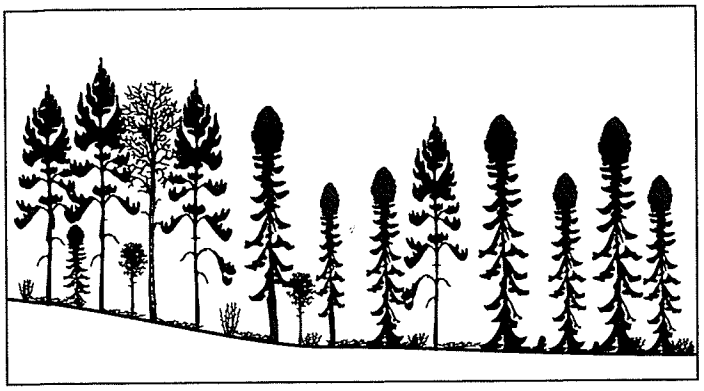
Soil Types: Common: S4, S5, S6, S10; Occasional: S11, SS9.
Organic Layer (LFH): Common: (6-15), (1-5).
Surface texture: clayey, f. loamy, silty.
C Horizon texture: clayey
Moisture-Drainage: Moisture: moist, wet; Drainage: poor, v.poor
Deposition and Landform: lacustrine, organic, glaciofluvial, morainal. Generally flat to slightly rolling topography of sediments with lacustrine origin. Located on flood plains subject to seasonal ponding and saturated soils.

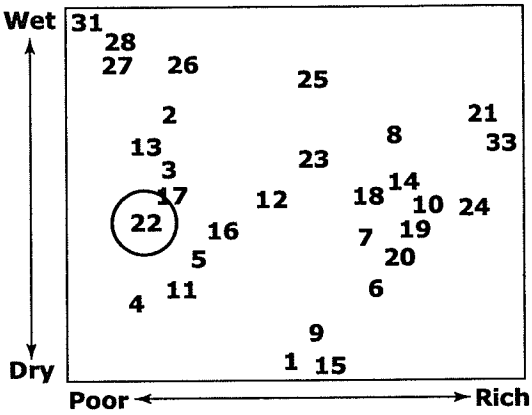
Comments: Generally a successionally stable ecosite because of the recruitment of black ash in the understory of most sites. This ecosite develops on very rich soils and is often found in riparian areas. The canopy often has good vertical development and displays a 'gallery forest' physiognomy.

E-22 • Spruce – jack pine/feathermoss on moist silty to clayey soil

General Description: Black spruce or jack pine dominated sites with poorly developed herb and dwarf shrub layers. Feathermoss cover is well-developed and forms the dominant understory component. Canopy cover is intermediate (spruce dominated) to open (jack pine dominated stands). Occurs on fresh to moist fine textured soils (V27, V28) and fresh to wet sites (V29).

Overstory Species: *Picea mariana, Pinus banksiana, Populus tremuloides, Betula papyrifera, Populus balsamifera, Larix laricina, Picea glauca.*





Common Understory Species:

Shrub layer: *Linnaea borealis, Picea mariana, Rosa acicularis, Alnus crispa, Vaccinium myrtilloides, Rubus pubescens, Ledum groenlandicum, Abies balsamea, Viburnum edule, Vaccinium vitis-idaea, Populus tremuloides, Gaultheria hispidula, Corylus cornuta.*

Herbs: *Cornus canadensis, Aralia nudicaulis, Lycopodium annotinum, Petasites palmatus, Mitella nuda, Aster ciliolatus, Geocaulon lividum, Fragaria virginiana, Maianthemum canadense, Equisetum scirpoides, Pyrola secunda, Smilacina trifolia, Elymus innovatus, Epilobium angustifolium.*

Mosses and Lichens: Mosses: *Pleurozium schreberi, Hylocomium splendens, Ptilium crista-castrensis, Dicranum polysetum*; Lichens: *Cladina mitis.*

Forest Floor Cover: Moss 70%, Wood 8, Conifer litter 10%, Humus 40%.

FEC Forest Composition: Common: V27, V28, V29; Occasional: V17, V18, V30.

Soil/Site Characteristics:

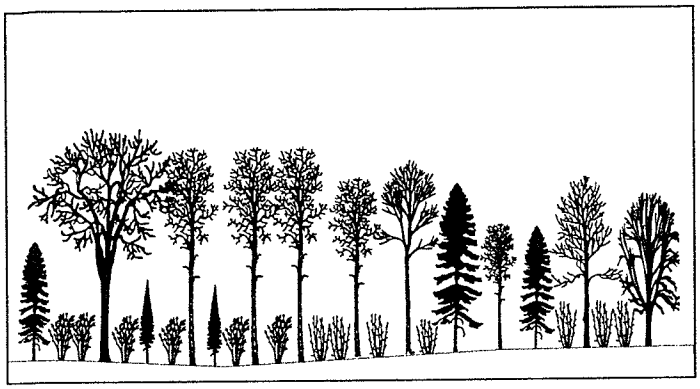
Soil Types: Common: S9, S10; Occasional: S11, SS7, SS9.
Organic Layer (LFH): Common: (6-15 cm), (15-26); Occasional (> 40 cm).
Surface texture: clayey, f.loamy, c.loamy, f.sandy, c.sandy.
C horizon texture: clayey, f. loamy, silty.
Moisture-Drainage: Moisture: fresh, moist; Drainage: well.
Deposition and Landform: lacustrine, morainal, glaciofluvial. Generally flat to slightly rolling topography of sediments with lacustrine origin. This ecosite occurs at lower slope positions and in catchment basins.

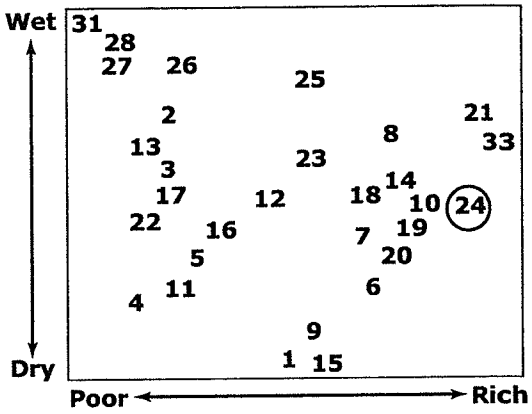
Comments: Black spruce feathermoss communities are relatively stable in the abscence of fire because of continuous recruitment of black spruce into the canopy. In jack pine dominated stands (V28), forest composition is considered to be successionally intermediate between V27 and V29. This ecosite separates from E-23 and E-24 because the canopy composition is almost exclusively softwood.

E-24 • Hardwood – balsam fir – spruce mixedwood on moist silty to clayey soil

General Description: Canopy dominated by trembling aspen, white spruce, jackpine, balsam fir and birch, wet areas characterized by cedar. The understory is typically shrub – herb rich to poor. The primary V-types associated with ecosite 24 is V-5, V-6, V-7, V-8, with V-9. & V-8 occasional as conifer abundance increases. Hardwood stands dominated with V-1, V-4 (with birch) and V-2 (with black ash as co-dominant) occur occasionally. When the shrub layer is present it is characterized by mountain maple and sarsaparilla. The terrain is flat to rolling moist silty to clayey soil. This ecosite is successionally young usually fire origin.

Overstory Species: *Populus tremuloides, Betula papyrifera, Populus balsamifera, Picea glauca, Pinus banksiana, Abies balsamea, Acer negundo, Ulmus americana, Fraxinus pennsylvanica.*





Common Understory Species:

Shrubs: *Acer spicatum, Corylus cornuta, Rubus pubescens, Rosa acicularis, Cornus stolonifera, Prunus virginiana, Viburnum edule, Diervilla lonicera.*

Herbs: *Aralia nudicaulis, Aster ciliolatus, Maianthemum canadense, Cornus canadensis, Fragaria virginiana, Viola renifolia, Streptopus roseus, Clintonia borealis, Pyrola asarifolia, Petasites palmatus, Mitella nuda, Mertensia paniculata, Schizachne purpurascens, Lathyrus ochroleucus.*

Mosses and Lichens: Mosses: *Brachythecium spp.,Pleurozium schreberi, Mnium spp, Plagiomnium drummondii, Drepanocladus uncinatus, Rhytidiadelphus triquetrus.*

Forest Floor Cover: Wood 5%, Moss 5%, Broadleaf litter 80%, Conifer litter 5%, Needles 5%

FEC Forest Composition: Common: V5, V6, V7, V8,V9; Occassional: V1, V2, V4; Rare: V3

Soil/Site Characteristics

Soil Types: Common: S9, S10; Occassional: SS8.
Organic Layer (LFH): Common: (6-15 cm), (1 - 5 cm).
Surface texture: silty, f. loamy, clayey
C Horizon texture: clayey, silty
Moisture-Drainage: Moisture: moist, fresh; Drainage: well
Deposition and Landform: lacustrine, morainal, glaciofluvial, glaciolacustrine. Generally flat to slightly rolling topography of sediments with lacustrine origin. Ecosite is at lower slope position or in a catchment basin.

Successional Relations: This ecosite is generally aspen dominated and likely successionally young. Presence of softwoods, particularly balsam fir indicate increasing site age. A tall shrub component is often present consisting of mountain maple in richer soils in the southern area of the Province and hazelnut elsewhere. Increased diversity of shrubs and herbs is associated with decreasing abundance of tall shrubs. This site separates from E-23 because of greater hardwood abundance.

Figure 1. Trapping data of porcupine predators for the Lac du Bonnet trapping area.

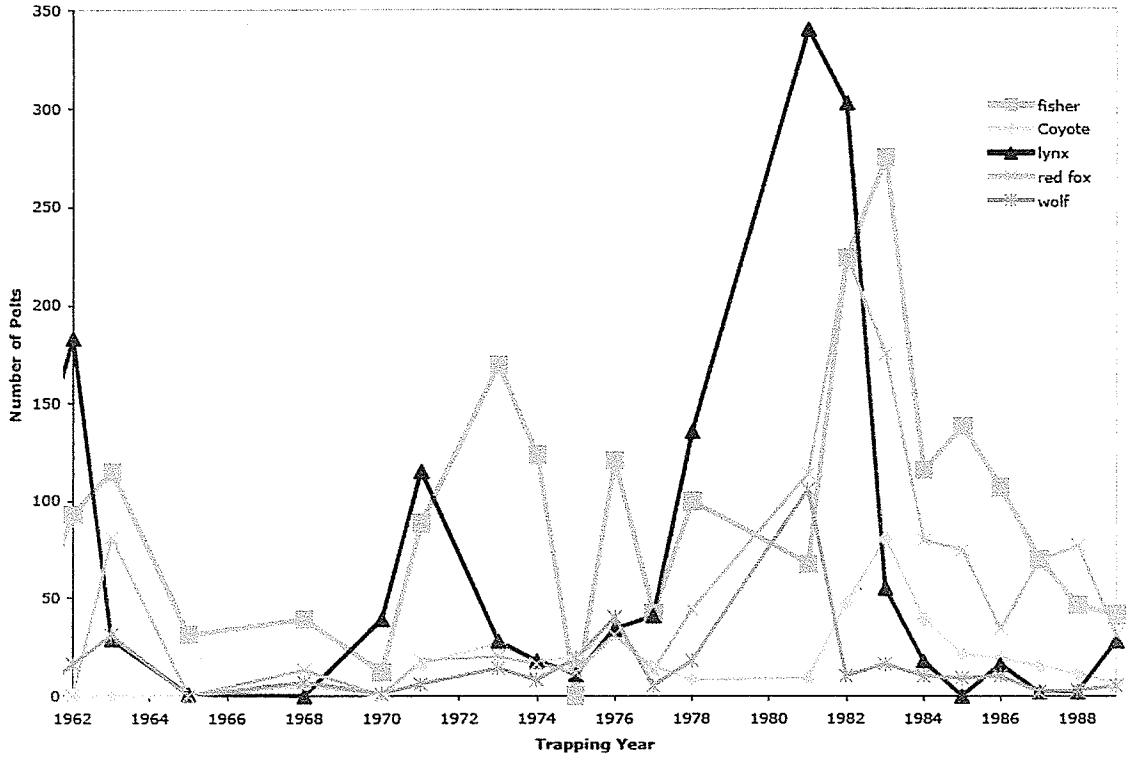


Figure 2. Trapping data of porcupine predators for the Hollow Water trapping area.

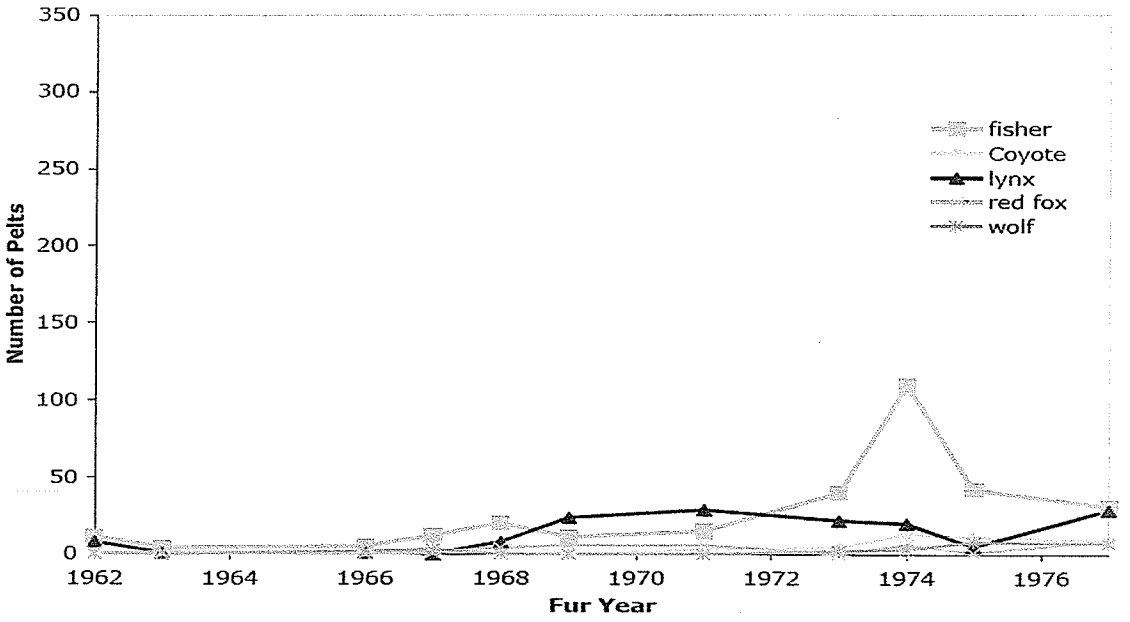


Figure 3. Trapping data of porcupine predators for the Whiteshell trapping area.

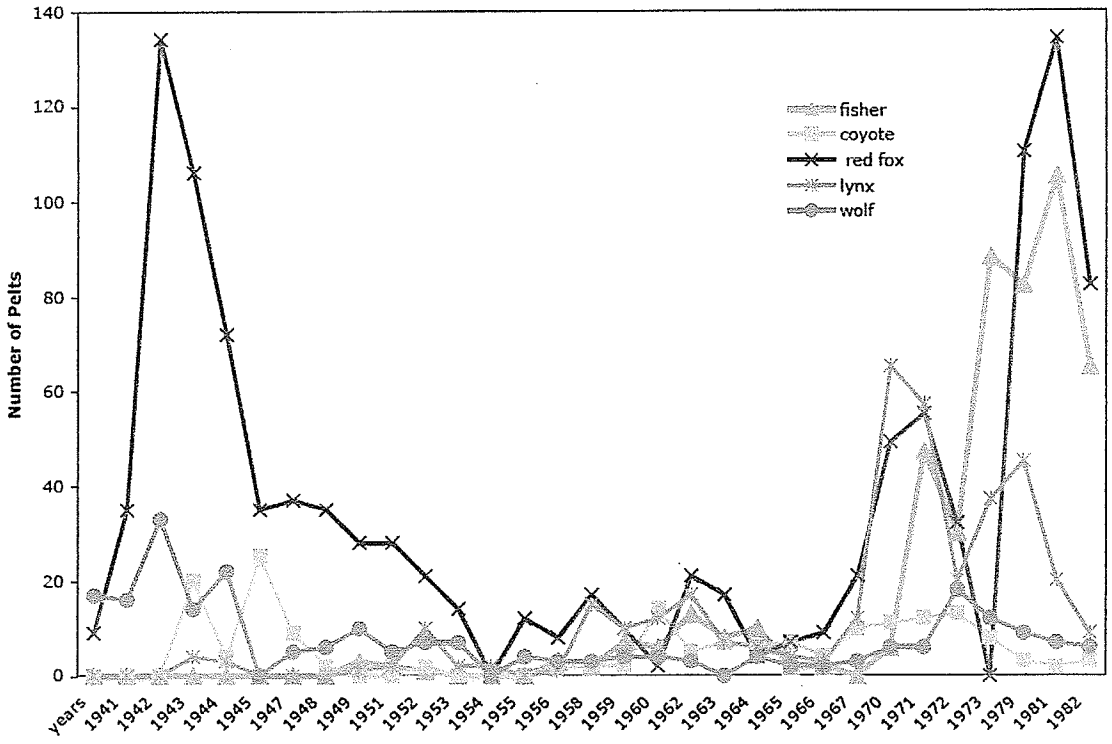


Figure 4. Provincial trapping data for porcupine predators.

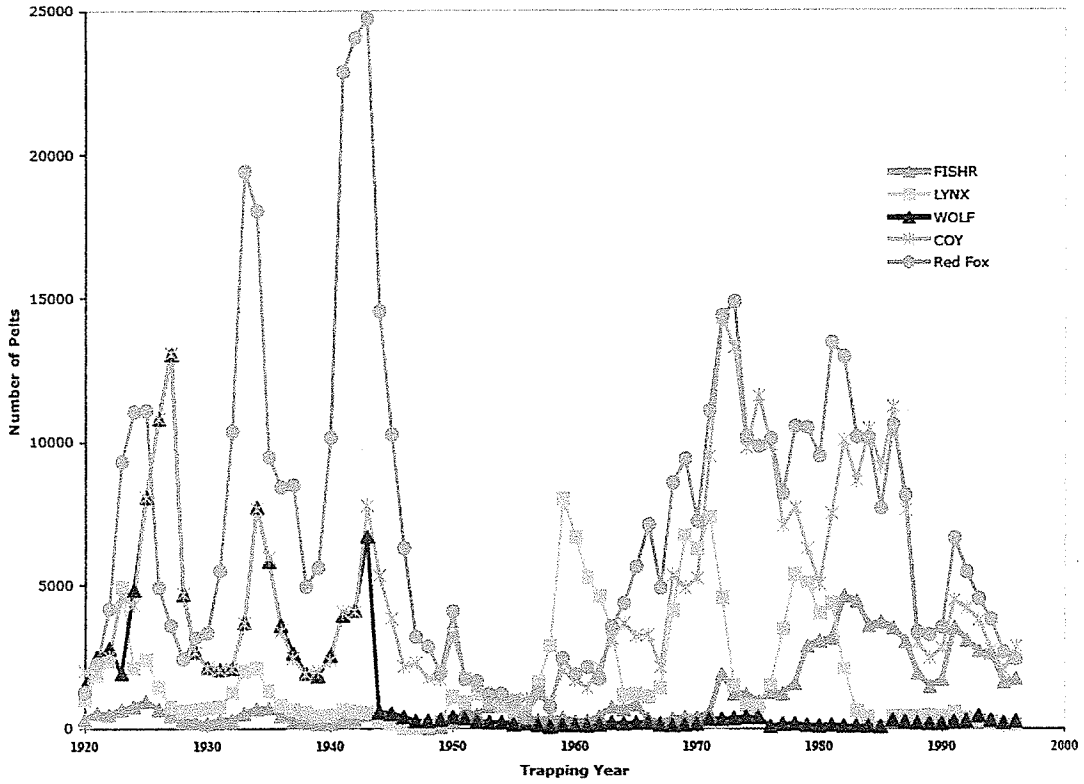


Figure 5. Provincial trapping data with only lynx and fisher.

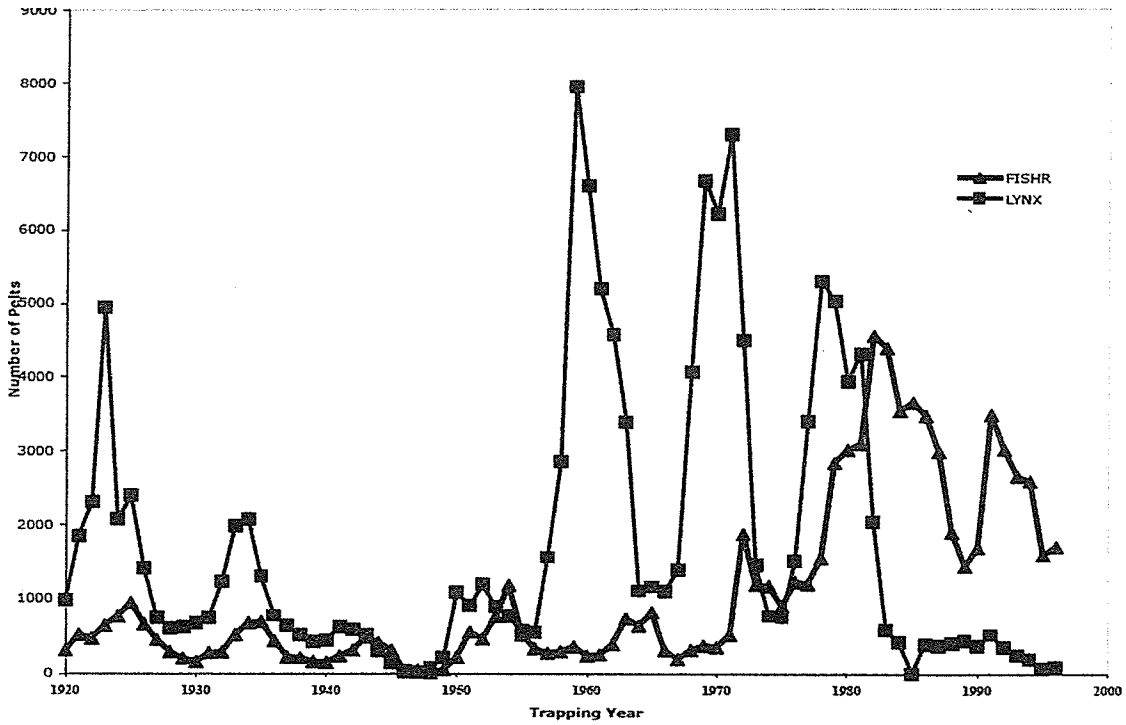


Photo 1. Boreal forest near Hollow Water that was sampled to determine Ecosite classification.

Photo 2. Porcupine perspective of a spruce tree.

Photo 3. Student field researcher setting up plot 10 x 10 metres before Ecosite data gathering in Hollow Water

Photo 4. Rough Ride. Student riding all-terrain vehicle down Commuter Rd. near Black River

Photo 5. Sandhills Biologist and Program Coordinator, Dick Thiel using wand to identify if porcupine in trap has a Passive Integrated Transponder (PIT) tag to identify the animal or whether it is a new porcupine to the study.

Photo 6. Porcupine in Sandhills being released from trap after it has been identified with the use of PIT tags.

Photo 7. Biologist Dick Thiel spray paints porcupine so that it will not be trapped accidentally.

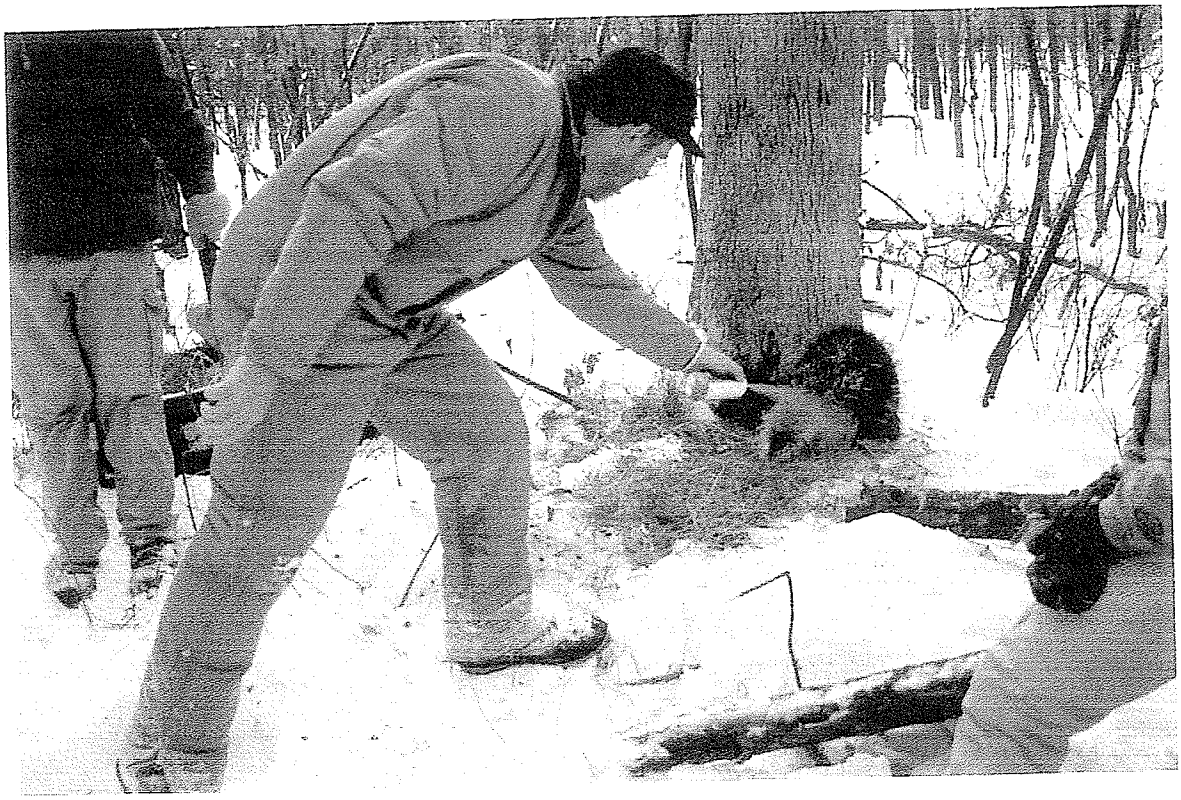
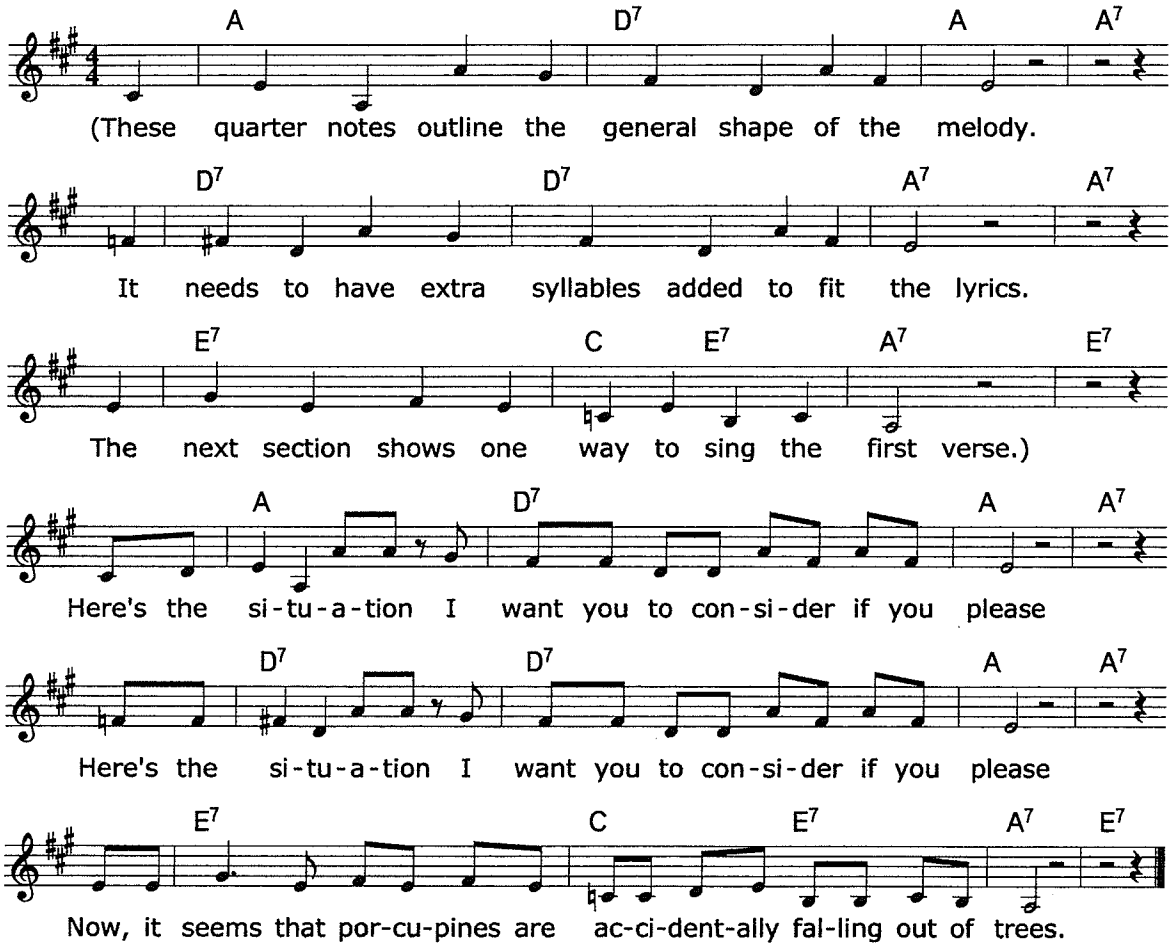


Photo 8. A good day in the field. Students and Dick make their way back to the Sandhills Outdoor Skills Center to process the data and return the equipment.

The Ex-Arboureal Porcupine Blues

Not too fast, and with a swing feel (divide pairs of eighth notes about 3:2 instead of 1:1)



For complete lyrics, see the next page

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howard@thrinberry-frog.com http://www.thrinberry-frog.com
This songsheet was constructed in February 2005

The Ex-Arboureal Porcupine Blues

Here's the situation I want you to consider if you please: (2x)
Now, it seems that porcupines are accidentally falling out of trees.

It's been happening for a while, as a search through museums has revealed: (2x)
One finds lots of skeletons with evidence of fractures that have healed.

One might hypothesize falling would make them ill (2x)
Through infection secondary to the self-impalement on a quill.

Well, that's not the case, for the lubricant that helps a quill glide (2x)
Through the flesh of an attacker is also a bactericide.

Now, the fisher is a weasel with a mighty fine coat of fur (2x)
Who has been extirpated from most places he used to occur.

The quick, clever fisher is an animal that's able to dine (2x)
Upon the flesh of the slow but prickly porcupine.

He goes for the face, which is toothy but is lacking protection, (2x)
Circling to avoid the tail, slashing from the other direction.

The porcupine, exhausted, is flipped on its back, (2x)
Leaving the unprotected belly open to attack.

When thin branches tempt a porcupine with buds or fruit, (2x)
Ex-arbouration can be the consequence of their pursuit.

It's safer to nip off the twigs and eat the treats out of hand, (2x)
Which tends to leave a lot of stunted, funny-looking trees on the land.

And those who are managing a forest for its lumber or a park (2x)
Don't like to have too many porcupines a-nibbling at the bark.

So, the fisher has been introduced again to play his old role (2x)
In keeping the tree-nibbling porcupine under control.

I've a major reference to cite for you before I close: (2x)
The North American Porcupine, by Uldis Roze.

References:

Adrian Forsyth. Mammals of the Canadian Wild. Camden House, 1985, pp. 162-163 [Fisher] and 224-227 [Porcupine]

Uldis Roze. The North American Porcupine. Smithsonian Institute Press, 1989.

Uldis Roze. How to Select, Climb, and Eat a Tree. Natural History [American Museum of Natural History], 1985, 94(5), 62-69.

Mark Stabb. At a Porcupine's Pace. Seasons [Federation of Ontario Naturalists], Spring 1992, 32(1), 24-29.