

A BRIEF FLORAL AND FAUNAL INVENTORY WITH
AN ASSESSMENT OF MANAGEMENT ALTERNATIVES FOR
NOPIPING PROVINCIAL PARK

By

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A Practicum Submitted
In Partial Fulfillment of the
Requirements for the Degree,
Master of Natural Resource Management

Natural Resource Institute
The University of Manitoba
Winnipeg, Manitoba, Canada
April, 1979

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ABSTRACT

Nopiming Provincial Park is an undeveloped tract of land in eastern Manitoba that has been given Natural Heritage Status. Increased human demand will be placed upon the area in the near future. Given the wilderness nature of the park and the objective of preservation and protection of sensitive habitat types and vanishing or restricted wildlife species, a vegetation and wildlife inventory and analysis must be provided prior to the formulation of specific plans for Nopiming Provincial Park. Such an inventory could be used to minimize degradation of the natural environment. The objectives of this study are:

1. to provide a vascular plant and animal inventory;
2. to quantitatively analyze and describe the major vegetative communities;
3. to analyze bird and animal populations in the major vegetative communities;
4. to identify sensitive habitats and vanishing or restricted species;
5. to recommend management guidelines to a) preserve and protect sensitive species and habitats, b) allow for suitable human use developments, c) produce an interpretative trail based on floral and faunal features.

It is concluded that Nopiming Provincial Park is endowed with a great diversity of plant and animal life. Five wildlife management recommendations are proposed to maintain or enhance the diversity and abundance of the wildlife and plant species of Nopiming Provincial Park. Measures to realize the proposed recommendations are: 1. protection of conditions which permit natural processes a maximum degree of freedom; 2. the protection and maintenance of sensitive habitats and species; 3. regulation of users to ensure that wildlife species composition and numbers approach the natural state; 4. the development of an interpretative program based on the floral and fauna; and 5. park development in harmony with the natural features of the area.

ACKNOWLEDGEMENTS

Recognition goes to numerous individuals who contributed time and material toward this paper. Without the field support of Mr. C.W. Cuthbert the information contained would be much more limited. Field assistance was also contributed by Mr. N. Foy and Miss. S. McCready.

My practicum committee members have spent hours examining drafts, providing encouragement and giving ideas. These members include: Mr. D.A. Chekay, Resource Management Specialist, Department of Mines, Natural Resources and Environment; Dr. R.R. Riewe, Biological Teaching Unit, University of Manitoba; Dr. R.W. Nero, Wetlands Specialist, Department of Mines, Natural Resources and Environment; and Professor T.J. Henley, Acting Director of the Natural Resource Institute.

Dr. M.W. Shoesmith, Chief of Wildlife Research, Department of Mines, Natural Resources and Environment has provided me with essential editing and administrative support.

Without the tolerance and support of my wife and family, the completion of this document would not have been possible.

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CHAPTER I

INTRODUCTION

1.1 The Problem Statement

Parks Division, Manitoba Department of Mines, Natural Resources and Environment, intends to develop Nopiming Provincial Park in the near future. Located in eastern Manitoba, Nopiming Park is a 1450 square kilometer tract of virtual wilderness exemplifying many physical features of the Canadian Shield. Precambrian gneisses and granite outcrops are interspersed with a thin, discontinuous cover of weak podsol and brown podsollic soil types. The topography is relatively flat with local elevations seldom exceeding 30 meters. Inadequate, chaotic drainage results in large areas of muskeg. Plant and animal communities of the Canadian Shield are generally less productive, and individual species are more vulnerable to human presence than they are in other geographic areas at similar latitudes. Plants are often adapted to stress factors such as severe moisture or pH conditions, low fertility, lack of topsoil or rooting areas. Animals often require large territories containing specialized feeding, nesting or loafing areas in an environment lacking homogeneity where plant growth produces scattered limited food resources.

In recognition of these unique features, Nopiming Provincial Park was given Natural Heritage Status by Order-in-Council in 1976. This status is given to

Areas of significant natural value or quality for illustrating or interpreting the natural heritage of our province (Criteria for the Provincial Park Lands System, 1974).

By virtue of the Provincial Park Lands Act¹ and according to the zoning system established in Criteria for the Provincial Park Lands System (1974), several objectives have been outlined for activities in, and development and management of Natural Heritage Parks. These objectives are:

1. Activities shall be oriented only to understanding and appreciating the unique feature(s);
2. Developments will be solely those necessary for the utilization and interpretation of the area. Preservation of unique features will dictate the scale and intensity of development; and
3. The management objective will be to preserve the unique feature(s).

To assure that the natural heritage of Nopiming Park is preserved and that the preceding objectives can be achieved, a vegetation and wildlife inventory and analysis is required prior to the formulation of a specific Master Plan for Nopiming Provincial Park. The inventory and analysis provides the data base necessary for a more detailed and comprehensive consideration

¹ The Provincial Park Lands Act is presented in its entirety in Appendix A.

of this park's flora and fauna, and for immediate management guidelines designed to preserve this park's unique natural features.

1.2 Description of the Study Area

1.2.1 Location

Nopiming Provincial Park is located in eastern Manitoba north of the Whiteshell Provincial Park, and southeast of Bissett. It is about 40 kilometers in width, extending on a narrow band along the Manitoba-Ontario border (Figure I).

1.2.2 Access

Nopiming Provincial Park is accessible on highway #315, 30 kilometers northeast of Lac du Bonnet and on highway #304, 30 kilometers southeast of Bissett. Provincial highway #314 becomes the Nopiming Parkway and transects the park from north to south (Figure I).

1.2.3 Climate

Nopiming Park is situated in a boreal continental climate region. Climate is characterized by warm summers and cold winters. Mean daily temperature is 19.4°C for July and -20°C for January. Average annual precipitation is 50 centimeters, falling mostly as rain in June and July (Weir, 1960).

1.2.4 Topography

The land surface contains considerable rock outcrop interspersed with hummocky bogs. Rock outcrops characteristically rise 5 to 35 meters above level terrain. The park is

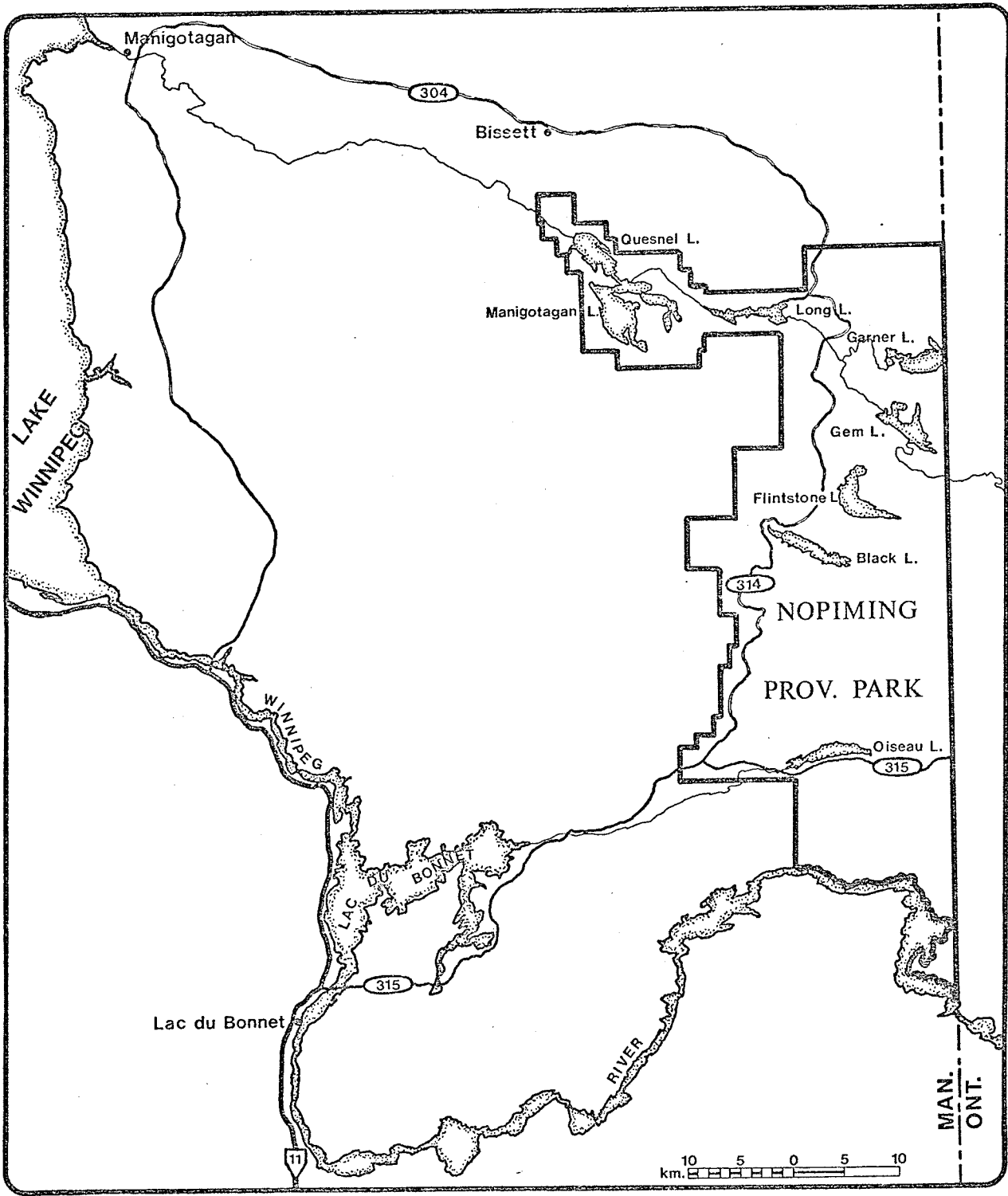


Fig. 1. Nopiming Park in relation to nearby roads and population centers.

poorly drained, with sedge meadows, bogs, rivers and lakes covering large expanses. Drainage is to the west where four river systems carry the park's runoff into Lake Winnipeg.

1.2.5 Geology

The geology is largely the product of tectonic and gradational forces acting since the Precambrian Era.

The main body of the rock is made up of granite and granite-like rocks formed from the molten state. Included with granite are relatively narrow sub-parallel belts of altered sediments and lavas which are the remnants of rocks which in very ancient times covered the surface. These ancient rocks were folded into mountain ranges and were intruded or largely replaced by the granite. These mountain ranges, by the long process of erosion, were worn down to their bases, and are now exposed as belts of lava and sediments contained within the granite.

In the Transitional Zone lacustrine clay and silt deposits from Lake Agassiz, as well as peat deposits, cover much of the bedrock and glacial drift (Rowe, 1972).

1.2.6 Soils

Soils are primarily shallow podzols and brown podzolic profiles usually zero to a few centimeters in depth. Some isolated sections are boulder strewn with glacial debris while isolated boulder, clay, sand and gravel deposits exist as remnants of post glacial rivers (Rowe, 1972).

1.2.7 Vegetative Cover

Nopiming Provincial Park lies within the lower English River and Northern Coniferous Forest section of the Boreal Forest Region (Rowe, 1972). Rock outcrops are primarily covered with jack pine, while many of the low-lying muskeg areas are vegetated by a mixture of black spruce and tamarack stands of varying size classes. Due to recent widespread fires, jack pine has become more prevalent. Although trembling aspen is common throughout the park, most notably at the northern end, it is generally associated with other tree species such as jack pine or white spruce (Scoggan, 1957). Due to drainage conditions, soils, and topographic features in the park, homogeneous forest communities of over 20 hectares are seldom encountered.

1.3 Research Objectives

1. To provide a vascular plant and animal inventory of Nopiming Provincial Park;
2. To quantitatively analyze and describe the major vegetative communities in Nopiming Provincial Park;
3. To analyze bird and mammal populations in the major vegetative communities found in Nopiming Provincial Park;
4. To identify sensitive habitat types and vanishing or restricted wildlife species within Nopiming Provincial Park;

5. To recommend management guidelines to:
 - a. preserve and protect the identified sensitive habitat types and vanishing or restricted wildlife species;
 - b. allow for suitable developments to provide human use and recreation within Nopiming Provincial Park, and
 - c. provide an interpretive trail which will allow short term park interpretation without risking habitat disturbance in Nopiming Provincial Park.

1.4 Delimitations

This research project is solely concerned with the fauna and flora comprising habitats currently existing within Nopiming Provincial Park. The conclusions and recommendations of this study are based upon one summer of field research.¹

Research does not delineate the potential impacts of mining or other developments in or near Nopiming Provincial Park, nor does it include considerations of such natural processes as fire, flood or succession upon the park's flora and fauna.

¹ Field investigations were often hampered by time, manpower, equipment, weather constraints, as well as the physical size of the area. Standardization of sampling techniques was attempted between this study, Turtle Mountain, Hecla Island and Beaudry Parks. Since this standardization centered upon breeding bird census plots, deficiencies in vegetation sampling techniques and data may result.

1.5 Definition of Terms

1. fauna - undomesticated animals not including invertebrates.
2. flora - undomesticated plants.
3. plant community - (basic vegetative unit) an aggregation of living plants having natural relationships among themselves and with their environment (Oosting, 1956).
4. cover type - a concrete example of a plant community named after the visually dominant species.
5. bird territory - the breeding area defended by the male of a species against other males of the same species.
6. sensitive area - an area that is unique, rare or fragile. An area that if disturbed will not likely return to its present state under natural conditions.
7. restricted species - a species which requires a unique habitat and will likely disappear if that habitat is disturbed.
8. quantitative method of vegetation analysis - an accurate measurement and precise record of the plants present at all levels of a concrete plant community.
9. preservation - protection without the intention of direct use other than for scientific observation such that the ecosystem is allowed to evolve naturally.
10. habitat - the region where a plant or animal naturally grows or lives; native environment.

1.6 Research Methodology

The following section includes a summary of the methods used to meet research objectives. A more complete description of study methods is contained in Appendix B.

Objective 1: To provide a vascular plant and animal inventory of Nopiming Provincial Park

When encountered throughout the park, plant species were collected to meet the inventory objective. Birds, mammals, amphibians and reptiles were recorded, along with their habitats, when observed. The songbird species inhabiting many less common Nopiming Park habitats were identified. The presence of small mammal species in three seldom encountered habitats was determined through snap trapping.

Objective 2: To quantitatively analyze and describe the major vegetative communities in Nopiming Provincial Park

Air photos and forest inventory classifications were used to determine the existence and accessible location of large homogeneous blocks of vegetation types. Once several choices had been identified, the areas were ground truthed to determine if they were suitable. Areas chosen as most typical of the desired cover type were then quantitatively analyzed to provide a description of common Nopiming Park vegetation communities.

Objective 3: To analyze bird and mammal populations in the major vegetative communities found in Nopiming Provincial Park

Sites within the three representative communities described as most common in the second objective (Figure 2) were selected for monitoring. Quantitative plant analysis, songbird and small mammal plots were established in each community.

Objective 4: To identify sensitive habitat types and vanishing or restricted wildlife species within Nopiming Provincial Park

This identification is based upon analyzed data from existing sources in addition to the vegetation and wildlife analysis in the present study. Species and natural habitats encountered rarely or which once disturbed would not likely re-establish themselves were documented.

Objective 5: To recommend management guidelines to:

- a. preserve and protect the identified sensitive habitat types and vanishing or restricted wildlife species;
- b. allow for suitable developments to provide human use and recreation within Nopiming Provincial Park, and
- c. provide an interpretative trail which will allow short term park interpretation without risking habitat disturbance in Nopiming Provincial Park.

Wildlife management recommendations and guidelines represent a synthesis of field data collected over the summer of 1977 and a review of previous biological studies in the area. Wildlife management principles were reviewed and discussions with wildlife biologists were also considered. Nopiming Park was then zoned according to the Land Use Zones for Natural Heritage Parks established by Parks Division in Criteria for the Provincial Park Lands System (1974).

The interpretative trail based upon the observed floral and faunal features was established along the Nopiming Parkway.

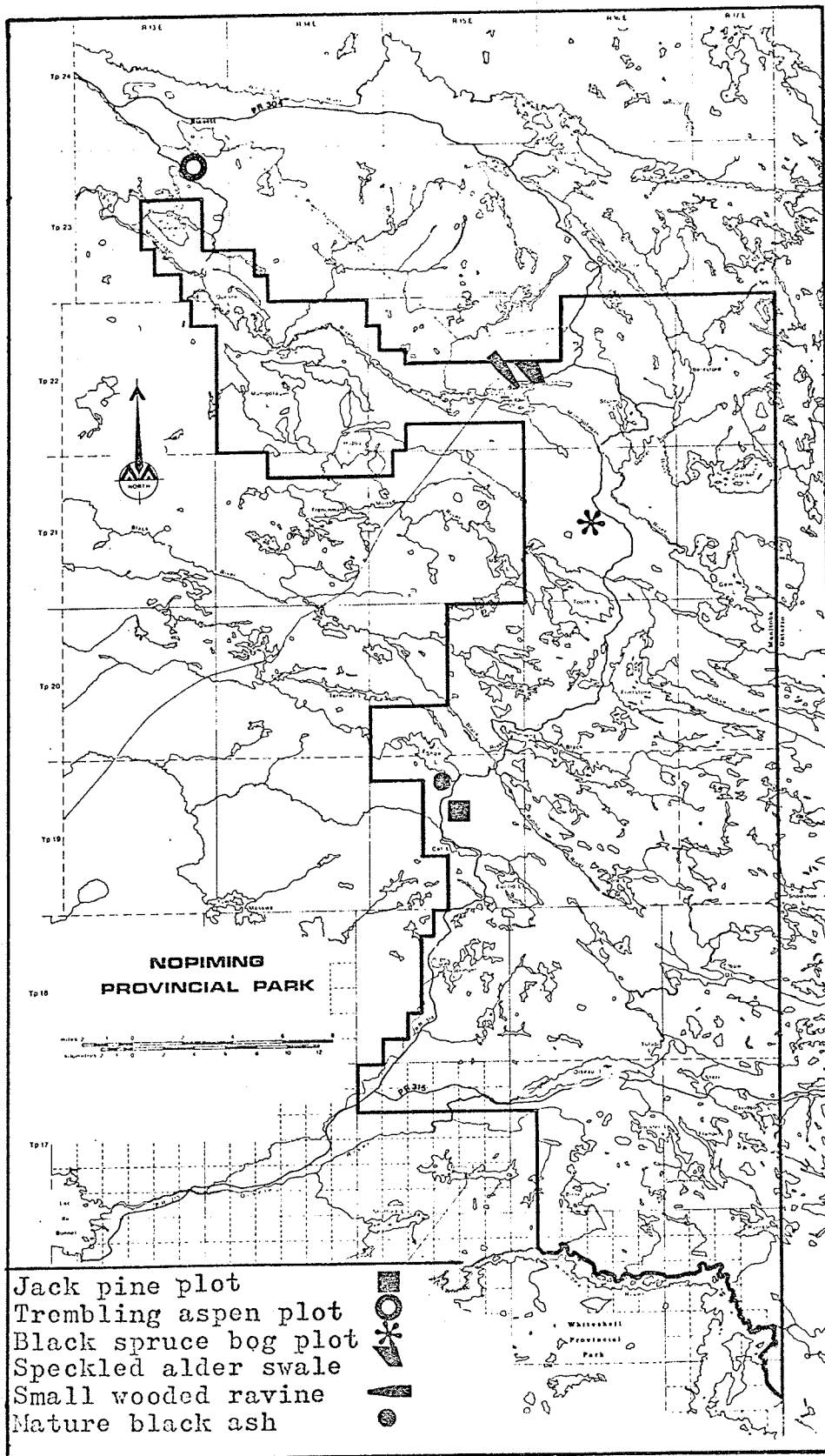


Fig. 2. Nopiming Park quantitative analysis plot locations for vegetation, birds and small mammals, plus random small mammal trapping sites.

1.7 Structure of the Study

Chapter 2 contains a summary of the floral and faunal results of this study, however the reader is referred to Appendix D for complete lists of plant and animal species found in the park and to Appendix E for the full presentation of the quantitative analysis. Details regarding the wildlife habitat classification as well as wildlife management recommendations for Nopiming Provincial Park are presented in Chapter 3. Chapter 4 contains the conclusions and recommendations formulated as a result of this study of the wildlife and vegetative resources in Nopiming Provincial Park.

CHAPTER 2

PROJECT RESULTS AND DISCUSSION:
FLORAL AND FAUNAL FEATURES OF NOPIMING PROVINCIAL PARK

2.1 Introduction

This chapter contains a discussion of the general vegetative cover and the plant and animal inventories of Nopiming Park, followed by a summary of the quantitative analysis of the three major cover types for plants, birds and small mammals. There is also some discussion of bird and animal species which are of particular interest for park management and scientific purposes.

2.2 Discussion of General Vegetative Cover and Summary of the Vegetative and Animal Inventories

Nopiming Park is located near the southwestern edge of the Boreal Forest Region. In this area black spruce is the forest species which will eventually cover the largest area unless landforms, special soil conditions, natural or human disturbances alter this pattern (Rowe, 1972). Black spruce is a slow growing, shade tolerant species which regenerates and thrives under canopy cover. After a disturbance such as a fire, jack pine, birch, aspen and various shrubs will likely become established. These species will eventually form a forest canopy. Since they are intolerant of shade as seedlings, they will not replace themselves under a dense forest canopy. Shade tolerant species such as black spruce and balsam fir will become established there. It may take hundreds of years and several plant

generations before enough shade tolerant seedlings mature to form the canopy. Once black spruce has become dominant, it will maintain itself. A disturbance will be required to alter the cover type in a black spruce dominated area. Nopiming Park's recent history of extensive fires and logging operations have combined to render the black spruce cover type to a mere 13% of the park's surface area. Jack pine dominated forests presently cover nearly 50% of the park while willow-alder, treed muskeg, treed rock, bare rock, marsh-muskeg, protection forest and unclassified lands contribute 17%. Trembling aspen dominated forest covers only 8%. Table 1 presents the five most common cover types found in each of Nopiming Park's 19 townships.

A limitations to forest production map for the Nopiming Park area was prepared by the Canadian Forest Service in 1972. A version of that map is contained in Appendix C. This map illustrates that the southern half of the park contains land of which half have limitations preventing commercial forest growth. Sections 18-15E; 18-16E; 18-17E; 19-15E; 20-15E; and 20-16E all have at least half of their land areas classed as having limitations which prevent commercial forest production growth.

There is considerable variation in the amounts of a particular cover type in different sections of the park. For example, the area covered by water averages 16% for the entire park, while the percent by park township ranges from 7% to 33%.

Table I: Major Cover Types of Nopiming Provincial Park by Township (in percentages).

Township	Water %	Non-productive non-forest %	Jack pine %	Spruce -fir %	Trembling aspen %
23-13E	29	13	35	7	15
22-17E	11	16	63	5	5
22-16E	7	12	42	25	14
22-15E	14	22	25	20	19
22-14E	33	13	24	17	13
21-17E	30	13	37	10	10
21-16E	8	21	42	23	6
20-17E	12	10	54	12	12
20-16E	23	18	42	15	2
20-15E	15	28	46	9	1
19-17E	11	14	64	10	2
19-16E	14	20	54	7	5
19-15E	8	29	52	9	2
18-17E	15	35	40	4	6
18-16E	8	13	63	13	3
18-15E	11	15	65	8	1
17-17E	16	9	58	14	2
17-16E	19	15	39	15	11
16-16E	10	15	53	13	10
Average	16	17	47	13	7

Source: A synthesis of individual cover compilation by township from Abitibi and Manitoba Forest Inventory Maps.

cover types large enough to be recorded as separate on forest inventory maps (0.5 hectare) indicate the cover type, variety and landform patterns in the area.

Due to resistant bedrock, recent glaciation and climate of the area, soil profiles and drainage patterns are not well developed. This situation has allowed numerous habitat types to become established. Interspersions of small habitat blocks are the rule, and seldom do large homogeneous blocks of a forest type exist. The lack of homogeneous areas and variety in habitat allows for the 209 flowering plant species, 141 bird species, 47 mammal species and 14 other animal species residing in the park.¹

The habitat diversity and small blocks of cover provide for an extremely large amount of edge in the park, but the size limitations often lead to habitat instability and incomplete cover type development. The diversity and large amount of edge is of some value to pioneer plant species and to small mammals; it is not necessarily of value to many plant and animal species requiring larger areas in which to sustain breeding populations over a long period of time.

Each species of plant and animal has a particular set of habitat requirements. Some species can inhabit more than one cover type while others inhabit only specialized areas. For example, trembling aspen, overbirds, red-backed voles and wood

¹ Appendix D contains the inventory lists of plants, birds, mammals, amphibians and reptiles found in Nopiming Park.

frogs inhabit nearly all of Nopiming Park's forest communities; while black ash, common terns, woodchucks and leopard frogs require more specialized habitats. Species identified in the park during the field season¹ were recorded as to location and habitats. In the case of flowering plants, the surrounding vegetation and first and last recorded blooming dates were documented. Many of Nopiming Park's lesser cover types were searched for songbird species. An attempt was made to determine which bird species utilize many of Nopiming Park's vegetation cover types.

Due to the habitat diversity, many animal species exist in a relatively small area. These habitats are usually scattered and limited in size so that large animals must often incorporate larger territories to provide for their essential needs. Habitats such as those dominated by willow, aspen, meadow or deciduous regeneration, although in larger blocks useful to deer, moose and lynx, are of little value to those species in scattered one to five hectare blocks found throughout a 20,000 hectare mature jack pine stand.

Although the number of animal species found in the park is considerable, the population of a particular species may be low. Such species as the fisher, lynx, otter, osprey, bald eagle and woodland caribou range over large tracts of the park; while individual numbers are limited. For example, Crichton (1976) estimated that only 42 caribou inhabit Nopiming Park areas

¹ The field season was April through September, 1977. More detailed information on methods can be found in Appendix B.

near Flintstone and Garner Lakes. Only three bald eagle nests and one osprey nest were recorded during this study. Records of fur trapping in Appendix E, p. 122 give an indication of the species available to trappers and of the park's annual production of furbearers.

The park has a large number of streams which often influence narrow bands of cover. Streams have several characteristics important to the park's plants and animals. They help to maintain stable water levels, limiting the problems of drowning or desiccating of shorelines. Streams often cut down through soil profiles, so that the area affected by them usually contains a variety of compressed vegetative communities, which include: from wet to dry; floating, submerged and emergent aquatic; sedge; grass; and shrub and tree communities all within a few meters lateral distance. The compressed strips of vegetation types provide areas with large numbers of plant and animal species existing in close proximity to each other. The stream shorelines do not only provide a variety of compressed habitats, but serve as corridors for movement of animal species from one block of preferred habitat into another block. Streams also provide spawning areas for fish, winter oxygen replenishment for fish, amphibians and reptiles and access and food supplies for many species. Species of fish were not field identified for this study. Most studies relating to Nopiming Park fish

have concerned themselves with game fish in specific lakes.¹ Reptiles and amphibians were recorded when observed during the study.²

2.2.1 Birds of Interest Recorded in Nopiming Park

Species occurring in the park which approached or exceeded their known northern breeding range in Manitoba include the mourning dove, black-billed cuckoo, ruby-throated hummingbird, red-headed woodpecker, great crested flycatcher, eastern wood pewee, house wren, veery, northern parula, northern oriole, scarlet tanager and indigo bunting (Manitoba Museum of Man and Nature records and Godfrey, 1960). Of particular interest were the sightings of an American woodcock (Nero, 1977) and a wood thrush (Serr, 1977). These species, which were singing in particular areas, were many kilometers outside of their known ranges.

Colonial nesting bird colonies were rare in the park although more study is necessary to confirm this observation. Provincial park, fisheries, water quality and Wilderness Corps personnel, and participants in this study have traveled extensively in the park but have recorded only two areas of possible importance for colonial nesting birds. Terns were associated with and attempted to nest on a rock island in Quesnel Lake in 1977. Herring gulls concentrated near some rock islands in Shoe Lake but did not appear to attempt nesting.

¹ An inventory of fish known or likely to be present in Nopiming Park appears in Appendix D. Lake studies dealing with game fish are listed in the Bibliography.

² Lists of known and expected reptiles and amphibian species for the park are contained in Appendix D.

Bald eagles and ospreys were also uncommon in the park. Known nest sites are limited to three for bald eagles and one for osprey (Figure 3). More extensive field study is required to document eagle and osprey use of the park.

2.2.2 Mammals of General Interest

Twenty-six of the 47 known or expected mammal species for the park were identified during the study. The eastern chipmunk, observed at Long Lake cabin, was the only species exceeding its known range (Wrigley, pers. comm.). Wolves were recorded on two occasions and appeared to concentrate in the Manigotogan River area and near the Long Lake dump. Black bears were common to the point of nuisance to field workers, especially in the songbird plots where sightings were made almost daily.

2.2.3 Ungulates

Woodland caribou, moose and white-tailed deer are known to inhabit Nopiming Provincial Park. Caribou inhabit climax forest areas where terrestrial and arboreal lichens are present. This habitat exists in many sections of the park, notably near Flintstone Lake where calving grounds are reported (Crichton, 1976). Caribou use islands in lakes for calving, while extensive bogs provide summer range for the species.

Moose exist in low densities throughout the park. Areas of deciduous regeneration, extensive willow, bog fringes and forest openings provide accessible browse for this species. Due to extensive areas of low food value such as rock outcrops,

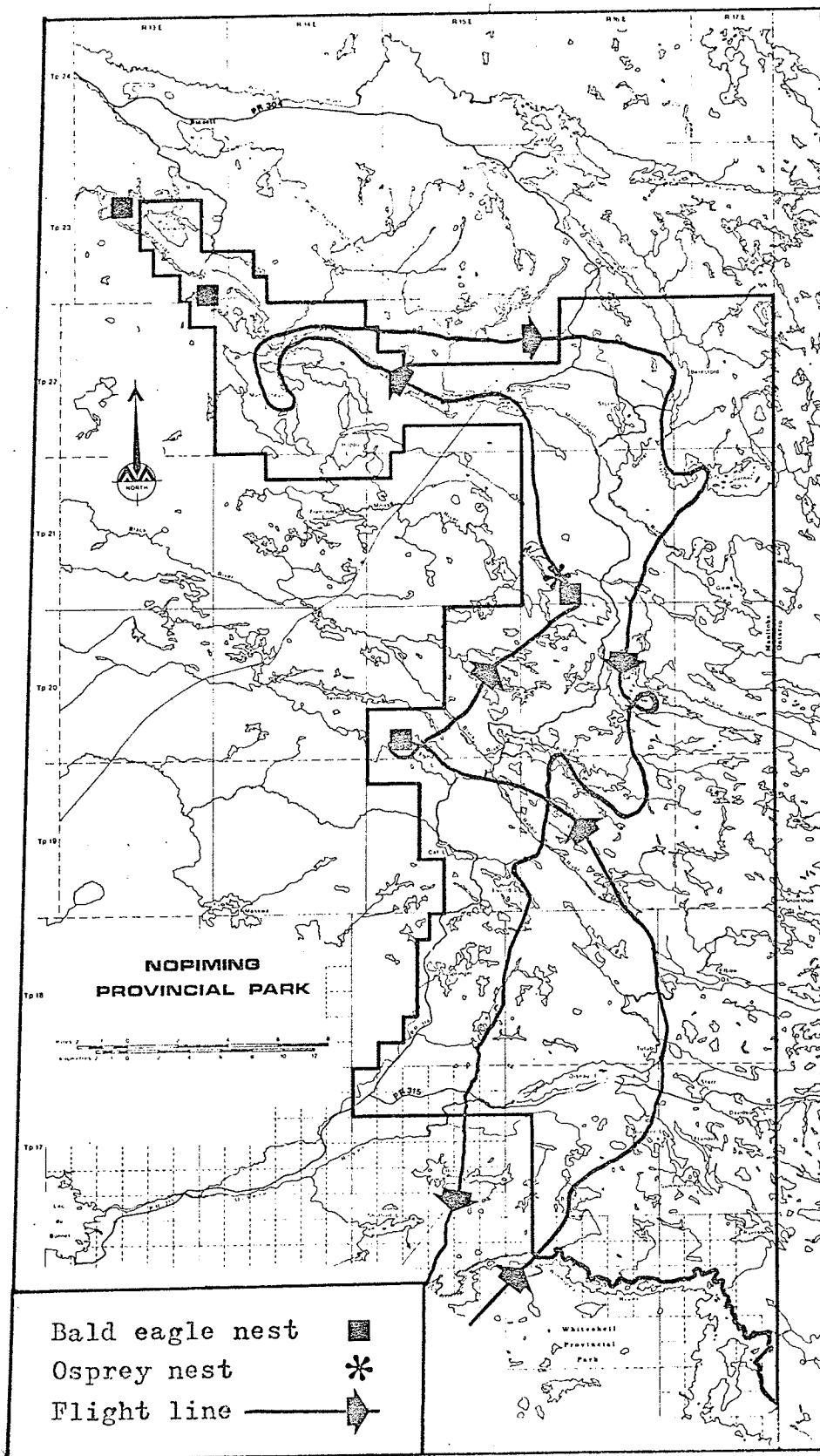


FIG. 3 Nopiming Park illustrating known bald eagle and osprey nest locations and July, 1977 raptor productivity flight line.

jack pine forest, black spruce and bogs, Nopiming Park's moose concentrations are low.

White-tailed deer are scattered throughout the region, avoiding dense black spruce, balsam fir, mature jack pine and bog areas. Deer are animals which utilize edge and recently disturbed areas. Cut-over areas, recent burns and road building have enhanced habitats utilized by this species.

2.2.4 Game Fish and Lake Stocking

The primary native game fish in Nopiming Park are northern and walleyed pike. These species are found in most of the shallow turbid basins found in the park. Test netting was conducted in several lakes to determine species presence and abundance (Hagenson and O'Connor, 1978). The results of this study led to a stocking of Birse, Springer and Tooth Lakes with walleye fry in 1978, while Shoe Lake was stocked with smallmouth bass (Manitoba, Division of Fish Culture, 1978).

Several Nopiming lakes were stocked previous to 1978. Garner Lake received splake in 1969-73 and lake trout in 1974 and 1975. The Wanipigaw and Black Rivers received kokanee in 1969 (Manitoba, Division of Fish Culture, 1978).

The Manigotogan River System currently produces over 100 master angler awards yearly, mostly from the Caribou and Long Lake sections (Hagenson, pers. comm.).

2.3 Discussion and Summary of the Quantitative Vegetation, Songbird and Small Mammal Analysis in Nopiming Park's Three Major Forest Cover Types

2.3.1 Introduction

The major cover types existing in Nopiming Provincial Park were determined from air photos and forest inventory maps. From these, major large stands of homogeneous jack pine, trembling aspen and black spruce were delineated. Table I indicates that jack pine covers 47% while black spruce covers 13% and trembling aspen covers 7% of Nopiming Park's surface. Ground observation, however, proved that there were no accessible large homogeneous stands of mature black spruce or trembling aspen. As a result the stand chosen for trembling aspen occurs northwest of the park's boundary and the black spruce plot exemplifies black spruce growing in a bog situation. The bird and mammal plots were established within the chosen representative stands of jack pine, trembling aspen and black spruce bog (Figure 2). The quantitative method of vegetation analysis follows James and Shugart (1970). Bird census techniques are those described by Hall (1964). Small mammal trapping techniques were detailed by Pruitt (1968). Detailed methods for the analysis are described in Appendix B. An in-depth description of the results of the quantitative analysis and the plot locations are included in Appendix E.

A brief summary of the quantitative analysis of vegetation, songbirds and small mammals residing in the jack pine, trembling aspen and black spruce bog is contained in the following section.

2.3.2 Jack Pine

2.3.2.1 Vegetation

Jack pine forest covers nearly 50% of Nopiming Park's land surface. Stands are typically homogeneous and even aged, indicating a fire history. In stands growing over sand, glacial till or other soils with considerable depth, trees are dense and straight with only the tops still green.

Shrub zones which exist under jack pine forest are poorly developed due largely to inhibited light penetration on the forest floor. Jack pine saplings were not encountered in the understory analysis, indicating the necessity of fire to perpetuate the cover type beyond the lifetime of the adult trees. The analysis included 14 species in the shrub zone. Balsam fir was the only tree species recorded in the shrub zone.

The ground surface under Nopiming jack pine forests is often covered by a layer of mosses. Species which grow there are shade tolerant and able to survive moisture and nutrient deficiencies. The 20 species of vascular plants identified in the ground cover analysis included five species of wintergreen and prince's pine, a species at the western edge of its range in Manitoba.

Jack pine forests are often park-like due to a lack of lower branches, poorly developed shrub and ground cover zones and a carpet of mosses.

2.3.2.2 Songbirds in the Jack Pine Plot

In the jack pine songbird plot, the ovenbird was the most common species followed by the yellow-bellied flycatcher, chipping sparrow, yellow-rumped warbler and nashville warbler. Only nine songbird species were recorded in the plot during the census period.¹ The poor development of shrub and ground cover zones contributed to the low numbers of species utilizing this cover type. The estimated 114 territorial males per square kilometer is in contrast to the 350 estimated for the same area in the representative trembling aspen stand.

2.3.2.3 Small Mammal Trapping Results in the Jack Pine Plot

Snap traps were set out on three consecutive nights to determine the presence of small mammals in the 1.2 hectare jack pine plot. A total of 11 red-backed voles, nine masked shrews and one flying squirrel were captured.² The shrew is an insectivore while the vole is a vegetarian. The numbers caught were high considering the scarcity of higher plants on the forest floor.

2.3.3 Trembling Aspen

2.3.3.1 Vegetation

Trembling aspen is a common species throughout Nopiming Provincial Park, occurring mostly in small blocks in associations dominated by other forest cover types. Less than 10% of the park is dominated by a trembling aspen overstory. These are usually

¹ Songbird census results are contained in Appendix E.

² Small mammal trapping results are contained in Appendix E.

in small blocks, typically on well developed soil profiles, glacial till, clay or sand deposits occurring on slopes or along streams, rivers or lakeshores. Six species of trees were recorded in addition to trembling aspen in the canopy zone. These trees were of various diameters indicating an uneven aged stand.

Of the 24 shrubs recorded in the aspen plot, five were tree species. Shrub stems outnumbered tree stems by over 20 to one, illustrating a well diversified, well developed shrub zone. Trembling aspen was the most abundant tree species in the shrub zone suggesting the forest type to be self-perpetuating.

A total of 35 species was recorded in the 84% herbaceous ground cover. This number is in contrast to the 20 species found under jack pine and 11 recorded in the black spruce bog plot. Dewberry, wild sarsaparilla, wild strawberry and grasses were the dominant cover species.

Aspen dominated forests are expected to gradually become dominated by shade tolerant species such as white spruce, black spruce and balsam fir barring natural disturbance (Rowe, 1972). This may take many hundreds of years to complete.

2.3.3.2 Songbirds in the Trembling Aspen Plot

Ovenbirds, least flycatchers and red-eyed vireos were the most common of the 19 species recorded in the plot. The development of canopy, shrub and ground cover zones, along with

the clay soils, small streams and rolling topography, contributed to the species diversity. A density of 350 bird territories per square kilometer was estimated. The species number and estimated territories are more than double that in either of the other cover types. The record of an active barred owl nest in the plot was one of only a few recorded historically in this Province. Trembling aspen is by far the most productive major cover type for songbirds in this park.

2.3.3.3 Mammals in the Trembling Aspen Plot

Results illustrate that the trembling aspen plot provided habitat for a wide variety of small mammals including seed-eating deer mice, herb-eating red-backed voles and insect-eating masked shrews. This habitat, with its diversity of plant communities within reach from the ground, provides an abundance of food for many mammal species.¹

2.3.4 Black Spruce Bog

2.3.4.1 Vegetation

Although black spruce is considered to dominate the climax forest in the Nopiming Park area, it presently covers less than 15% of the park's land surface. Large homogeneous blocks of black spruce are scarce and rarely occur near the park's access routes. Fires in recent history and logging operations have fragmented this cover type. The stand chosen

¹ Results of the vegetation analysis in the aspen plot are contained in Appendix E.

to represent black spruce was also intended to illustrate typical bog features in the park. A severely high water table will prevent black spruce from attaining much greater than its present eight meter height in the plot. Tamarack is the only other tree species found in the stand.

In the shrub zone dwarf birch was the only shrub attaining height of over 1.5 meters. Leatherleaf was the most common low shrub species.

Ground cover was dominated by sphagnum mosses with herbs such as buckbean, swamp pink and sundew occurring in the more open areas of the plot. These herbs would not likely be recorded under a mature black spruce forest in a well drained Nopiming Park site.

2.3.4.2 Songbirds in the Black Spruce Bog

Due to the extremely high water table and the scattered nature of the stunted black spruce trees, the songbird census indicated fewer species and territories than expected. The most common species were the palm warbler, Savannah sparrow, Connecticut warbler and Lincoln's sparrow. These species are more typical of an open bog community. Typical of mature black spruce in drier locations of Nopiming Park are the cape may warbler, red-breasted nuthatch and golden-crowned and ruby-crowned kinglet. The LeConte's sparrow recorded in the plot represents a species more common west and south of this area. Only in these semi-open bogs does this species appear to find suitable

habitat this far northeast. Species associated with the plot such as greater yellowlegs and sandhill cranes require more study to determine breeding status.

2.3.4.3 Mammals in the Black Spruce Bog

Four species of small mammals were recorded in the black spruce plot, including two insectivorous shrews; the meadow vole, a grassland species; and the red-backed vole, a forest species. The species diversity is a tribute to the adaptability of boreal small mammals as the plot was nearly all under water during the small mammal trapping period. In addition to the small mammals, a moose foraged in portions of the plot throughout the summer.

2.4 Summary

Nopiming Provincial Park is made up of an alternation of rock outcrops, lakes and bog areas seldom covered by an accumulation of topsoil. Recent fires, logging and poorly developed drainage in the area have combined to further disrupt vegetative communities. The park contains a large diversity of flowering plant species including over 200 species identified in the study. Nearly 50 species of mammals have been recorded in the park, while this study identified over 140 bird species. Amphibian and reptile species are limited, but expected occurrence of amphibians is near 10 and reptile species number four.

Colonial nesting birds such as gulls, terns and herons and other restricted species such as bald eagles and ospreys were

limited in occurrence in the park. More study is required to determine use of the park by these species.

Animals such as the otter, marten, fisher, woodland caribou and lynx either have specialized habitat requirements or require considerable areas to provide their life necessities.

Certain plant communities in the park are dwindling. White spruce, balsam fir and mature black spruce stands are becoming scarce.

CHAPTER 3

PRINCIPLES OF WILDERNESS PRESERVATION
AND GUIDELINES FOR MANAGEMENT OF
NOPIMING PROVINCIAL PARK

3.1 Introduction

This chapter contains a brief review of principles for the preservation and management of wilderness areas. The rationale upon which these principles are founded, in combination with the results of the plant and animal inventory and analysis, forms the basis for the recommendations and guidelines for Nopiming Provincial Park.

3.2 Management Principles for Wilderness Areas

Nopiming Park is a virtual wilderness area which was given Natural Heritage Status in 1976. This status requires that the park's natural features be illustrated or interpreted and that its natural qualities be preserved. The problem in the park planning process is to preserve the natural environment while providing for recreation and other human uses of the area.

The idea of managing a wilderness area such as Nopiming Provincial Park is not to mold nature but to manage direct and indirect human influences so as to minimize their impact on natural processes in the wilderness. The primary role of wilderness management is to limit unnatural constraints on "the free play of natural forces" (Schoenfeld and Hendee, 1978).

Habitat preservation is the key to species preservation, whether the species be a minute flatworm on the underside of a water-lily or a 500-kilogram moose browsing on the water lilies at the edge of a lake (Cain, 1966). Artificial habitat manipulation is not consistent with the wilderness spirit. Where there are exceptions, the least artificial practices and tools should be used in a manner exerting the least impact on wilderness naturalness. The following guidelines have been suggested for maintaining natural wilderness areas:

1. Vegetative communities should express natural conditions. The distribution, abundance and diversity of plant cover should be substantially unaltered by humans;
2. Lakes and streams should reflect watershed and channels as undisturbed as possible; and
3. The animal life should approach natural numbers and species. Any harvest that is permitted should be well within biological limits (Schoenfeld and Hendee, 1978).

The main goal of the wildlife manager is to ensure that conditions permit natural processes a maximum degree of freedom. In areas where for one reason or other the natural processes have been compromised or have broken down, the manager may deliberately mimic natural processes (Hendee and Stankey, 1973). To achieve the goal of natural distributions and numbers of native wildlife in wilderness areas, fire must be allowed to play a more prevalent and thus more natural role in wilderness ecosystems - including in some cases the artificial

introduction of prescribed burns to make up for past fire prevention and control. Among the various habitat management methods, the prescribed use of fire is certainly the most natural (Heinselman, in press). In special cases, vegetation disturbance and distribution may have to be employed to substitute for natural processes. For example, fire or clear-cutting may cause a situation in which the natural processes have been disrupted and artificial vegetative distribution will be necessary.

The main emphasis of natural wilderness management should be upon the whole ecosystem. At a recent conference of Canadian and U.S. wildlife experts, the main principle that emerged was the need to focus on maintaining the ecosystem as a whole rather than concentrating on any one species or even an assemblage of species. Haber (1974) stated:

"The ecosystem is like a living organism, with all its many parts interacting in an elaborate way to promote homeostasis and self-perpetuation. Because there are so many key interdependencies, it is folly to try to manage the parts of an ecosystem as separate entities. Each part gains its sustenance and, most important, expresses its greatest beauty and biological significance not by itself but as a contribution to the smooth operation of the whole."

3.3 Wildlife in Wilderness Planning

The ecosystem approach to wilderness management does not preclude wildlife management. On the contrary wildlife should receive strong consideration in wilderness planning and management. However, wildlife species are to be considered as

components of an ecosystem, not as separate entities. Wildlife management should be governed by the holistic view that seeks preservation of natural ecosystems of which wildlife species are an important part, but only a part. Wildlife management and wildlife uses in wilderness areas are appropriate only when they harmonize with the particular wilderness environment. The consumptive use of wildlife must be in harmony with the reproductive potentials and availability of suitable habitat.

Inspection of lists of threatened or vanishing species suggests that more than a hundred such mammals, birds, fishes, reptiles and amphibians may appear - at least seasonally - in wilderness environments. Some of the species dependent upon the natural wilderness environment include the lynx, fisher, pine marten, bald eagle and osprey (United States Department of Agriculture, 1975). In Canada, the woodland caribou could be added to that list. Categorization of wilderness wildlife is often not a black-and-white process, but it can be a valuable aid in management. A first step in wilderness management should be an inventory of all the species seemingly dependent upon the wilderness environment and detailed descriptions of the natural habitat on which they depend. Monitoring and preservation of these habitats must then be assigned a high priority. Follow-up inventories of the identified species and their habitats should be an on-going process (Schoenfeld and Hendee, 1978).

3.4 Recreational Use of Wilderness Areas

Recreational use of wilderness areas has been increasing rapidly. Many people enjoy viewing or photographing native species in natural settings. The value of incidental contact with wildlife to outdoor recreation experiences is indicated by a study in which 96% of all campers interviewed said that the opportunity to see wildlife in its natural setting had added to their outdoor experience (Lime and Cushwa, 1969). The need for interpretative trail and sites has grown out of this increased interest and demand by people.

3.5 The Role of Habitat in Species Preservation

Since preservation of habitat has been established as the key to species preservation, it is imperative that an operational definition of habitat be provided for this study before recommendations and guidelines are outlined. Habitat can be defined as the complex of soil, water and plants, commonly called "cover", in which birds and animals exist (Madson and Dozicky, 1962). This cover must provide a place of escape from predators, winter shelter, a place to rear young and even a place for play and expression of social behavior, in addition to food and water for energy and nutriment.

Various habitat types found in Nopiming Provincial Park have already been described in detail in this study. However, due to the size of the study area and research constraints, it is impossible to provide a detailed breakdown of these habitats in map form. As previously stated, the pockets of habitat

in Nopiming Park useful to the greatest diversity of wildlife are fragmented and usually located in narrow bands along streams. The major cover types by township in Nopiming Park can be found on Table I, and detailed descriptions of major vegetative communities can be found in Chapter 2.

3.6 Wildlife Management Recommendations

3.6.1 Introduction

The importance of managing wildlife populations as a recreational resource through the preservation of natural habitats has been identified in the first part of this chapter. The emphasis upon vegetation results is an indication of the cover and food available to all wildlife observed.

Wildlife management through habitat provision in a provincial park like Nopiming Park requires the determination of wildlife species inhabiting the park, the abundance of the wildlife species and an analysis of their food, water and cover needs in relation to the diversity and quality available as habitat. This study delineates those habitat areas which should be protected and maintained in order to preserve the wildlife which are dependent upon the wilderness environment.

By way of a summary and explanation of the organization of the following section, Wildlife Management Recommendations were formulated upon the basis of the vegetation and wildlife inventory and analysis, and upon data procured from existing sources. These wildlife recommendations are listed

and discussed individually. The discussion of each recommendation includes a statement of the goal of wildlife management underlying the recommendation, the presentation of objectives to be reached should steps be taken to implement the recommendations and, finally, general measures which could be taken to meet the objectives are presented as guidelines.

Within the framework of these recommendations and guidelines, the sensitive habitat types and vanishing or restricted wildlife species have been identified. These recommendations require periodic review to ensure that they are in accord with park policy and to determine if they apply to the park's flora and fauna as various stages of succession occur.

3.6.2 Management Recommendations

1. Efforts should be undertaken to ensure that conditions permit natural processes a maximum degree of freedom;
2. Sensitive habitats should be protected and wildlife species identified as restricted or vanishing should be given direct protection and their habitats maintained;
3. Use or exploitation of the park's flora and fauna should be regulated to ensure that species composition and numbers approach those of a natural state;
4. An interpretative program should be developed and implemented with minimum disturbance to the natural quality of the area; and
5. Developments in the park should be in harmony with the natural features of the area.

3.6.2.1 Recommendation 1: Efforts should be undertaken to ensure that conditions permit natural processes a maximum degree of freedom.

The goal of natural resource management in Nopiming Provincial Park is to maintain those natural features which exemplify wilderness values for which the park was established. The natural features and processes existing in the park must be allowed to continue with as little influence from man as possible, yet the park must also provide recreation options for people. To protect the natural interactions between the ecological systems of the area, provision must be made to prevent developments which will cause unnatural manipulation of the park's habitats. Natural vegetative communities are continually progressing toward a stable climax with natural disasters occurring at various stages in the progression. With pressures to suppress fires and also to provide the type of lush grass and exotic species present in many parks, the tendency to disregard natural conditions and artificially manipulate the area will be strong. This type of manipulation will not be in harmony with natural succession, and is therefore to be avoided. Where natural disturbance has been suppressed, manipulation may be necessary to maintain habitats. These manipulations must be designed to closely mimic natural methods of disturbance.

Fire is a natural disturbance factor which can take different forms in different areas and at different times of the year. It can consume only the ground cover vegetation leaving the accumulated litter, shrubs and trees virtually undisturbed. This type of fire will allow rapid regrowth of

the ground cover. A somewhat hotter fire will likely consume not only the herbaceous surface material but will also consume much of the accumulated ground litter and cause death to many of the trees and shrubs. A third type of fire consumes much of the forest; it often contains two levels of flame, one consuming the crown, while the other burns the ground vegetation and accumulated litter on the forest floor. In a park such as Nopiming, which is narrow and surrounded by forested lands, legislation to allow fires to burn naturally will not be passed easily. Because of fire suppression, many park habitats will successional-ly advance beyond their usefulness for many species of wildlife. Provisions must be made to set these areas back to stages useful to wildlife species typical of the park. Fire is a tool which, if used at the appropriate time in the correct areas and with proper control, can be effective in maintaining natural plant succession within a range capable of providing habitat for a desired animal community.

Examples of habitat which may require manipulation to maintain species diversity include: willow-alder stands which have grown out of reach for most browsers; meadow lands which have dense layers of old plant debris on the surface preventing light penetration and tying up nutrients; dense trembling aspen stands which have grown out of reach for many species and over-mature jack pine stands which are not being replaced by more shade tolerant species.

In some areas of the park considerable spruce and pine cuttings have been made. These cut-over areas have helped reduce

the park's area under a crown of spruce trees. Past fires have burned extensive tracts of the park's vegetation. These areas have usually been invaded by jack pine stands which form vast monocultures throughout the park. These jack pine forests often have little understory, and thus will fall down and revert to an early successional stage without disturbance or a source of seedlings to provide a later successional stage. The possibility of broadcasting seeds of natural regenerated spruce or fir species should be considered in parts of the mature pine forests to normalize the area covered by these species.

To maintain its wilderness theme, only indigenous plant and animal species should be allowed in Nopiming Provincial Park. For example, plantations and walk areas around campgrounds and other developments should consist only of indigenous species. Fish and animal species should also be kept indigenous.

When developments such as park campgrounds are established, they are generally put in place to remain indefinitely. However, this practice should be modified. The areas should be assigned a lifespan based upon the ages of the trees under which they are established. As stated earlier, plant communities are constantly progressing toward a climax successional stage. Some of these stages are suitable for campgrounds or other types of developments, while others are not. Once the cover around a particular development type is no longer suitable for the desired use, the development should move to a new, more suitable location.

Objectives for management of Nopiming Provincial Park plant and animal communities:

1. To ensure that species alien to the park are not purposely introduced in the area;
2. To maintain Nopiming Provincial Park habitat and species diversity through natural disturbance where possible; and
3. To ensure that Nopiming Provincial Park maintains floral and faunal species diversity and numbers natural to the area.

Guidelines:

1. The formulation of a policy statement by Manitoba Parks Division which prohibits the introduction of non-indigenous species in Nopiming Provincial Park;
2. The amendment of the Order-in-Council establishing this park to include this policy statement;
3. Park floral and faunal communities should be left as natural as possible with natural disturbance the preferred management tool;
4. Where manipulation is necessary, methods which mimic natural processes should be employed whenever possible; and
5. Developments should be considered to be temporary features; concern for the successional stages and future of the proposed site should be expressed. Permanent features which require future alteration of their surrounding vegetation should not be allowed.

3.6.2.2 Recommendation 2: Sensitive habitats should be protected and wildlife species identified as restricted or vanishing should be given direct protection and their habitats maintained.

The goal of wildlife management underlying this recommendation is to maintain populations of those species which are considered endangered, vanishing or restricted in Nopiming Provincial Park. Nopiming Park contains numerous wildlife species which are dependent upon the wilderness. The species include: bald eagle, loon, osprey, mergansers, grebes, goldeneye, bufflehead, ringneck, woodland caribou, lynx, fisher, marten and wolf. Most of the species have yet to be identified as endangered, vanishing or restricted in the park. However, increased human presence in the area will cause a decrease in their numbers. For many of these species, little is known of their habitat requirements, numbers or exact locations in the park. For others, such as the woodland caribou, their use areas and habitat requirements have been crudely defined.

The most effective strategy to meet this goal is the application of a zoning system which delineates the type of recreation development and the amount of visitor use. Since the park is a wilderness environment, natural vegetation management is recommended. When natural disturbance is not possible, certain measures such as prescribed burning may be deemed necessary to maintain or enhance certain habitats which naturally exist in the park.

Application of a zoning system

The basic zoning system utilized in this study is the zoning system formulated by the Manitoba Parks Division



Criteria for the Provincial Park Lands System (1974). This zoning has been modified to apply more effectively to the flora and fauna of Nopiming Provincial Park. In addition, areas delineated in the various zones should be reviewed every four to five years to ensure that the species for which the designations was made is still utilizing that particular area. Also, if a habitat area is zoned for complete protection and that habitat advances to another successional stage or is set back, it may no longer warrant its zone status. Finally, as more information on the flora and fauna of the park is gathered, new areas may be considered for unique status, while other areas once thought to be unique may prove to be common. A skeleton of the zoning system used in this study is contained in Appendix F. The designation of the park lands into zoning classes was accomplished through a study of the park's natural flora and fauna as determined from this study and the data supplied by other studies on the area.

The underlying premise of the application of a zoning system to the park is that human interaction with wildlife should be regulated since, in general, the net effect of increased interaction is a decline in wildlife populations.

With respect to park zoning, three classes have been distinguished in Nopiming Park. 1) Class I: preservation to the exclusion of human use; 2) Class II: restricted, single use areas; and 3) Class III: multi-use areas.

3.6.2.2.1 Class I: Preservation to the Exclusion of Human Use Habitats in Nopiming Provincial Park identified for preservation in their natural state and the exclusion from public use include:

1. one-half kilometer radius buffer zone around all known bald eagle and osprey nests;
2. the woodland caribou ranges;
3. streams and their associated riparian habitats;
4. islands and their associated habitats;
5. study plots for monitoring habitats;
6. colonial nesting bird colonies; and
7. archaeological sites

1. One-half kilometer radius buffer zone around all known bald eagle and osprey nests

Bald eagle and osprey populations have decreased drastically in recent years. These species are indigenous to the wilderness areas and should be maintained in Nopiming Provincial Park. Once nest sites have been established, the birds tolerate some human disturbance because they are very attached to their nests. Despite human disturbance, these species will likely return to the same nest near after year. They will not likely establish a new nest in a disturbed area once the original nest has been destroyed. The protection of an area around the nest provides the potential for the resident pair to build new nests within their present territory should something happen to their present nest site. Protection of bald eagle sites should be initiated in late April when the birds return to

their nesting territories. This protection should continue through August when fledglings leave the nests. For ospreys, the initial protection need not begin until mid-May but should continue into September. The most critical time for both species is the egg-laying period, which is early May for bald eagles, and June for ospreys. These nest sites require monitoring. As more information is gathered, territories no longer in use can be removed from the protected list while newly recorded nest sites can be added.

Objectives for one-half kilometer radius buffer zone around all known bald eagle and osprey nests:

1. To ensure that the vanishing species can be maintained where they exist in Nopiming Provincial Park; and
2. To provide a buffer zone, so that if the active nest or adults are destroyed, there will be an undisturbed portion of territory in which to initiate a new nest.

Guidelines:

1. All park developments be at least one-half kilometer from known bald eagle or osprey nests;
2. All canoe routes and hiking trails should be constructed such that people will not stop near bald eagle or osprey nests; and
3. Forest operations should not be allowed within one-half kilometer of known bald eagle or osprey nest sites.

2. Woodland caribou ranges

Woodland caribou are the representative ungulates of the boreal wilderness. They are often found in groups, exhibit

little fear of man, have a low reproductive potential, travel over a large territory and seldom survive long after man has obtained access into their habitat range. Although once present in Minnesota, Wisconsin and Michigan, woodland caribou have now retreated north of Whiteshell Provincial Park. The caribou in Nopiming Park now represent the southernmost limit of the species in North America. They are also the herd closest to a major urban area (Winnipeg). Without protection from hunting and destruction of their habitat, they will soon retreat farther northward. Woodland caribou calving occurs in late April and early May in the Flintstone Lake area of Nopiming Provincial Park.

Objectives for management of woodland caribou ranges:

1. To ensure that a viable population of woodland caribou continues to survive in Nopiming Provincial Park;
2. To maintain habitat suitable for the existence of this species in the park; and
3. To prevent disturbance of those areas known to be used by caribou as calving grounds.

Guidelines:

1. Allow no recreation development on those lakes known to be used as calving grounds;
2. Limit access to calving ground lakes to non-motorized boats only; and
3. Prohibit hunting of woodland caribou in the park.

3. Streams and their associated riparian habitats

The cover of Nopiming Park is made up of nearly 50% jack pine, 16% water, 15% black spruce and another 10% of rock outcrop and bog communities. The above mentioned cover types account for 90% of Nopiming Provincial Park's surface area, yet they support only limited species and numbers of wildlife, because jack pine forests lack shrub and ground cover development as do mature spruce forests. Water alone supports few species while bogs and bare rock outcrops provide few opportunities for survival. The greatest species diversity and numbers of animals in Nopiming Park occur in pockets of aspen dominated forest, in meadows, willow alder areas and generally in those places associated with stream habitats. Streams are most important because they are often used by several fishes for spawning, otters and mink for access, many life forms for oxygen supplies and lakes for cleansing. They also provide water and habitat for such species as deer, moose, hares and many small mammals. Since streams provide habitat for the herbivores, they also attract carnivores.

Objectives for management of streams and their associated habitats:

1. To ensure that streams are not obstructed, polluted or destroyed as travel corridors for wildlife and fish species; and
2. To ensure that the stream riparian habitat and the species using it are protected and maintained.

Guidelines:

1. No developments be allowed along streams;
2. No streams be bridged without assurance that fish species can get upstream through the culvert;
3. No dumping into, or scraping of the stream banks be permitted; and
4. Habitat existing along streams be allowed to progress naturally. If, due to suppression of natural disturbances, manipulation is required to provide suitable habitat for a particular wildlife community, the manipulation process should mimic nature as closely as possible.

4. Islands and their associated habitats

Islands are important areas since: 1) they represent the area least likely to be burned by a fire; 2) they often contain the best soil development; 3) they are likely to contain archaeological evidence; and 4) they often provide isolation for colonial nesting birds, eagles, ospreys and calving ground for woodland caribou. Since islands are usually small, they are not worth logging. This is fortunate as the slash and erosion from islands would likely pollute the water system if logging would take place. As a result, islands often represent the only illustration of climax forest in the area.

Objectives for management of islands and their associated habitats:

1. To ensure that islands receive complete protection from logging;

- 2. To ensure that no developments occur on islands;
- 3. To ensure that species of wildlife known to exist on islands are protected from human disturbances.

Guidelines:

- 1. No logging, bulldozing or consumptive use be allowed on islands;
 - 2. No base camps, campgrounds or other buildings be allowed on islands; and
 - 3. When endangered, restricted or vanishing species are known to exist on islands, these islands are to be off limits to human use.
5. Study plots for monitoring vegetation, songbirds and small mammals in the three major Nopiming vegetative communities.

Study plots were established to monitor long term trends in vegetation and wildlife populations in the park's three major cover types. From the results in these plots comparisons can be made with developed areas to determine which species are affected by development. The type and level of development can then be programmed to the number and composition of species desired in the development area. Plots such as these provide identification of indicator species, interpretative information, a knowledge base, and a training area for naturalists. They also provide a means of monitoring species and succession over time.

Objectives for management of study plots for monitoring vegetation, songbirds and small mammals in the three major Nopiming vegetative communities:

- 1. To ensure that no developments occur in or near those established plots.

Guidelines:

1. No development or public use areas be allowed to establish within 200 meters of any of these plots; and
2. Songbird and small mammal populations be monitored annually in these plots.

6. Colonial nesting bird colonies

Species of gulls, terns and herons are vulnerable to human disturbance during the breeding season. If disturbed during, or just prior to the incubating season, desertion often follows. Disturbance during the post hatch period often causes death of young from exposure. Although evidence of these colonies is limited in the park, they require protection when located to prevent their total loss.

Objectives for management of colonial nesting bird colonies:

1. To ensure that identified colonial nesting bird colonies receive complete protection from human disturbance during the nesting season; and
2. To ensure that logging or other developments do not impose upon, or destroy the nesting site.

Guidelines:

1. No human access be allowed to any colonial nesting bird colony island during the nesting season except for scientific purposes; and
2. No park facilities or operations be permitted in areas occupied by colonial nesting bird colonies.

7. Archaeological sites

Nopiming Provincial Park has not been extensively studied for possible archaeological sites. As more information is gathered, these areas will become better documented. These sites are important from a historical point of view and require preservation and protection from non-scientific scavengers.

Objectives for management of archaeological sites:

1. To identify and preserve archaeological sites in Nopiming Provincial Park; and
2. To ensure that these sites will not be destroyed through development on, access to, or pilfering of their historical artifacts.

Guidelines:

1. A study of the park's area should be undertaken to determine the locations and numbers of archaeological sites; and
2. Public access to identified archaeological sites in the park should be prohibited.

3.6.2.2.2 Class II: Restricted, Single Use Areas

These areas require some protection and maintenance. They are to be used for education, recreation and single purposes. These areas include:

1. road corridors and borrow pits,
2. lake shorelines and wild rice harvest areas,
3. bogs,
4. existing cottage areas,

5. moose and deer habitat areas, and
6. blocks of cover typical of the natural park

1. Road corridors and borrow pits

Road corridors and borrow pits are existing unnatural disturbance areas in the park. They are important to the park because they represent areas where plant succession is rapidly taking place and many animal species can find habitats. Appendix G contains numerous interpretative details about the areas. Not only are the road edges important to plants and animals in the park, but the road itself is used as a travel route in winter by large animals such as deer, moose, caribou and wolves. To maintain continued diversity, some form of natural manipulation of the roadsides may be necessary, especially of protected corridors several hundred meters in width on either side of the road. These areas usually receive protection from fires and are allowed to become over-mature, decadent, uninteresting and of little value to wildlife.

Objectives to manage road corridors and borrow pits:

1. To maintain a diversity of wildlife species near roads and borrow pits;
2. To provide protection to species utilizing habitat areas near roads and borrow pits; and
3. To provide park visitors with visual evidence of the wildlife of Nopiming Park.

Guidelines:

1. Allow natural disturbance to occur along the roadside borrow pits and road corridors;

2. Prohibit discharge of a firearm or the taking of fur species within 200 meters of the Nopiming Parkway; and

3. If fires are suppressed, consider using a tool closely mimicking nature to maintain the road corridors in a diversity of successional stages.

2. Lakes, shorelines and wild rice harvest areas

Nopiming Park lakes are important for a number of species which exemplify wilderness features. Species such as loons, grebes, mergansers and eagles use lakes. Shorelines are important to wildlife because of the diversity of cover. Shoreline areas and marshes provide summer habitats for many waterfowl species, and species such as moose, mink and muskrats. These shorelines require protection to limit degradation by humans. They also require successional set-backs to provide the diversity of habitats necessary for wildlife communities consisting of numerous species.

Wild rice areas are significant to people as a potential source of income. They are also important as food and cover for numerous waterfowl species, fish species, aquatic furbearers, small mammals and moose. These areas require protection from water manipulation, power boat damage to plants, pollution and over-harvesting.

Objectives to manage lakes, shorelines and wild rice areas:

1. To protect and maintain those park species which utilize lake communities for much of their lives;

2. To maintain water quality to allow all species utilizing lakes to continue to do so;

3. To allow natural disturbance and succession to occur on lakeshores;

4. To prevent human use or development from defacing shorelines;

5. To maintain wild rice beds in Nopiming Provincial Park lakes;

6. To ensure that these beds are not degraded through mismanagement or human disturbance; and

7. To provide Nopiming Park visitors with an opportunity to view wild rice in a natural setting.

Guidelines:

1. Control the size of boat motors on lakes;

2. Prevent permanent developments on lakeshores;

3. Prevent overuse of lakeshores; and

4. Allow wildlife species complete access to shoreline habitats;

5. Continue to issue licenses to wild rice harvesters;

6. Prevent power boat use in wild rice producing areas;

and

7. Control sources of pollution which will likely degrade wild rice beds.

3. Bogs

Bog areas in Nopiming Provincial Park contain a variety of sensitive plant species. Bog communities are vulnerable to pollution because of poor drainage and trampling due to poorly developed stem and root systems of certain species. Penetration

as a result of walking over a bog is harmful to such an area. Since bogs are generally acid and moist in nature, they are slow to recover from disturbance. Several species of wildlife are typical of a wilderness associated with bogs. Some of these include the great grey owl, sandhill crane and greater yellow-legs.

Objectives for management of bogs:

1. To protect bogs from pollution, unnatural manipulation and degradation caused by human use; and
2. To illustrate the value of bogs in an ecological system to park users.

Guidelines:

1. Bog and bog associated communities should be protected from pollution, human disturbance and drainage manipulation; and
 2. An interpretative program should be initiated to provide the public with information about the major characteristics and importance of bogs.
4. Existing cottage areas

Cottage areas are not being subjected to natural successions and their presence does not contribute to the wilderness experience of the park visitor. In addition, many of the areas where cottages exist (Long Lake, for example) are under an over-mature forest which presents hazards to users. Nopiming Park waterbodies are, for the most part, shallow eutrophic lakes which cannot tolerate large quantities of human waste materials.

If cottage development is to continue in the park, stringent pollution standards must be implemented.

Objectives for management of existing cottage areas:

1. To ensure that developments such as cottage sites do not detract from the wilderness nature of Nopiming Provincial Park;

2. To phase out permanent recreational buildings in the park including cottages; and

3. To ensure that the natural processes of succession are allowed in all areas of the park and that pollution from human sources be kept at a minimum.

Guidelines:

1. The formulation of a policy statement by Manitoba Division of Parks which prohibits new cottage development or erection of permanent recreational buildings in Nopiming Provincial Park;

2. The amendment of the Order-in-Council establishing this park to include this policy statement;

3. No new licenses should be issued;

4. Cottage sites now in existence be phased out by prohibition of sale or the passing on by will; and

5. Rigorous pollution standards be implemented to protect the existing cottage area environments.

5. Moose and deer habitat areas

Moose and deer are found throughout the park, concentrated in areas of regeneration forest, trembling aspen dominated forests, meadows and extensive willow areas. In the case

of deer, some of the recent burns are important as are the road corridors and borrow pit areas. Moose are most commonly found along streams, rivers and lakes, and in burns with adequate cover which have substantial deciduous growth and in deciduous dominated forests. These areas represent less than 10% of the park and can be delineated by township from air photos. Consideration of management of these areas for the desired species must be made. The control of hunting may be necessary to prevent reducing ungulate populations to levels below natural numbers.

Objectives for management of moose and deer habitat areas:

1. To maintain viable populations of moose and deer in Nopiming Provincial Park;
2. To ensure that populations of these species are not reduced below natural levels through over-exploitation; and
3. To maintain habitat in a natural condition for use by moose and deer.

Guidelines:

1. Hunting within 200 meters of the roadway should be prohibited and the numbers of park hunters controlled;
2. No off-road vehicles be allowed in the park;
3. Natural succession and disturbances should be allowed to proceed throughout the park; and
4. Manipulation, closely mimicking nature, be employed when necessary to ensure that adequate, useful habitat exists for moose and deer.

6. Blocks of cover typical of the natural park

Due to recent fires and logging operations in Nopiming Provincial Park, certain native plant species and communities have been drastically reduced. These include forest cover dominated by white spruce, black spruce and associated climax species such as balsam fir. If logging is allowed to continue, there is danger that large representative stands of these cover types will be eliminated from the park. Stands will become restricted to protected sites such as islands, areas along roads, and areas around campgrounds. These protected sites are seldom large enough in size or stable enough to provide suitable habitat for all the wildlife species normally associated with these forest communities. Although this study favors the discontinuation of block cutting in the park, this practice is not likely to end soon. Representative large stands of native spruce forests in various stages of succession should be protected from logging and human disturbance to prevent the loss of these communities in large enough continuous blocks to provide habitats for all the species normally associated with them.

Objectives for the management of blocks of cover typical of the natural park:

1. To ensure that the habitats natural to Nopiming Provincial Park are maintained in large enough blocks to provide habitats for their associated plant and animal species.
2. To ensure that seed sources and population centers exist to provide Nopiming Provincial Park with a continuing abundance of vegetative and wildlife representing all the park's natural habitats.

Guidelines:

1. Sufficient areas (300 hectares) typical of forests dominated by white and black spruce be zoned for no logging to provide natural stands of these forest types in the park; and

2. Areas set aside for protection should be at various stages of succession and may be removed from protection when they no longer exemplify those features for which they were established.

3.6.2.2.3 Class III: Multi-Use Areas

Areas of Nopiming Park which can accommodate two or more types of use include interpretative trails, productive forest areas, campgrounds and active mines. Areas classified as such may be included in other zone classifications as natural succession occurs, and new information on the park's natural features is received. Most of Nopiming Provincial Park not delineated in the first two classifications belongs in this class. Even in these multiple use areas the underlying purpose of Nopiming Provincial Park is to maintain the wilderness condition and preserve the unique features for which it was given Natural Heritage Status. The rationale for the following objectives and guidelines has been presented in previous sections.

Objectives for management of areas of Nopiming Park which can accommodate two or more types of use:

1. To maintain Nopiming Provincial Park in as pristine a state as possible.

Guidelines:

1. Permanent buildings cannot be erected;

2. Natural succession should be allowed to progress unhampered;
3. Campgrounds and other developments should be moved when they are no longer in harmony with surrounding areas;
4. Numbers of people must be restricted in certain areas to prevent habitat degradation; and
5. Hunting and trapping must be regulated to prevent habitats and species from being reduced below levels naturally occurring in the park.

3.6.2.3 Recommendation 3: Use or exploitation of the park's flora and fauna should be regulated to ensure that natural species composition and numbers approach those of a natural state

Nopiming Provincial Park contains a number of wildlife species which exist only in wilderness areas. In addition, other species in the park are associated with the wilderness. With the improved road access into the area and the likelihood of more development, certain species are in danger of being extirpated from the park or having their numbers severely reduced. Species of concern not only include the endangered or restricted species, but also species which occur generally in the park. For example, populations of moose, deer, mink, fisher, lynx, otter and marten will likely be reduced unless human use is regulated. Many of these species have specific habitat preferences which can easily be detected from air photos. With the public use of these photos, better park access and better all-terrain equipment and the increased value of fur pelts, many species risk being depleted to numbers far below what is natural for the park. Species such as

lynx, fisher, otter and marten are particularly vulnerable when they are at a low in their cycles. Legal protection and strict enforcement of the game laws are required to prevent such declines.

Objectives for management of park users:

1. To maintain populations of all indigenous Nopiming Park species at levels typical of natural populations;
2. To prevent the destruction of indigenous Nopiming Park species from areas of the park most frequented by visitors; and
3. To provide for a quality experience in the park either of a consumptive or non-consumptive nature.

Guidelines:

1. Numbers of park hunters and areas hunted should be controlled;
2. Fur harvest should be regulated and an assurance given that only fur license holders for the area be allowed to take fur;
3. A closed season on such fur species as lynx, otter, fisher and marten when cyclic populations are low; and
4. The taking of Nopiming Park species should be based upon the existence of an adequate standing crop of animals capable of undergoing a reduction without severely hampering the species' potential for recovery.

3.6.2.4 Recommendation 4: An interpretative Program should be Developed with Minimum Disturbance to the Natural Quality of the Area

Any human activity allowed in a natural wilderness should exert as little influence as possible on the area. The easiest way to limit the effect of interpretative uses in Nopiming Provincial Park is to utilize the existing features found along the park's road system. An interpretative program has been developed in this study and is attached as Appendix G. Other interpretative experiences could include a trip into a bog where a boardwalk and controls on movement corridors would be provided. Wilderness canoe routes could be established which would allow visitors to personally observe the park's wilderness features. Users would require regulation to prevent over-use or pollution problems. A hiking trail paralleling the road could be established with primitive camping permitted. The wilderness features of Nopiming Park can be enjoyed today, and at the same time can be preserved for future generations.

Objectives for management of an interpretative program

1. To establish an interpretative trail using already existing roadways as reference points;
2. To protect the wilderness features of the park for today's users as well as future users; and
3. To establish a public awareness of the values and fragile nature of a truly wilderness area.

Guidelines:

1. The numbers of users and the area visited should be regulated and the effects be monitored;

2. Interpretative adventures into sensitive areas should be controlled and preparations be made in advance;

3. When natural communities show signs of deterioration due to use, the areas should be protected to give them time to recover;

4. Whenever possible, developments should be made in existing disturbed areas; and

5. Trips into the interior of Nopiming Provincial Park should include a carry-out of spent cans and other containers.

3.5.2.5 Recommendation 5: Development in the Park Should be in Harmony with the Natural Features of the Area.

The underlying goal of this recommendation is to maintain the natural appearance of the park. The temporary developments that are made can blend into the surroundings and be appropriate to the particular location. Nopiming Provincial Park was set aside because it contains unique features illustrating the natural heritage of this Province. Preservation of this unique, natural wilderness area is a major responsibility for park administrators.

Objectives for development in the park:

- 1. To ensure that developments in Nopiming Provincial Park are in harmony with the park's natural features;
- 2. To ensure that the usefulness and status of park developments be reviewed to determine if they are meeting the needs for which they were created; and
- 3. To ensure that the human use of park developments does not degrade the natural wilderness features within the park.

Guidelines:

1. Developments not be permanent and locations be periodically changed according to successional stages, and the effects of use on the natural quality of the developed site;
2. There should be no construction of unnatural features in the park such as dams, dykes, canals, drains, spoil piles, artificial meadows or man-made lakes;
3. Manipulations which are deemed necessary should imitate nature as closely as possible; and
4. Developments are to bring the public into the wilderness and the quality of that encounter should not decrease over time.

Conclusion drawn from Recommendations:

The result of the presentation of the Wildlife Habitat Recommendations and discussion of measures to reach the objectives for each recommendation is the delineation of land-use zones for Nopiming Provincial Park. These land-use zones reflect the tolerances of the natural vegetation and wildlife species to recreational use and present a guide to the areas most suitable for recreational development in the park. The major emphasis is on preservation of the wilderness for which the park was established.

CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The conclusions arising from this study of the floral and faunal resources of Nopiming Provincial Park follow:

1. Nopiming Provincial Park is endowed with a great diversity of plant and animal species, many of the latter being closely associated with a wilderness environment. In the summer of 1977, over 200 species of higher plants, 140 species of birds, 25 species of mammals, five species of amphibians and two reptile species were identified in the park. The species diversity can be attributed to the variety of habitats existing in the park and the area's extensive wilderness area. Nearly half of the park's surface was found to be covered by jack pine stands, while another 16% is overlain by water. Black spruce covers 15% of the area while bogs and rock outcrop cover another 10%. The above cover types were found to be relatively unproductive in species diversity or densities of plants and animals. Habitats comprising the remaining 9% contain the largest wildlife diversity in Nopiming Provincial Park. These habitats are those associated with deciduous regeneration growth, stream banks and riparian zones. To maintain the natural species diversity and density in the park, these habitats

require protection from human disturbance and should be subject to the processes of succession to the greatest degree possible.

Due to the size of the area and the scarcity of previous plant data, no plant species were considered rare or endangered in the park, although several species represent range extensions. Shrub communities dominated by mountain maple, or forests dominated by black ash will not likely re-establish if disturbed.

An outcome of the bird and mammal studies indicated that several species may be considered rare, vanishing or restricted. Species considered rare, vanishing or restricted include the bald eagle, osprey and woodland caribou. Typical species of wilderness areas include the loon, red-breasted merganser, sandhill crane, fisher, marten, lynx and otter.

2. Each of Nopiming Provincial Park's cover types support an associated fauna. A listing of the bird and small mammal species identified in the park's three major habitats is included in Appendix E. Bird species associated with many of the park's less common habitats are also illustrated in Appendix E. A listing in percent of the park's major cover types in each township is on Table 2 in Appendix C.

3. The following Wildlife Management Recommendations to maintain the diversity and abundance of wildlife species and their habitats in Nopiming Provincial Park were proposed:

1. Efforts should be undertaken to protect conditions which permit natural processes a maximum degree of freedom.
2. Sensitive habitats should be protected and wildlife species identified as restricted or vanishing should be given direct protection and their habitats maintained.
3. Use or exploitation of the park's flora and fauna should be regulated to ensure that species composition and numbers approach those of a natural state.
4. An interpretative program should be developed with minimum disturbance to the natural quality of the area.
5. Developments in the park should be in harmony with the natural features of the area.

4.2 Recommendations

1. That the land use zones of Nopiming Provincial Park, described in Chapter 3, which synthesize the floral and faunal concerns expressed in this document and which were developed from field observation, outside data and cover delineation, should be incorporated in future development plans for Nopiming Provincial Park.
2. That the wildlife management recommendations for Nopiming Provincial Park contained in this document be thoroughly examined prior to development of the park and adopted wherever over-riding concerns do not

prohibit such management. Over-riding concerns might include fire suppression or mining activities in the park.

These recommendations are general in nature and therefore could also be applied as a framework for consideration of any Natural Heritage Park's vegetation and wildlife resources during the planning stage.

3. An interpretative plan for Nopiming Provincial Park which incorporates this study's floral and faunal information and brochure, Appendix G, should be developed.
4. The background data on wildlife and plant populations collected for this study should serve as the basis for an on-going inventory program. In this program, inventory information on plant and animal populations would be added to the data base whenever it was obtained. The songbird and small mammal populations in the three major cover types should be monitored annually.
5. A vegetation analysis in the three plots outlined during this study should be conducted every five years. Information from these plots would be utilized in the formulation of management strategies of the park's floral and faunal resources. Future comparisons between wildlife populations in these plots and in similar

cover type areas where development has occurred will give an indication of the effect of recreational development upon the vegetation and wildlife resources.

4.3 Areas Identified during this Study as Requiring More Data

1. A determination of whether increased road access or human disturbance on lakes used by woodland caribou will be detrimental to the species. Detrimental factors include range alteration, predator accessibility and disturbance. A delineation of park caribou range as well as seasonal movements, food habits and mortality factors would be included.
2. The development of a monitoring program for raptors and colonial nesting birds to determine use areas and productivity in the park should be implemented. This program should include map locations and yearly outcomes of each nest or colony.
3. A program to monitor populations and prepare control guidelines for consumptive users of such wilderness species as the lynx, otter, fisher and marten should be undertaken. This monitoring should include numbers taken and tracks seen in the park. The information should be taken in context with the populations of these species occurring in other parts of Manitoba.
4. Park guidelines regarding erosion control, refuse disposal, building codes and lake use regulations are

needed. These should be based on the Natural Heritage Status of the park.

5. An inventory of fishes and a documentation of major spawning areas in the park would fill a wide information gap.
6. The development of a park bear management plan to minimize bear-people conflict is necessary.
7. A review of present timber cutting practices and protection zones should determine if timber operations are compatible with Natural Heritage Parks and if protection forests are needed.
8. The determination of the effects of hunting and trapping in the park and the development of a management policy should be undertaken.
9. The data from the natural vegetation and wildlife resources of Nopiming Provincial Park presented in this document should be used to identify site types for recreation facilities by a landscape architect.
10. That a loon monitoring program be established and measures taken to assure that disturbance of loon nest sites be kept to a minimum.
11. Two large (300 hectare plus) continuous blocks of homogeneous mature spruce forest be protected from logging or park development to provide ample habitat for wildlife species dependent upon large blocks of this forest type.

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Appendix A: The Provincial Park Lands Act

CHAPTER P 20

THE PROVINCIAL PARK LANDS ACT.

(Assented to July 11, 1972)

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of Manitoba, enacts as follows:

Definitions.

1 In this Act

- (a) "minister" means the member of the Executive Council charged by the Lieutenant Governor in Council with the administration of this Act;
- (b) "officer" includes
 - (i) the minister, the deputy to the minister, the assistant to the deputy to the minister,
 - (ii) any person designated by the minister as an officer, whether or not he is employed under the minister in the administration of provincial park lands;
- (c) "provincial park lands" means lands designated as provincial park lands under this Act.

S.M. 1972, c. 67, s. 1.

System of provincial park lands.

2 (1) The government shall establish, develop and maintain a system of provincial park lands.

Dedication of provincial park lands.

2 (2) Provincial park lands are dedicated to the people of Manitoba and visitors to Manitoba, and may be used by them for healthful enjoyment, and for the cultural, educational and social benefits that may be derived therefrom.

Development of provincial park lands.

2 (3) Provincial park lands shall be developed and maintained

- (a) for the conservation and management of flora and fauna therein;
- (b) for the preservation of specified areas and objects therein that are of geological, cultural, ecological or other scientific interest; and
- (c) to facilitate the use and enjoyment of outdoor recreation therein.

S.M. 1972, c. 67, s. 2.

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Administration of provincial park lands.

3 The minister is responsible for the administration, planning, development and maintenance of provincial park lands.

S.M. 1972, c. 67, s. 3.

Disposal restricted.

4 (1) Provincial park lands shall not be sold or, except as herein otherwise provided, be disposed of in any other way.

Permanent occupation restricted.

4 (2) No person shall take up or attempt to take up his chief place of residence in provincial park lands

(a) except staff employed under the minister in the development, maintenance or supervision of provincial park lands; or

(b) unless the minister has, in writing, given specific permission to the person to take up his chief place of residence therein.

S.M. 1972, c. 67, s. 4.

Designation of provincial park lands.

5 (1) Subject to The Crown Lands Act, the Lieutenant Governor in Council may, by regulation, designate land as provincial park lands.

Name and type of areas.

5 (2) In designating any land as provincial park lands, the Lieutenant Governor in Council, by regulation, shall give to the designated area a name by which it shall be known and shall specify, in accordance with types described in the regulations, the type of provincial park lands that the designated area is to be.

S.M. 1972, c. 67, s. 5.

Withdrawal from municipalities, etc.

6 The Lieutenant Governor in Council may, by regulation, withdraw provincial park lands from any municipality, local government district, school division, school district, or other local government area.

S.M. 1972, c. 67, s. 6.

Acquisition of land for provincial park lands.

7 The minister may, in accordance with The Land Acquisition Act and with the approval of the Lieutenant Governor in Council, acquire land for provincial park lands by purchase, lease, exchange, expropriation or otherwise.

S.M. 1972, c. 67, s. 7.

Application of Act.

8 This Act and the regulations apply to

(a) all private land within provincial park lands;

(b) all highways as defined in The Highway Traffic Act within provincial park lands excepting Provincial Trunk Highways and Provincial Roads:
and

(c) every right-of-way of a public utility, as defined in The Public Utilities Board Act, that is within provincial park lands.

S.M. 1972, c. 67, s. 8.

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Change in land use.

9 Except in accordance with a development plan or planning scheme of the area within which the land is situated, no owner or occupant of land within provincial park lands shall without the written consent of the minister alter the use of the land as it existed up to the coming into force of this Act.

S.M. 1972, c. 67, s. 9.

Powers of officers.

- 10 (1) For the purpose of administering this Act, an officer may
- (a) enter upon and inspect any land, road, structure or work in or on provincial park lands;
 - (b) order the repair, alteration, improvement, evacuation, or removal of or addition to any structure or work in provincial park lands;
 - (c) order any person in any provincial park lands to cease or refrain from any action, omission, or conduct that is dangerous to life or property or detrimental to the public interest; and
 - (d) require any person in provincial park lands to inform the officer of
 - (i) the name, address and occupation of the person, and
 - (ii) any fact or intention relating to the use by the person of the provincial park lands.

Seizure.

10 (2) An officer may seize any motor, vehicle, aircraft, boat, skiff, canoe, punt, or vessel, or any equipment, appliance, or other article or object that is used in provincial park lands in contravention of this Act or the regulations, or in contravention of any other Act of the Legislature or the regulations made thereunder whether it is found in the possession of the person alleged to have committed the contravention or not.

Eviction of persons from provincial park lands.

- 10 (3) An officer may remove and evict from provincial park lands
- (a) any person making an unauthorized use of the provincial park lands; or
 - (b) any person failing to comply with any provision of this Act or the regulations; or
 - (c) any person creating a nuisance or disturbance or committing a trespass.

S.M. 1972, c. 67, s. 10.

Leases, permits, etc.

11 (1) The minister may issue or grant permits, leases, licences or authorizations respecting the use or occupation of provincial park lands in accordance with the regulations and subject to such conditions not inconsistent with this Act or the regulations as he may prescribe.

Conditions and restrictions on use of natural resources.

11 (2) The minister may prescribe conditions and restrictions in respect of the use or removal of the resources within provincial park lands that are in addition to the provisions of The Forest Act, The Wildlife Act, and The Mines Act, and those Acts, and the provisions thereof, are subject to the conditions and restrictions prescribed by the minister under this section.

S.M. 1972, c. 67, s. 11.

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Regulations by Lieutenant Governor in Council.

12 (1) For the purpose of carrying out the provisions of this Act according to their intent, the Lieutenant Governor in Council may make such regulations as are ancillary thereto and are not inconsistent therewith; and every regulation made under, and in accordance with the authority granted by, this section has the force of law; and, without restricting the generality of the foregoing, the Lieutenant Governor in Council may make such regulations, not inconsistent with any other provisions of this Act,

- (a) designating land as provincial park lands, giving to an area so designated a name by which it shall be known, and specifying the type of provincial park lands that the area so designated is to be;
- (b) describing various types of provincial park lands, including, without limiting the generality of the foregoing,
 - (i) provincial natural parks,
 - (ii) provincial wilderness parks,
 - (iii) provincial recreation parks,
 - (iv) provincial recreational trailways,
 - (v) provincial parkways,
 - (vi) provincial recreational waterways,
 - (vii) provincial heritage parks,
 - (viii) wayside parks,
 - (ix) marine parks,
 - (x) access sites,
 - (xi) information centres, and
 - (xii) seasonal dwelling areas;
- (c) respecting the preservation, protection, care, management, control, improvement, and maintenance of provincial park lands, including public works and private properties within provincial park lands;
- (d) respecting the use and occupancy of lands and the use and removal of resources within provincial park lands and the issuing of permits, licences, certificates, or authorizations permitting entry to, and remaining within, provincial park lands;
- (e) respecting the exploration, excavation, and searching of land within provincial park lands for the purpose of obtaining fossil remains, or other objects of geological, archaeological, historical or scientific interest and the issuing of permits, licences, certificates or authorizations with respect thereto;
- (f) respecting the leasing or rental of lands or buildings, or both, within provincial park lands for private or commercial purposes and prescribing terms and conditions with respect thereto;
- (g) respecting the development of all or any lands in provincial park lands and the use to which such land shall be put, including, without limiting the generality of the foregoing, the establishment of development plans, planning schemes, and building regulations;
- (h) prescribing standards and specifications of buildings and other structures erected on provincial park lands;
- (i) respecting the operation of stores, camps, and commercial ventures operated for gainful purposes within provincial park lands, including itinerant business persons and delivery services within provincial park lands;

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- (j) respecting the fees and rentals payable in respect of permits, leases, licences, certificates, authorizations, and rentals in respect of land or buildings within, or entry to, or remaining within, provincial park lands, including, without limiting the generality of the foregoing, the fixing of any fee or rental at a percentage of gross receipts, or at a land rental, or at a recovery for services or development costs incurred, and the making of assessments or special levies, or any combination thereof;
- (k) respecting the use of provincial park lands for purposes other than those mentioned in subsection (3) of section 2;
- (l) restricting or prohibiting any act or thing within provincial park lands, or relating to the administration of provincial park lands.

Regulations by minister.

12 (2) In addition to the regulations made under subsection (1), the minister, in the administration of this Act, may make regulations that are not inconsistent with this Act or the regulations made under subsection (1), and every regulation made under, and in accordance with the authority granted by, this section has the force of law; and, without restricting the generality of the foregoing, the minister may make regulations, not inconsistent with any other provision of this Act or the regulations made under subsection (1),

- (a) respecting the public safety and the preservation of order in, and the conduct of persons residing in, or making use of, provincial park lands;
- (b) respecting health and sanitation within provincial park lands, and pollution thereof by dust, litter, garbage, human or mechanical waste, or other offensive or injurious substances or material, abandoned or discarded objects, or noise;
- (c) respecting the use, setting out, extinguishing and protection from fires in provincial park lands;
- (d) respecting the use, erection, posting or other display of notices, signs, sign-boards and other advertising devices in provincial park lands;
- (e) respecting the licensing, regulating, restricting, or controlling the use of any area within provincial park lands by pedestrians or operators of automobiles, trucks, trailers, tractor-trailer units, houseboats, vessels, motorboats, over-the-snow vehicles, canoes, sailboats, aircraft, hydroplanes, hovercraft, all-terrain vehicles or other conveyances and of mobile equipment attached thereto;
- (f) respecting the preservation, management, control, or improvement of all things of value within provincial park lands, whether animal, vegetable or mineral and whether natural or otherwise;
- (g) respecting the maximum periods of stay of persons, vehicles, boats, vessels, trailers, campers, aircraft, over-the-snow vehicles, houseboats, canoes, sailboats, hydroplanes, hovercraft, all-terrain vehicles or other conveyances and any equipment thereof during which any provincial park lands or a specified portion thereof may be used for any specified purpose;
- (h) respecting the use of public facilities within provincial park lands including parking areas, camping sites, trailer sites, picnic sites, winter sports facilities, interpretive centers, museums, visitor centers, comfort facilities, shelters, roads and trails, and all others;

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- (i) respecting public beaches, shoreline, swimming, boating and other uses of water within provincial park lands;
- (j) respecting the imposition of restrictions respecting the speed of vehicles and other matters relating to vehicles within provincial park lands other than on Provincial Trunk Highways and Provincial Roads;
- (k) respecting the prohibiting, regulating, and controlling the keeping of, or use of horses, dogs, cats and other animals in provincial park lands and for licensing or permitting persons keeping or using horses, dogs, cats or other animals in provincial park lands;
- (l) respecting the use, control and regulation of firearms, explosives or other weapons and for the licensing or permitting of persons in possession of firearms, explosives, or other weapons in provincial park lands;
- (m) respecting the zoning of any portions of provincial park lands in order to regulate or confine the various uses of land, resources and water therein;
- (n) if there is no express provision to the contrary herein, authorizing the doing of such acts, matters and things relating to the administration of any provincial park lands as may be deemed essential and desirable.

Application of regulations.

12 (3) Any regulation made under this section may be made to apply to all provincial park lands, or to any specified provincial park lands, or to any specified type of provincial park lands as described in the regulations.

S.M. 1972, c. 67, s. 12.

Rules by park officer.

13 The senior resident officer in charge of any provincial park lands, or the officer designated by the minister as being in charge of any provincial park lands, may make rules not inconsistent with any provision of this Act or any provision of regulations made under section 12, prohibiting or restricting any act, matter or activity within the provincial park lands of which he is in charge; and, if notice of the rule is conspicuously posted in areas intended to be affected by the rule, it has the force of law notwithstanding that it is not filed under The Regulations Act; but no such rule shall remain in force for a period of more than one month.

S.M. 1972, c. 67, s. 13.

Offence.

14 Every person who contravenes, or fails to comply with, any provision of this Act or of the regulations, or any order or direction of an officer given pursuant to this Act, or any rule made in compliance with section 13, is guilty of an offence and liable, on summary conviction, to a fine of not more than two hundred dollars, or to imprisonment for not more than thirty days, or to both such fine and such imprisonment.

S.M. 1972, c. 67, s. 14.

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Place in continuing consolidation.

15 This Act is enacted in substitution for The Provincial Parks Act, being chapter P20 of the Revised Statutes, and may be referred to as chapter P20 of the continuing consolidation of the Statutes of Manitoba.

S.M. 1972, c. 67, s. 15.

Repeal.

16 The Provincial Parks Act, being chapter P20 of the Revised Statutes, is repealed.

S.M. 1972, c. 67, s. 16.

Commencement of Act.

17 This Act comes into force on the day it receives the royal assent.

S.M. 1972, c. 67, s. 17.

APPENDIX B

STUDY METHODS FOR INVENTORY AND ANALYSIS OF
NOPIPING PARK PLANTS AND ANIMALS

B.1 Vegetation

B.1.1 Major Cover Types, Location and Selection Methods

Copies of the forest inventory classification maps and air photos were obtained for the park. From these, it was determined which cover types were largest and where examples of each was located. Several large accessible blocks of each of the three major cover types were delineated on a park map and field checked for size and homogeneity of stand. Large, accessible, homogeneous stands, typical of the three largest cover types were chosen to represent the three major cover types throughout the park (Figure 2). The trembling aspen stand chosen occurs just northwest of the park due to a scarcity of large, accessible homogeneous trembling aspen stands in the park.

B.1.2 Vegetation Inventory Methods

Scientific and common names for plants in this study are according to Scoggan (1957). Common names not listed in Scoggan are from Gray's Manual of botany (Fernald, 1950)

Field reconnaissance trips were made into various park habitats to record plant species. For each recorded species a specimen was pressed and recorded as to location, surrounding vegetation and first and last blooming date when applicable. All specimens were eventually donated to the Manitoba Museum of Man and Nature.¹

¹ A list of plant species in alphabetical order by common name including blooming dates when applicable is in Appendix D.

B.1.3 Specific Site Cover Type Analysis Methods

A quantitative method of vegetation analysis following James and Shugart (1970) was implemented in the jack pine, trembling aspen and black spruce bog cover types.

Sampling plots within each major cover type consisted of one-tenth acre square quadrats (20m. X 20m.) constructed with a measured rope and silva compass for the analysis of trees, shrubs and ground cover. The field data necessary for the derivation of quantitative estimates of the population, size and structure of the tree stratum of each region were the species, number and diameter at breast height (dbh) of each tree in the sample plots taken in that region. These data were collected by enumeration. In this procedure, trees, defined as woody stems equal to or greater than 7.62 centimeters in diameter at breast height (1.3 meters above ground) in the sample plot, were counted and identified by species as well as measured for diameter at breast height. The basal area of each tree was calculated from the dbh measurement. The locations of sample plots were chosen systematically in an attempt to achieve an even spacing of plots throughout the stand. A total of 25 sample plots were taken in each of the three forest cover types. The plot location in the park for jack pine, trembling aspen and black spruce bog are identified on Figure 2.

The data obtained from the areal sampling method described above was summarized by the calculation of dominance,

density and frequency for each species. The relative values for dominance, density and frequency were calculated and then summed into a single Importance Value which reflects these different measures of the importance of species in a community. These vegetational measurements were calculated from the following formulas:

$$\text{density} = \frac{\text{number of individuals}}{\text{area sampled}}$$

$$\text{relative density} = \frac{\text{density for a species} \times 100}{\text{total density for all species}}$$

$$\text{basal area} = \frac{\text{diameter at breast height}^2}{2}$$

$$\text{dominance} = \frac{\text{total basal area}}{\text{area sampled}}$$

$$\text{relative dominance} = \frac{\text{dominance for a species} \times 100}{\text{total dominance for all species}}$$

$$\text{frequency} = \frac{\text{number of plots in which a species occurred}}{\text{total number of plots sampled}}$$

$$\text{relative frequency} = \frac{\text{frequency values for a species} \times 100}{\text{total of frequency value for all species}}$$

$$\text{importance value} = \text{relative density} + \text{relative dominance} + \text{relative frequency}$$

To analyze shrubs, two, one-meter-wide transects were made across each of the 25 sub sample plots in each cover type. The number and species of woody stems less than 7.62 cm. in diameter intercepted at breast height (1.3 meters) were counted and recorded. The total number of shrub stems of each species counted in the two transects of each subplot were used to calculate the shrub stems per hectare, the relative density and the

relative frequency for each shrub species in each cover type. The relative density and the relative frequency for each species was summed to arrive at the importance value for each shrub species.

Ground vegetation was determined by ocular tube reading (James and Shugart, 1970). This method entails sighting vertically downward through a tube and determining the portion of field covered by each plant species. Twenty-five ocular tube readings were taken in each subsample plot to determine the average cover and dominant ground cover species in each cover type.

B.2 Birds

B.2.1 Bird Inventory Methods

Bird species were recorded along with their habitats, when encountered in the park, throughout the study. Common and scientific names of birds follows the American Ornithologists' Union Check-list of North American Birds and 3rd. Supplement (A.O.U., 1957, 1973)¹ An effort was made to reach lesser park habitats to identify bird species utilizing these areas. From this information a list of probable breeding birds in many of Nopiming Park's cover types was established.² A flight was made in July to determine productivity of bald eagles, ospreys and colonial nesting birds in the park. The results of this survey are contained in Appendix E.

¹ A list of bird species identified in the park in 1977 is included in Appendix D.

² A list of probable breeding birds in selected Nopiming Park cover types is described in Appendix E.

B.2.2 Songbird Census Methods

The breeding bird censusing procedure suggested by Hall (1964) was followed for the bird census plots conducted in the jack pine, trembling aspen and black spruce cover types.

Parallel census lines were laid out in the three cover types prior to the birds' breeding season with the use of a silva compass and measured 50 meter rope. The resulting bird census plots are square grids, 16 hectares in area.

Consequent to the recorders familiarization with the songs of those species inhabiting the three study plots, breeding bird censusing was initiated. The survey trips were taken between 04:00 and 08:00 hours, C.D.T in each plot, between May 27 and June 30, 1977. The approximate locations of singing males for each trip (plotted on a field map) were transferred onto a separate map for each species. The combined results for the ten surveys then combined through a series of locations to form the census and illustrate the size, number and location of territories for each species. The results of the breeding bird censuses are given in Appendix E in the form accepted by American Birds (Cuthbert, 1979).

D.3 Mammals

D.3.1 Mammal Inventory Methods

Mammal species were recorded when observed, along with the habitat they were in, throughout the study. Scientific and common names in this report follow Burt and Grossenheider (1964).

A list of species was compiled for the park based upon field observation, trapping records, written reports and consultation with Dr. R.E. Wrigley of the Manitoba Museum of Man and Nature.¹ Park fur statistics for the years 1961-77 were tabulated as to species, composition and numbers according to traplines existing in Nopiming Park (Stardom, pers. comm.).²

B.3.2 Snap Trapping Locations and Methods

Small mammals were snap trapped according to the quadrat method described by Pruitt (1968) in the jack pine, trembling aspen and black spruce bog cover types (Figure 2). Traps were set out in a hectare grid in each cover type for three consecutive nights. In addition, line transects were set out in areas dominated by willow alder, black ash and mountain maple (Figure 2) for short periods of time to determine presence of species utilizing these areas.

B.4 Amphibian Inventory Methods

Amphibians were recorded, along with the habitat they were found in, when encountered during the study. Spring searches were made into likely areas to determine singing males. Species not recorded but expected were supplied by Dr. W. Preston (pers. comm.). Common and scientific names of amphibians follow Conant (1975).³

¹ A list of mammal species is contained in Appendix D.

² Trapping results 1961-1977 appear in Appendix E.

³ A list of amphibians known or expected in the park is in Appendix D.

B.5 Reptiles Inventory Methods

Reptiles were recorded along with locations when encountered in the park. A list was prepared including species sighted during the study and species expected in the park. Dr. K. Stewart (pers. comm.) provided information on species not recorded in this study.¹ Common and scientific names of reptiles follow Conant (1975).

B.6 Fish Inventory Methods

Fish species were not field identified during this study. Provincial reports dealing with game fish recorded in various park lakes is included in the Bibliography. Common and scientific names of fish including non-game fish expected, according to range maps, follow Scott and Crossman (1973).

¹ A list of reptiles known and expected to occur in the park is in Appendix D.

² A list of fish known and expected to occur in the park is included in Appendix D.

APPENDIX C

NOPIMING PROVINCIAL PARK
FOREST COVER AND FOREST POTENTIAL

Table 2 is an analysis of the cover existing in Nopiming Provincial Park as derived from forest inventory maps (Abitibi, 1970) (Manitoba, Forest Inventory, 1969). The park is broken down into townships. The information was synthesized from stands delineated on township maps. The table represents a compilation of the areas of each stand type by township compared to the total area of each township. An overall park average of each cover type has also been calculated.

Figure 4 illustrates the park's area showing limitations to forest growth as determined by the Canadian Forest Service. The classification for lands in the Nopiming Park area contains no class one, two or three areas. The lower the class, the better the productivity potential. Nopiming Park forest potential starts at class four, with moderate limitations and is comprised of mostly lands with severe limitations to forest growth.

Table 2. Cover in % of the 16 major townships in Nopiming Provincial Park.¹

<u>Twp.</u>	<u>Range</u>	<u>Water</u>	<u>Treed Muskeg</u>	<u>Treed Rock</u>	<u>Willow Alder</u>	<u>Protection Forest</u>	<u>Marsh Muskeg</u>	<u>Unclass- ified</u>	<u>Black Spruce Cl. 2</u>	<u>Black Spruce Cl. 3</u>	<u>Black Spruce 71%+ Cl. 4</u>	<u>White Spruce (40-70%) Cl. 4</u>
22-17	E.	11	7	2	4	0	1	0	1	2	0	0
22-16	E.	7	1	0	2	1	0	1	7	0	7	0
22-14	E.	33	1	1	3	1	2	1	1	0	2	0
21-17	E.	30	5	0	1	3	3	0	1	5	0	0
21-16	E.	8	10	4	2	1	4	0	1	10	2	0
20-17	E.	12	3	1	1	0	2	0	1	4	3	0
20-16	E.	23	7	6	1	1	3	0	2	5	1	0
20-15	E.	15	10	12	1	0	3	0	3	3	0	0
19-17	E.	11	7	2	3	0	1	0	0	6	1	0
19-16	E.	14	11	2	4	0	1	0	1	4	0	0
19-15	E.	8	17	4	2	0	1	0	1	3	1	0
18-17	E.	16	7	23	2	0	1	0	0	1	0	0
18-16	E.	8	5	0	3	2	4	1	8	0	3	7
18-15	E.	11	11	0	2	1	4	6	0	1	0	0
17-17	E.	16	2	1	8	1	0	1	0	1	3	0
17-16	E.	19	0	0	2	14	1	0	0	0	5	1
Average per Township		16	6.5	3.6	2.6	1.6	2	0.6	1.7	2.8	1.8	0.5

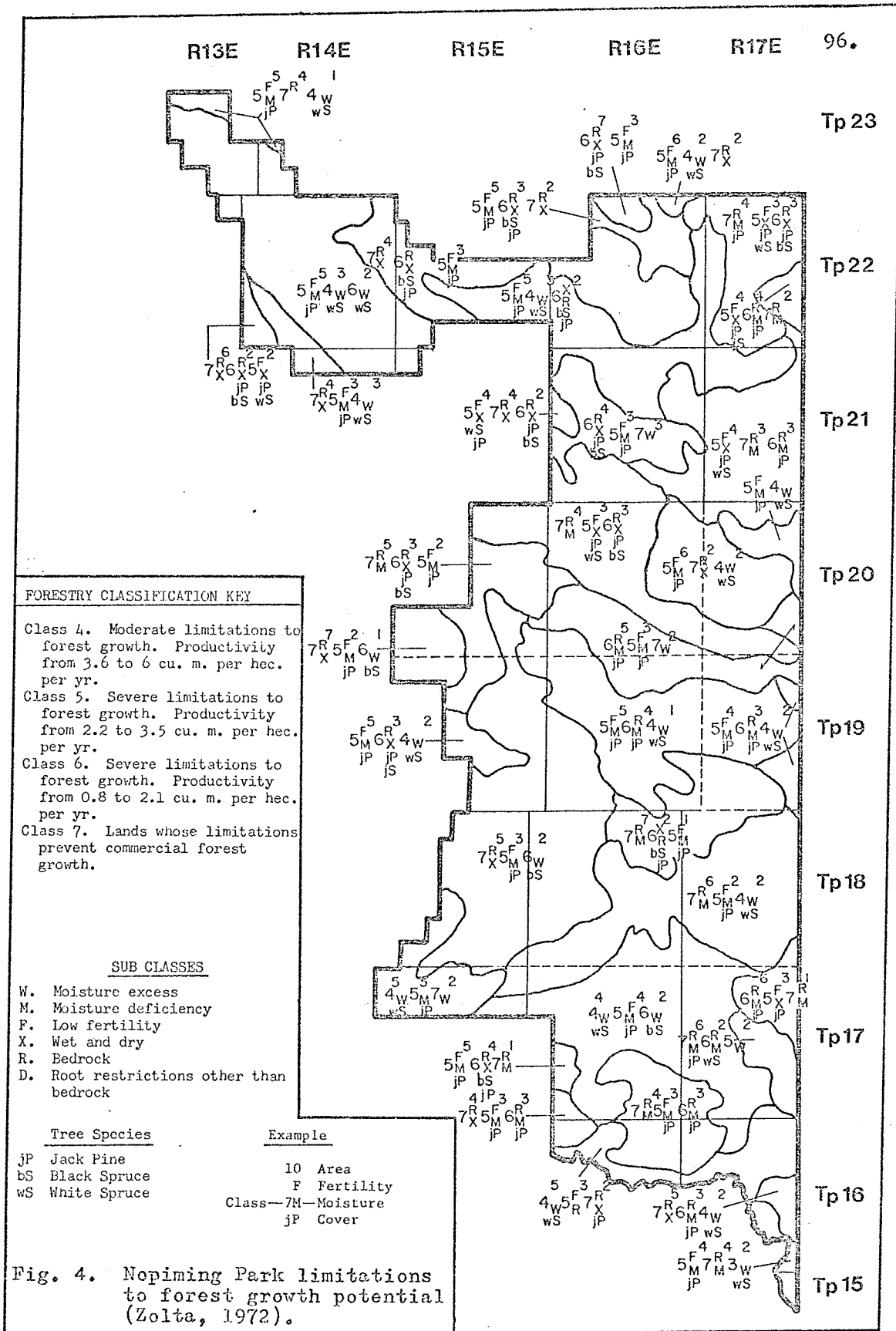
¹ Source: A Compilation of stand areas illustrated on township maps supplied by Abitibi (1970) and Manitoba Department of Mines, Natural Resources and Environment. 1969. Forest Inventory Maps.

Table 2 (Cont.)

<u>Twp.</u>	<u>Range</u>	Black spruce (40-70%)				Hardw. (51-100%)		Hardw. + Jack pine			Hardw. + Black spruce	
		<u>Cl. 2</u>	<u>Cl. 3</u>	<u>Cl. 4</u>	<u>Cl. 5</u>	<u>Cl. 3</u>	<u>Cl. 4</u>	<u>Cl. 2</u>	<u>Cl. 3</u>	<u>Cl. 4</u>	<u>Cl. 3</u>	<u>Cl. 4</u>
22-17	E.	0	1	1	0	0	0	0	0	0	3	2
22-16	E.	0	0	17	1	0	0	0	10	0	3	9
22-14	E.	0	8	7	0	0	0	3	2	3	2	8
21-17	E.	0	2	2	0	2	0	0	1	1	3	3
21-16	E.	0	3	2	5	0	0	0	2	1	0	3
20-17	E.	0	3	3	2	0	0	0	2	1	1	8
20-16	E.	0	4	3	0	0	0	0	1	0	0	1
20-15	E.	0	2	1	0	0	0	0	1	0	0	0
19-17	E.	1	1	1	0	0	0	0	1	0	1	0
19-16	E.	1	1	0	0	1	1	0	1	0	1	1
19-15	E.	0	1	3	0	0	1	0	0	1	0	0
18-17	E.	2	1	0	0	2	0	0	1	0	3	0
18-16	E.	1	2	5	0	0	0	1	0	0	0	3
18-15	E.	0	0	0	0	0	0	0	0	0	0	1
17-17	E.	0	8	6	0	0	1	0	0	0	1	12
17-16	E.	0	2	4	0	2	0	0	0	4	2	0
Average per Township		0.3	2.4	3.5	0.5	0.4	0.2	0.2	1.4	0.7	1.3	2.7

Table 2 (Cont.)

<u>Twp.</u>	<u>Range</u>	Jack pine (71-100%)					Jack pine (41-70%) with spruce					Jack pine (41-70%) no Spruce		
		<u>Cl. 0</u>	<u>Cl. 1</u>	<u>Cl. 2</u>	<u>Cl. 3</u>	<u>Cl. 4</u>	<u>Cl. 0</u>	<u>Cl. 2</u>	<u>Cl. 3</u>	<u>Cl. 4</u>	<u>Cl. 5</u>	<u>Cl. 2</u>	<u>Cl. 3</u>	<u>Cl. 4</u>
22-17	E.	0	0	16	6	10	2	12	5	12	0	0	0	0
22-16	E.	0	0	4	0	1	0	0	7	7	0	5	6	5
22-14	E.	0	0	2	0	0	0	0	1	1	0	2	7	9
21-17	E.	0	0	0	3	5	1	0	8	17	2	0	1	0
21-16	E.	0	0	0	7	1	0	1	25	2	4	0	2	0
20-17	E.	2	0	9	0	0	23	2	12	4	2	0	0	0
20-16	E.	0	0	3	4	2	2	4	22	4	0	0	1	0
20-15	E.	0	0	2	5	1	0	8	24	5	0	0	1	0
19-17	E.	2	8	16	6	0	0	8	22	0	0	2	0	0
19-16	E.	0	4	17	10	3	0	5	9	3	0	0	3	0
19-15	E.	0	0	2	26	3	0	1	13	4	0	0	3	0
18-17	E.	0	0	1	21	2	0	1	10	2	0	0	3	0
18-16	E.	0	0	1	1	0	0	1	9	2	1	23	10	3
18-15	E.	0	0	5	4	0	0	1	9	15	3	2	2	17
17-17	E.	0	0	0	5	2	0	1	14	5	3	1	6	9
17-16	E.	0	0	2	0	0	0	0	12	3	0	5	5	18
Average per Township		0.2	0.7	5	6	2	1.8	2.2	12.8	5.4	1	2.7	3.1	3.8



APPENDIX D

BIRD, PLANT, MAMMAL, AMPHIBIAN, REPTILE AND FISH
SPECIES LISTS

B.1 Birds identified in Nopiming Provincial Park from April 18,
to September 1, 1977.

Those marked with an * were verified as nesting.

Terms used: A = Abundant, C = Common, R = Rare

*Common Loon	<u>Gavia immer</u>	A
Red-necked Grebe	<u>Podiceps grisegena</u>	U
Horned Grebe	<u>Podiceps auritus</u>	R
Pied-billed Grebe	<u>Podilymbus podiceps</u>	U
Great Blue Heron	<u>Ardea herodias</u>	C
American Bittern	<u>Botaurus lentiginosus</u>	U
Canada Goose	<u>Branta canadensis</u>	U
*Mallard	<u>Anas platyrhynchos</u>	C
Green-winged Teal	<u>Anas crecca</u>	U
Blue-winged Teal	<u>Anas discors</u>	U
Wood Duck	<u>Aix sponsa</u>	U
Ring-necked Duck	<u>Aythya collaris</u>	A
*Common Goldeneye	<u>Bucephala clangula</u>	C
*Hooded Merganser	<u>Lophodytes cucullatus</u>	A
*Common Merganser	<u>Mergus merganser</u>	C
Turkey Vulture	<u>Cathartes aura</u>	C
Goshawk	<u>Accipiter gentilis</u>	R
Sharp-shinned Hawk	<u>Accipiter striatus</u>	U
Cooper's Hawk	<u>Accipiter cooperii</u>	R
Red-tailed Hawk	<u>Buteo jamaicensis</u>	U
Broad-winged Hawk	<u>Buteo platypterus</u>	A
*Bald Eagle	<u>Haliaeetus leucocephalus</u>	U

Appendix D.1 (Cont'd.)

Marsh Hawk	<u>Circus cyaneus</u>	U
Osprey	<u>Pandion haliaetus</u>	R
American Kestrel	<u>Falco sparverius</u>	C
*Spruce Grouse	<u>Canachites canadensis</u>	C
*Ruffed Grouse	<u>Bonasa umbellus</u>	C
Sharp-tailed Grouse	<u>Pedioecetes phasianellus</u>	R
Sandhill Crane	<u>Grus canadensis</u>	U
Sora	<u>Porzana carolina</u>	U
*Killdeer	<u>Charadrius vociferus</u>	C
American Woodcock	<u>Philohela minor</u>	R
*Common Snipe	<u>Capella gallinago</u>	C
*Spotted Sandpiper	<u>Actitis macularia</u>	C
Solitary Sandpiper	<u>Tringa solitaria</u>	A
Greater Yellowlegs	<u>Tringa melanoleuca</u>	U
Lesser Yellowlegs	<u>Tringa flavipes</u>	U
Pectoral Sandpiper	<u>Calidris melanotos</u>	R
Stilt Sandpiper	<u>Micropalama himantopus</u>	R
Semipalmated Sandpiper	<u>Calidris pusilla</u>	R
Buff-breasted Sandpiper	<u>Tryngites subruficollis</u>	R
Sanderling	<u>Calidris alba</u>	R
Herring Gull	<u>Larus argentatus</u>	C
Ring-billed Gull	<u>Larus delawarensis</u>	R
*Common Tern	<u>Sterna hirundo</u>	U
Black Tern	<u>Chlidonias niger</u>	U
Mourning Dove	<u>Zenaida macroura</u>	R

Appendix D.1 (Cont'd.)

Black-billed Cuckoo	<u>Coccyzus erythrophthalmus</u>	U
Great Horned Owl	<u>Bubo virginianus</u>	U
*Barred Owl	<u>Strix varia</u>	U
Common Nighthawk	<u>Chordeiles minor</u>	C
Ruby-throated Hummingbird	<u>Archilochus colubris</u>	U
Belted Kingfisher	<u>Megaceryle alcyon</u>	C
*Common Flicker	<u>Colaptes auratus</u>	A
Pileated Woodpecker	<u>Dryocopus pileatus</u>	C
Red-headed Woodpecker	<u>Melanerpes erythrocephalus</u>	R
Yellow-bellied Sapsucker	<u>Sphyrapicus varius</u>	U
*Hairy Woodpecker	<u>Picoides villosus</u>	C
*Downy Woodpecker	<u>Picoides pubescens</u>	C
*Black-backed Three-toed Woodpecker	<u>Picoides arcticus</u>	C
Eastern Kingbird	<u>Tyrannus tyrannus</u>	A
Great Crested Flycatcher	<u>Myiarchus crinitus</u>	U
*Eastern Phoebe	<u>Sayornis phoebe</u>	C
*Yellow-bellied Flycatcher	<u>Empidonax flaviventris</u>	C
*Alder Flycatcher	<u>Empidonax alnorum</u>	A
*Least Flycatcher	<u>Empidonax minimus</u>	A
*Eastern Wood Pewee	<u>Contopus virens</u>	U
Olive-sided Flycatcher	<u>Nuttallornis borealis</u>	C
*Tree Swallow	<u>Iridoprocne bicolor</u>	C
Bank Swallow	<u>Riparia riparia</u>	R
*Barn Swallow	<u>Hirundo rustica</u>	C
*Cliff Swallow	<u>Petrochelidon pyrrhonota</u>	C

Appendix D.1(Cont'd)

Purple Martin	<u>Progne subis</u>	R
Gray Jay	<u>Perisoreus canadensis</u>	A
Blue Jay	<u>Cyanocitta cristata</u>	C
*Common Raven	<u>Corvus corax</u>	A
*Common Crow	<u>Corvus brachyrhynchos</u>	C
Black-capped Chickadee	<u>Parus atricapillus</u>	C
Boreal Chickadee	<u>Parus hudsonicus</u>	U
Red-breasted Nuthatch	<u>Sitta canadensis</u>	C
Brown Creeper	<u>Certhia familiaris</u>	U
House Wren	<u>Troglodytes aedon</u>	U
Winter Wren	<u>Troglodytes troglodytes</u>	A
Short-billed Marsh Wren	<u>Cistothorus platensis</u>	U
Gray Catbird	<u>Dumetella carolinensis</u>	R
Brown Thrasher	<u>Toxostoma rufum</u>	R
*American Robin	<u>Turdus migratorius</u>	C
Wood Thrush	<u>Hylocichla mustelina</u>	R
*Hermit Thrush	<u>Catharus guttatus</u>	A
*Swainson's Thrush	<u>Catharus ustulatus</u>	A
*Veery	<u>Catharus fuscescens</u>	U
Golden-crowned Kinglet	<u>Regulus satrapa</u>	R
*Ruby-crowned Kinglet	<u>Regulus calendula</u>	C
*Cedar Waxwing	<u>Bombycilla cedrorum</u>	A
*Solitary Vireo	<u>Vireo solitarius</u>	U
*Red-eyed Vireo	<u>Vireo olivaceus</u>	A
*Philadelphia Vireo	<u>Vireo philadelphicus</u>	U

Appendix D.1 (Cont'd)

*Black-and-white Warbler	<u>Mniotila varia</u>	C
Tennessee Warbler	<u>Vermivora peregrina</u>	U
*Nashville Warbler	<u>Vermivora ruficapilla</u>	A
*Northern Parula	<u>Parula americana</u>	C
*Yellow Warbler	<u>Dendroica petechia</u>	C
*Magnolia Warbler	<u>Dendroica magnolia</u>	A
Cape May Warbler	<u>Dendroica tigrina</u>	U
*Yellow-rumped Warbler	<u>Dendroica coronata</u>	C
Black-throated Green Warbler	<u>Dendroica virens</u>	R
*Blackburnian Warbler	<u>Dendroica fusca</u>	A
*Chestnut-sided Warbler	<u>Dendroica pensylvanica</u>	A
Bay-breasted Warbler	<u>Dendroica castanea</u>	R
Blackpoll Warbler	<u>Dendroica striata</u>	R
*Palm Warbler	<u>Dendroica palmarum</u>	C
*Ovenbird	<u>Seiurus aurocapillus</u>	A
Northern Waterthrush	<u>Seiurus noveboracensis</u>	U
*Connecticut Warbler	<u>Oporornis agilis</u>	C
*Mourning Warbler	<u>Oporornis philadelphia</u>	A
Common Yellowthroat	<u>Geothlypis trichas</u>	C
Wilson's Warbler	<u>Wilsonia pusilla</u>	U
*Canada Warbler	<u>Wilsonia canadensis</u>	C
American Redstart	<u>Setophaga ruticilla</u>	U
Western Meadowlark	<u>Sturna neglecta</u>	R
*Red-winged Blackbird	<u>Agelaius phoeniceus</u>	C
Northern Oriole	<u>Icterus galbula</u>	U

Appendix D.1 (Cont'd.)

*Common Grackle	<u>Quiscalus quiscula</u>	C
*Brown-headed Cowbird	<u>Molothrus ater</u>	C
*Scarlet Tanager	<u>Piranga olivacea</u>	C
*Rose-breasted Grosbeak	<u>Pheucticus ludovicianus</u>	U
*Indigo Bunting	<u>Passerina cyanea</u>	U
Evening Grosbeak	<u>Hesperiphona vespertina</u>	C
*Purple Finch	<u>Carpodacus purpureus</u>	U
Pine Siskin	<u>Carduelis pinus</u>	A
American Goldfinch	<u>Carduelis tristis</u>	C
White-winged Crossbill	<u>Loxia leucoptera</u>	C
*Savannah Sparrow	<u>Passerculus sandwichensis</u>	C
*LeConte's Sparrow	<u>Ammospiza leconteii</u>	U
Dark-eyed Junco	<u>Junco hyemalis</u>	U
*Chipping Sparrow	<u>Spizella passerina</u>	A
Clay-colored Sparrow	<u>Spizella pallida</u>	U
*White-throated Sparrow	<u>Zonotrichia albicollis</u>	A
*Lincoln's Sparrow	<u>Melospiza lincolni</u>	U
Swamp Sparrow	<u>Melospiza georgiana</u>	C
*Song Sparrow	<u>Melospiza melodia</u>	C

APPENDIX D.2 Plant species identified in Nopiming Provincial
Park from April 18 to September 1, 1977.
Flowering dates are included where applicable.

Species	First bloom observed	Latest bloom observed
Green Alder <u>Anus crispa</u> (Ait) Pursh	-	-
Speckled Alder <u>Alnus rugosa</u> (Dur Roi) Spreng. var. <u>americana</u> (Regel) Fern.	-	-
Heart-leaved Alexanders <u>Zizia aptera</u> (Gray) Fern.	June 7	July 12
Alfalfa <u>Medicago sativa</u> L.	June 11	July 31
Alumroot <u>Heuchera richardsonii</u> R. Br.	June 4	July 6
Canada Anemone <u>Anemone canadensis</u> L.	May 31	July 13
Cut-leaved Anemone <u>Anemone multifida</u> Poir.	June 5	July 19
Arrowhead <u>Sagittaria cuneata</u> Sheldon	July 2	August 10
Jerusalem Artichoke <u>Helianthus tuberosus</u> L. var. <u>subcanescens</u> Gray	June 25	August 31
Water-Arum <u>Calla palustris</u> L.	May 29	June 21
Black Ash <u>Fraxinus nigra</u> Marsh.	-	-
Green Ash <u>Fraxinus pennsylvanica</u> Marsh. var. <u>austini</u> Fern.	-	-
Mountain Ash <u>Sorbus decora</u>	-	-
Aspen <u>Populus tremuloides</u> Michx.	-	-

Species	First bloom observed	Latest Bloom observed
Aster <u>Aster lateriflorus</u> (L.) Britt.	July 17	August 26
Flat-topped Aster <u>Aster umbellatus</u> Mill. var. <u>pubens</u> Gray	July 25	August 31
Lindley's Aster <u>Aster ciliolatus</u> Lindl.	July 17	August 31
Smooth Aster <u>Aster laevis</u> L.	June 22	August 26
Yellow Avens <u>Geum aleppicum</u> Jacq. var. <u>strictum</u> (Ait.) Fern	June 7	June 22
Baked-apple-berry <u>Rubus chamaemorus</u> L.	-	-
Red Baneberry <u>Actaea rubra</u> (Ait) Willd.	May 15	June 14
White Baneberry <u>Actaea rubra</u> var. <u>neglecta</u> (Gillman) Robins	May 17	June 12
Common Bearberry <u>Arctostaphylos uva-ursi</u> (L.) Spreng.	May 16	July 1
Northern Bedstraw <u>Galium septentrionale</u> R. & S.	May 31	July 15
Sweet-scented Bedstraw <u>Galium triflorum</u> Michx.	-	-
Wild Bergamont <u>Monarda fistulosa</u> L.	July 20	August 14
Dwarf Birch <u>Betula glandulosa</u> Michx.	-	-
White Birch <u>Betula papyrifera</u> Marsh.	-	-
Bishop's - cap <u>Mitella nuda</u> L.	-	-
Common Bladderwort <u>Utricularia vulgaris</u> L.	June 2	June 30

Species	First Bloom observed	Latest bloom observed
Blue Flag <u>Iris versicolor</u> L.	June 3	June 17
Low Sweet Blueberry <u>Vaccinium angustifolium</u> Ait.	June 3	July 4
Sour-top-Blueberry <u>Vaccinium myrtilloides</u> Michx.	June 3	July 12
Bog-Laurel <u>Kalmia polifolia</u> Wang	June 6	July 2
Bog-Rosemary <u>Andromeda glaucophylla</u> Link	June 6	July 5
Buckbean <u>Menyanthes trifoliata</u> L.	June 3	June 24
Alder-leaved Buckthorn <u>Rhamnus alnifolia</u> L'Her.	-	-
Northern Bugleweed <u>Lycopus uniflorus</u> Michx.	June 22	August 12
Soft-stem Bulrush <u>Scirpus validus</u> Vahl	-	-
Bunchberry <u>Cornus canadensis</u> L.	June 1	June 22
Bur-reed <u>Sparganium eurycarpum</u> Engelm	-	-
Smooth-leaved Buttercup <u>Ranunculus abortivus</u> var. <u>acrolisus</u>	May 25	June 15
Common Cat-tail <u>Typha latifolia</u> L.	-	-
Night-flowering Catchfly <u>Silene noctiflora</u> L.	July 22	August 12
Ground-Cedar <u>Lycopodium complanatum</u> L.	-	-
Pin Cherry <u>Prunus pensylvanica</u> L. f.	-	-
Chokecherry <u>Prunus virginiana</u> L.	-	-

Species	First bloom observed	Latest bloom observed
Rough Cinquefoil <u>Potentilla norvegica</u> L.	June 3	June 21
Tall Cinquefoil <u>Potentilla arcuta</u> Pursh	June 6	June 17
Three-toothed Cinquefoil <u>Potentilla tridentata</u> Ait.	June 5	June 24
Alsike Clover <u>Trifolium hybridum</u> L.	June 28	July 31
Red Clover <u>Trifolium pratense</u> L.	June 21	July 26
White Clover <u>Trifolium repens</u> L.	July 2	July 20
Arrow-leaved Coltsfoot <u>Petasites sagittatus</u> (Pursh) Gray	May 15	June 12
Palmate-leaved Coltsfoot <u>Petasites palmatus</u> (Ait.) Gray	-	-
Vine-leaved Coltsfoot <u>Petasites vitifolius</u> Greene	-	-
Wild Columbine <u>Aquilegia canadensis</u> L.	June 5	June 17
Pale Comandra <u>Comandra pallida</u> A. DC.	June 5	July 15
Pale Corydalis <u>Corydalis sempervirens</u> (L.) Pers.	May 31	July 28
Golden Corydalis <u>Corydalis aurea</u> Willd.	June 3	July 20
Cotton-grass <u>Eriophorum angustifolium</u> Honcheny	-	-
Highbush Cranberry <u>Viburnum trilobum</u> Marsh.	-	-
Lowbush Cranberry <u>Viburnum edule</u> (Michx.) Raf.	-	-

Species	First bloom observed	Latest bloom observed
Rock Cranberry <u>Vaccinium vitis-idaea</u> L. var. minus	-	-
Small Cranberry <u>Oxycoccus quadripetalus</u> Gilib	-	-
Bicknell's Cranesbill <u>Geranium bicknellii</u> Britt.	July 15	August 20
Creeping Savin <u>Juniperus horizontalis</u> Moench	-	-
White Water-Crowfoot <u>Ranunculus aquatilis</u> L. var. <u>capillaceus</u> (Thuill.) DC.	June 12	July 21
Wild Black Currant <u>Ribes americanum</u> Mill.	-	-
Red Currant <u>Ribes triste</u> Pall.	-	-
Common Dandelion <u>Taraxacum officinale</u> Weber	May 20	August 31
Dewberry <u>Rubus pubescens</u> Raf.	June 1	July 7
Spreading Dogbane <u>Apocynum androsacmifolium</u> L.	June 1	July 31
Red Osier Dogwood <u>Cornus stolonifera</u> Michx.	-	-
Downy Arrow-wood <u>Viburnum rafinescuianum</u> Schultes.	-	-
Dragonhead <u>Moldavica parviflora</u> (Nutt.) Britt.	July 14	July 31
Lesser Duckweed <u>Lemna minor</u> L.	-	-
White Elm <u>Ulmus americana</u> L.	-	-
Bracken Fern <u>Pteridium aquilinum</u> (L.) Kuhn var. <u>latiusculum</u> (Desv.) Underw.	-	-

Species	First bloom observed	Latest bloom observed
Interrupted Fern <u>Osmunda claytoniana</u> L.	-	-
Lady Fern <u>Athyrium filix-femina</u> (L.) Roth var. <u>michauxii</u> (Spreng.) Farw.	-	-
Oak Fern <u>Dryopteris disjuncta</u> (Ladeb.) C.V. Mort	-	-
Rattlesnake-Fern <u>Botrychium virginianum</u> (L.) Sw	-	-
Rock-Polypody <u>Polypodium virginianum</u> L.	-	-
Rusty Wood Fern <u>Woodsia ilvensis</u> (L.) R. Br.	-	-
Spinulose Wood-Fern <u>Dryopteris spinulosa</u> (O.F. Muell.) Watt.	-	-
Balsam Fir <u>Abies balsamea</u> (L.) Mill.	-	-
Fireweed <u>Epilobium angustifolium</u> L.	June 11	August 18
Sweet Gale <u>Myrica gale</u> L.	-	-
Blue Giant Hyssop <u>Agastache foeniculum</u> (Pursh) Ktze.	July 15	August 28
Bog Goldenrod <u>Solidago purshii</u> Porter	August 11	August 31
Canada Goldenrod <u>Solidago canadensis</u> L.	July 18	August 31
Flat-topped Goldenrod <u>Solidago graminifolia</u> (L.) Salisb. var. <u>Major</u> (Michx.) Fern.	July 21	August 31
Low Goldenrod <u>Solidago missouriensis</u> Nutt.	June 30	August 25
Mountain Goldenrod <u>Solidago decumbens</u> Greene var. <u>oreophila</u> (Rydb.) Fern.	July 17	August 20

Species	First bloom observed	Latest bloom observed
Goldthread <u>Contis trifolia</u> (L.) Salisb. var. <u>groenlandica</u> (Oeder) Fassett	May 19	June 7
Northern Gooseberry <u>Ribes oxycanthoides</u> L.	-	-
Maple-leaved Goosefoot <u>Chenopodium hybridum</u> L. var. <u>gigantospermum</u> (Aellen) Rouleau	-	-
Grass-of-Parnassus <u>Parnassia multiseta</u> (Ladeb.) Fern	July 21	August 14
Common Hawkweed <u>Hieracium umbellatum</u> L.	July 15	August 10
Hawthorn <u>Crataegus chrysocarpa</u> Ashe	-	-
Beaked Hazelnut <u>Corylus cornuta</u> Marsh.	-	-
Bush-Honeysuckle <u>Diervilla lonicera</u> Mill.	June 4	July 25
Twinning Honeysuckle <u>Lonicera dioica</u> L. var. <u>glaucescens</u> (Rydb.) Butters	June 22	July 14
Harebell <u>Campanula rotundifolia</u> L.	May 31	August 31
Field-Horsetail <u>Equisetum arvense</u> L.	-	-
Wood-Horsetail <u>Equisetum sylvaticum</u> L.	-	-
Indian-pipe <u>Monotropa uniflora</u> L.	July 10	July 30
Joe-Pye-Weed <u>Eupatorium maculatum</u> L. var. <u>bruneri</u> (Gray) Breitung	July 15	August 10
Common Juniper <u>Juniperus communis</u> L.	-	-
Labrador-tea <u>Ledum groenlandicum</u> Oeder	June 6	July 7

Species	First bloom observed	Latest bloom observed
Small Yellow Lady's-slipper <u>Cypripedium calceolus</u> L. var.	June 6	June 28
Stemless Lady's-slipper <u>Cypripedium acaule</u> Ait.	May 12	June 17
Leatherleaf <u>Chamaedaphne calyculata</u> (L.) Moench	June 6	July 7
Blue Lettuce <u>Lactuca pulchella</u> (Pursh.) DC.	June 28	July 22
White Lettuce <u>Prenanthes albus</u> L.	July 25	August 14
Bluebead-Lily <u>Clintonia borealis</u> (Ait.) Raf.	May 25	June 30
Small White Water Lily <u>Nymphaea tetragona</u> Georgi subsp. <u>leibergii</u> (Morong) Porsild	June 7	July 18
Wild Lily <u>Lilium philadelphicum</u> L.	May 29	July 6
Wild Lily-of-the-Valley <u>Maianthemum canadense</u> Desf.	May 20	June 17
Yellow Pond-lily <u>Nuphar variegatum</u> Engelm.	June 10	August 6
Fringed Loosestrife <u>Steironema ciliatum</u> (L.) Raf.	June 25	July 3
Tufted Loosestrife <u>Naumburgia thyrsoflora</u> (L.) Duby	June 5	June 19
Tall Lungwort <u>Mertensia paniculata</u> (Ait.) G. Don	June 2	June 23
Rose Mandarin <u>Streptopus roseus</u> Michx. var. <u>perspectus</u> Fassett	May 25	June 20
Marsh Five-finger <u>Potentilla palustris</u> (L.) Scop	--	--
Manitoba Maple <u>Acer negundo</u> L.	--	--
Mountain Maple <u>Acer spicatum</u> Lam.	--	--

Species	First bloom observed	Latest bloom observed
Marsh Marigold <u>Caltha palustris</u> L.	May 21	June 27
Purple Meadow-Rue <u>Thalictrum dasycarpum</u> Fisch. & Lall.	-	-
Veiny Meadow-Rue <u>Thalictrum venulosum</u> Trel.	-	-
Meadow-Sweet <u>Spiraea alba</u> Du Roi	June 2	August 9
Black Medick <u>Medicago lupulina</u> L.	-	-
White Melilot <u>Melilotus alba</u>	June 5	August 15
Yellow Melilot <u>Melilotus officinalis</u> (L.) Lam	June 8	August 15
Wild Mint <u>Mentha arvensis</u> L. var. <u>villosa</u> (Benth.) Stewart	July 8	August 20
Wild Morning-glory <u>Convolvulus sepium</u> L.	June 12	August 17
Stiff Club-moss <u>Lycopodium annotinum</u> L.	-	-
Nannyberry <u>Viburnum lentago</u> L.	-	-
Common Nettle <u>Urtica dioica</u> L. var. <u>procera</u> Wedd.	June 12	August 9
Hedge-Nettle <u>Stachys tenifolia</u> Willd. var. <u>hispidula</u> (Pursh) Fern.	June 12	August 14
Bur Oak <u>Quercus macrocarpa</u> Michx.	-	-
Wild Onion <u>Allium stellatum</u> Fraser	July 22	August 10
Leafy White Orchis <u>Habenaria dilatata</u> (Pursh) Hook.	August 12	August 30

Species	First bloom observed	Latest bloom observed
Water-parsnip <u>Sium sauve</u> Walt.	July 9	August 12
Cow-parsnip <u>Heracleum lanatum</u> Michx.	June 21	July 22
Wild Pea <u>Lathyrus venosus</u> Muhl. var. <u>intonsus</u>	June 1	July 12
Pearly Everlasting <u>Anaphalis margaritacea</u> (L.) C.B. Clarke	July 20	August 31
Phragmites <u>Phragmites communis</u> Trin. var. <u>berlandieri</u> (Fourn.) Fern	-	-
Ground-Pine <u>Lycopodium obscurum</u> L.	-	-
Jack Pine <u>Pinus banksiana</u> Lamb.	-	-
Prince's Pine <u>Chimaphila umbellata</u> (L.) Bart. var. <u>occidentalis</u> (Rydb.) Blake	June 12	July 1
Pineapple-weed <u>Matricaria matricarioides</u> (Less.) Porter	-	-
Pitcher-plant <u>Sarracenia purpurea</u> L.	June 15	July 3
Swamp Pink <u>Arethusa bulbosa</u> L.	June 2	July 5
Common Plantain <u>Plantago major</u> L.	-	-
Water Plantain <u>Alisma triviale</u> Pursh	July 4	August 13
Wild Plum <u>Prunus americana</u> Marsh.	-	-
Poison Ivy <u>Rhus radicans</u> L. var. <u>rydbergii</u> (Small)	-	-
Balsam-Poplar <u>Populus balsamifera</u> L.	-	-

Species	First bloom observed	Latest bloom observed
Yellow Evening-Primrose <u>Oenothera biennis</u> L.	June 23	August 17
Hoary Puccoon <u>Lithospermum canescens</u> (Michx.) Lehm.	May 21	June 20
One-sided Pyrola <u>Pyrola secunda</u> L.	June 16	June 30
One-flowered Pyrola <u>Moneses uniflora</u> (L.) Gray	June 9	June 23
Cut-leaved Ragwort <u>Senecio eremophilus</u> Richards.	July 15	August 31
Raspberry <u>Rubus idaeus</u> L. var. <u>strigosus</u> (Michx.) Maxim.	June 20	July 12
Prickly Rose <u>Rosa acicularis</u> Lindl.	June 9	July 14
Wood's Rose <u>Rosa woodsii</u> Lindl.	June 7	July 19
Bristly Sarsaparilla <u>Aralia hispida</u> Vent.	-	-
Wild Sarsaparilla <u>Aralia nudicaulis</u> L.	-	-
Saskatoon Serviceberry <u>Amelanchier alnifolia</u> Nutt.	-	-
Seaside Arrow-grass <u>Triglochin maritima</u> L.	-	-
Sedge <u>Carex intumescens</u> Rudge	-	-
Shinleaf <u>Pyrola elliptica</u> Nutt.	June 15	June 24
Silverweed <u>Potentilla anserina</u> L.	May 21	July 9
Common Skullcap <u>Scutellaria galericulata</u> L. var. <u>epilobiifolia</u> (Hamilt.) Jordal	July 10	July 25
Smartweed <u>Polygonum cilinode</u> Michx.	July 6	July 27

Species	First bloom observed	Latest bloom observed
Black Snakeroot <u>Sanicula marilandica</u> L.	-	-
Creeping Snowberry <u>Gaultheria hispidula</u> (L.) Bigel.	-	-
Soapberry <u>Shepherdia canadensis</u> (L.) Nutt.	-	-
False Solomon's-seal <u>Smilacina stellata</u> (L.) Desf.	May 20	June 25
Three-leaved Solomon's Seal <u>Smilacina trifolia</u> (L.) Desf.	May 11	June 18
Perennial Sow-thistle <u>Sonchus arvensis</u> var. <u>glabrescens</u> Guenth., Grab., & Wimm.	June 14	July 31
Black Spruce <u>Picea mariana</u> (Mill.) BSP.	-	-
White Spruce <u>Picea glauca</u> (Moench) Voss	-	-
Star-flower <u>Trientalis borealis</u> Raf.	June 3	June 27
Stick-tight <u>Bidens cernua</u> L.	June 1	August 28
Common Strawberry <u>Fragaria virginiana</u> Dushesne	June 7	June 18
Woodland Strawberry <u>Fragaria vesca</u> L. var. <u>americana</u> Porter	May 27	June 20
Sundew <u>Drosera</u> sp. (<u>intermedia</u> or <u>anglica</u>)	-	-
Sweetflag <u>Acorus calamus</u> L.	-	-
Tamarack <u>Larix laricina</u> (Du Roi) K. Koch	-	-
Thimbleweed <u>Anemone riparia</u> Fern.	June 14	July 4

Species	First bloom observed	Latest bloom observed
Canada Thistle <u>Cirsium arvense</u> (L.) Scop.	June 23	July 21
Spotted Touch-me-not <u>Impatiens capensis</u> Meerb.	July 9	August 30
Nodding Trillium <u>Trillium cernuum</u> L.	May 11	June 1
Twinflower <u>Linnaea borealis</u> L. var. <u>americana</u> (Forbes) Rehd.	June 4	June 25
American Vetch <u>Vicia americana</u> Muhl.	June 9	July 4
Pale Vetchling <u>Lathyrus ochroleucus</u> Hook.	June 7	June 10
Northern Bog Violet <u>Viola nephrophylla</u> Greene	May 21	July 7
Virginia Creeper <u>Parthenocissus inserta</u> (Kerner) K. Fritsch	-	-
Water-oats <u>Zizania aquatica</u> L. var. <u>interior</u> Fassett	-	-
Hoary Willow <u>Salix candida</u> Flugge	-	-
Northern Willow-herb <u>Epilobium glandulosum</u> Lehm. var. <u>adenocaulon</u> (Haussk.) Fern.	-	-
Wintergreen <u>Gaultheria procumbens</u> L.	-	-
Greenish-flowered Wintergreen <u>Pyrola virens</u> Schweigg.	June 14	July 1
Pink Wintergreen <u>Pyrola asarifolia</u> Michx.	June 7	July 10
Wolfberry <u>Symphoricarpos occidentalis</u> Hook.	-	-
Common Yarrow <u>Achillea millefolium</u> L.	June 10	August 20

Appendix D.3 List of Nopiming Park Mammals

Those species marked with an asterisk were observed during this study. Species marked with a double asterisk are of uncertain status.

* Masked Shrew	<u>Sorex cinereus</u>
American Water Shrew	<u>Sorex palustris</u>
* Arctic Shrew	<u>Sorex arcticus</u>
* Pygmy Shrew	<u>Microsorex hoyi</u>
* Short-tailed Shrew	<u>Blarina brevicauda</u>
Star-nosed Mole	<u>Condylura cristata</u>
* Little Brown Bat	<u>Myotis lucifugus</u>
Silver-haired Bat	<u>Lasionycteris noctivagans</u>
Big Brown Bat	<u>Eptesicus fuscus</u>
Red Bat	<u>Lasiurus borealis</u>
Hoary Bat	<u>Lasiurus cinereus</u>
* Man	<u>Homo sapiens</u>
* Snowshoe Hare	<u>Lepus americanus</u>
* Eastern Chipmunk	<u>Tamias striatus</u>
* Least Chipmunk	<u>Eutamias minimus</u>
* Woodchuck	<u>Marmota monax</u>
* American Red Squirrel	<u>Tamiasciurus hudsonicus</u>
* Northern Flying Squirrel	<u>Glaucomys sabrinus</u>
* American Beaver	<u>Castor canadensis</u>
* Deer Mouse	<u>Peromyscus maniculatus</u>
* Gapper's Red-backed Vole	<u>Clethrionomys gapperi</u>
Heather Vole	<u>Phenacomys intermedius</u>
* Meadow Vole	<u>Microtus pennsylvanicus</u>
* Muskrat	<u>Ondatra zibethicus</u>
**Southern Bog Lemming	<u>Synaptomys cooperi</u>
Northern Bog Lemming	<u>Synaptomys borealis</u>
* Meadow Jumping Mouse	<u>Zapus hudsonicus</u>

Appendix D.3 (Cont'd.)

**Woodland Jumping Mouse	<u>Napaeozapus insignis</u>
American Porcupine	<u>Erethizon dorsatum</u>
Coyote	<u>Canis latrans</u>
* Gray Wolf	<u>Canis lupus</u>
* Red Fox	<u>Vulpes vulpes</u>
* Black Bear	<u>Ursus americanus</u>
* Raccoon	<u>Procyon lotor</u>
Marten	<u>Martes americana</u>
Fisher	<u>Martes pennanti</u>
* Ermine	<u>Mustela erminea</u>
Least Weasel	<u>Mustela nivalis</u>
* American Mink	<u>Mustela vison</u>
Wolverine	<u>Gulo gulo</u>
* Striped Skunk	<u>Mephitis mephitis</u>
* River Otter	<u>Lontra canadensis</u>
Mountain Lion	<u>Felis concolor</u>
* Lynx	<u>Lynx lynx</u>
* White-tailed Deer	<u>Odocoileus virginianus</u>
* Moose	<u>Alces alces</u>
* Caribou	<u>Rangifer tarandus</u>

Appendix D.4 List of Nopiming Park Amphibians

Amphibians known or expected to occur within Nopiming Provincial Park.¹ Species identified during this study are marked by asterisks.

Mudpuppy	<u>Necturus maculosus</u>
Blue-spotted salamander	<u>Ambystoma laterale</u>
*American toad	<u>Bufo americanus</u>
*Northern spring peeper	<u>Hyla crucifer</u>
Eastern gray tree frog	<u>Hyla versicolor</u>
*Boreal chorus frog	<u>Pseudacris triseriata</u>
Green frog	<u>Rana clamitans</u>
Mink frog	<u>Rana septentrionalis</u>
*Wood frog	<u>Rana sylvatica</u>
*Leopard frog	<u>Rana pipiens</u>

1. Expected species were indicated by Dr. W. Preston, Museum of Man and Nature.

Appendix D.5 List of Nopiming Park Reptiles

Reptiles expected to occur in Nopiming Park.¹
Those species identified during this study are
marked by asterisks.

*Common snapping turtle	<u>Chelydra serpentina</u>
*Western painted turtle	<u>Chrysemys picta</u>
Northern red-bellied snake	<u>Storeria occipitomaculata</u>
*Red-sided garter snake	<u>Thamnophis sirtalis</u>

1. Expected species were indicated by Dr. K. Stewart, University of Manitoba.

Appendix D.6 List of Nopiming Park Fish

Species of fish known or expected to occur within Nopiming Provincial Park.¹ Those species marked with asterisks are of known occurrence.

Chestnut Lamprey	<u>Ichthyomyzon castaneus</u>
Silver Lamprey	<u>Ichthyomyzon unicupis</u>
Lake Sturgeon	<u>Acipenser fulvescens</u>
Rainbow Trout	<u>Salmo gairdneri</u>
*Lake Trout	<u>Salvelinus namaycush</u>
*Cisco	<u>Coregonus artedii</u>
*Lake Whitefish	<u>Coregonus clupeaformis</u>
Goldeye	<u>Hiodon alosoides</u>
Mooneye	<u>Hiodon tergisus</u>
Central Mudminnow	<u>Umbra limi</u>
*Northern Pike	<u>Esox lucius</u>
Muskellunge	<u>Esox masquinongy</u>
Northern Red-belly Dace	<u>Chrosomus eos</u>
Finescale Dace	<u>Chrosomus neogaeus</u>
Lake Chub	<u>Couesius plumbeus</u>
Carp	<u>Cyprinus carpio</u>
*Golden Shiner	<u>Notemigonus crysoleucas</u>
*Emerald Shiner	<u>Notropis atherinoides</u>
River Shiner	<u>Notropis blennioides</u>
*Common Shiner	<u>Notropis cornutus</u>
*Blacknose Shiner	<u>Notropis heterolepis</u>
*Spottail Shiner	<u>Notropis hudsonicus</u>
Rosyface Shiner	<u>Notropis rubellus</u>
*Sand Shiner	<u>Notropis stramineus</u>
Mimic Shiner	<u>Notropis volucellus</u>
Bluntnose Minnow	<u>Pimephales notatus</u>
Fathead Minnow	<u>Pimephales promelas</u>
Blacknose Dace	<u>Rhinichthys atratulus</u>

¹ Known occurrence from Provincial test net results (See Bibliography). Expected species have ranges which appear to overlap at least part of the Park.

Appendix D.6(Cont'd.)

*Longnose Dace	<u>Phinichthys cataractae</u>
Creek Chub	<u>Semotilus atromaculatus</u>
Pearl Dace	<u>Semotilus margarita</u>
Quillback	<u>Carpionodes cyprinus</u>
Longnose Sucker	<u>Catostomus catostomus</u>
*White Sucker	<u>Catostomus commersoni</u>
Silver Redhorse	<u>Moxostoma anisurum</u>
Shorthead Redhorse	<u>Moxostoma macrolepidotum</u>
Brown Bullhead	<u>Ictalurus nebulosus</u>
Channel Catfish	<u>Ictalurus punctatus</u>
Tadpole Madtom	<u>Noturus gyrinus</u>
*Burbot	<u>Lota lota</u>
Brook Stickleback	<u>Culaea inconstans</u>
*Threespine Stickleback	<u>Gasterosteus aculeatus</u>
*Ninespine Stickleback	<u>Pungitius pungitius</u>
Trout-Perch	<u>Percopsis omiscomayeus</u>
Rock Bass	<u>Ambloplites rupestris</u>
Pumpkinseed	<u>Lepomis gibbosus</u>
Smallmouth Bass	<u>Micropterus dolomieu</u>
Largemouth Bass	<u>Micropterus salmoides</u>
Black Crappie	<u>Pomoxis nigromaculatus</u>
*Yellow Perch	<u>Perca flavescens</u>
Sauger	<u>Stizostedion canadense</u>
*Walleye	<u>Stizostedion vitreum</u>
Iowa Darter	<u>Etheostoma exile</u>
*Johnny Darter	<u>Etheostoma nigrum</u>
*Logperch	<u>Percina caprodes</u>
Blackside Darter	<u>Percina maculata</u>
River Darter	<u>Percina shumardi</u>
Freshwater Drum	<u>Aplodinotus grunniens</u>
Mottled Sculpin	<u>Cottus bairdi</u>
Slimy Sculpin	<u>Cottus cognatus</u>
*Spoonhead Sculpin	<u>Cottus ricei</u>

APPENDIX E

RESULTS AND DISCUSSION
OF QUANTITATIVE PLANT AND ANIMAL ANALYSIS
IN NOPIMING PROVINCIAL PARKE.1 Quantitative Analysis of the Three Major Vegetation Cover
Types in Nopiming Provincial Park¹

E.1.1 Jack Pine

This forest cover comprises nearly 50% of Nopiming Provincial Park according to forest inventory data. The stand chosen for the analysis plot based upon personal observation, is considered representative of homogeneous mature jack pine forests found throughout the park. A vast majority of the tree stems are in diameter class A (7.6 to 15.2 cm.), indicating an even-aged stand most probably established shortly after the 1929 fire which burned extensive areas of southeastern Manitoba. The trees are straight and dense with little understory and few low branches. Table 3 illustrates the densities by size class, the basal area, dominance and relative density by species for trees in the stand. Trembling aspen was the only other species recorded in the tree class, representing less than two percent of the stems. The number of dead jack pine stems recorded illustrates the competition for sunlight within the stand.

Dense stands of jack pine in the Nopiming Park area typically contain minimal shrub zone development. In the chosen plot a total of 14 species were found in the shrub zone. The total number of stems per hectare of 2797 was only slightly

¹ Plot locations are illustrated in Figure 2.

Table 3. Density, importance and basal area of tree species in a jack pine stand ¹

Species	DENSITY				Basal Area (M ²)/hectare				
	# of trees in all circles by diameter size Class (cm)				Total	Trees/hectare by species	Relative density by species	Basal area by species	Dominance by species
	A	B	C	D					
	7.62 15.24	15.24 22.86	22.86 30.48	30.48 38.10					
Jack pine	1387	575	30		1992	2110	91	72.1	99
Dead Jack pine	191				191	205	9	5.0	0
Trembling aspen	2	1			3	2		0.1	1
Totals	1580	576	30		2186	2317	100	77.2	100
Trees/hectare by size class category	1698	619	32		2349				
Relative density by size class category	73	26	1		100				
Species	Basal area (M ²) cross section area of the trunk (dbh) by size Class								
	A	B	C	D					
	0.01	0.03	0.07	0.17					
	Jack pine	13.87	17.25	0.21					
Dead jack pine	1.91								
Trembling aspen	0.02	0.03							
Totals	15.80	17.28	0.21						
Relative basal area	6.40	7.0	0.10						

1. From a 1977 quantitative analysis in Nopiming Provincial Park.

larger than the number of tree stems per hectare in the plot. Table 4 indicates for each species the number of stems per hectare, the relative density in the stand and the frequency with which each species occurs. Green alder was by far the most abundant shrub; while blueberry was the most frequently encountered in the sub sample plots. The only tree species in the shrub zone was balsam fir suggesting that once the forest matures, it will be some time before young trees establish themselves.

TABLE 4 Shrub importance and densities in the 16 hectare jack pine plot.

Species	Stems per hectare	Relative Density (%)	Frequency Percent ¹
Green alder	1530	54.0	57
Canada blueberry	591	20.0	87
Bush honeysuckle	173	6.2	30
Saskatoon	118	4.9	22
Trembling aspen	74	3.0	13
Beaked hazelnut	64	2.3	4
Willow spp.	64	2.3	13
White spruce	64	2.3	17
Wild red raspberry	32	1.1	4
Chokecherry	22	1.1	4
Wood's rose	22	1.0	39
Labrador tea	22	1.0	9
Common juniper	11	0.4	4
Balsam fir	10	0.4	4
TOTAL	2797	100.0	

¹ Frequency is a measure of distribution throughout an area. The frequency represents the percent chance of recording a species in any one sub sample.

The ground surface was covered by a mat of mosses. On this base, 20 species of non-woody plants were recorded. Twinflower, bunchberry, wild strawberry and wild lily-of-the-valley were most common in order of abundance. All five species of wintergreen occurring in Manitoba were found in the plot. Prince's pine, a more easterly species whose western boundary is not established, was also present in the plot. More study is required to determine if prince's pine is present under other eastern Manitoba jack pine stands.

E.1.2 Trembling Aspen

This forest type dominates the cover of less than eight percent of Nopiming Park according to forest inventory data (Table 2). Trembling aspen is commonly found in other associations and rarely occurs as a large monoculture in the park. In the stand chosen, over two-thirds of the tree stems occurred in class A (7.62 to 15.24 diameter at breast height/dbh). Table 5 illustrates that although class C (22.86 to 30.48 dbh) contained only 11 percent of the stems, it produced a basal area nearly equal to the class A total. Although trembling aspen dominates the plot, six other tree species were recorded. The rolling topography with a clay soil base, some rock outcrop and a number of damp areas contributed to the species diversity.

A total of 24 species were recorded in the shrub zone of this plot. This diversity, plus the fact that shrub stems outnumbered tree stems by over 20 to one indicates the development of the plot's shrub zone. Beaked hazelnut was the most

Table 5. Density, importance and basal area of tree species in a trembling aspen stand.¹

Species	DENSITY				Basal Area (M ²)/hectare				
	# of trees in all circles by diameter size Class (cm)				Total	Trees/hectare by species	Relative density by species	Basal area by species	Dominance by species
	A	B	C	D					
	7.62	15.24	22.86	30.48					
	15.24	22.86	30.48	38.10					
Trembling aspen	550	175	122		847	951	75	47.2	83
Jack pine	144	24	1		169	190	15	5.2	9
Balsam poplar	38	18	2		58	64	5	2.5	4
Willow spp.	21	-	-		21	25	2	0.5	1
White birch	20	4	1		25	27	2	1.0	2
White spruce	9	3	1		13	15	1	0.5	1
Balsam fir		1	-		1	1	-	0.1	-
Totals	782	225	127		1,134	1,273	100	57.0	100
Trees/hectare by size class category	877	556	314		1,747				
Relative density by size class category	69	20	11		100				
	Basal area (M ²) cross section area of the trunk (dbh) by size Class								
	A	B	C	D					
Species	0.01	0.03	0.07	0.17					
Trembling aspen	8.47	5.25	8.54						
Jack pine	1.44	0.72	0.07						
Balsam poplar	0.38	0.54	0.14						
Willow spp.	0.21								
White birch	0.20	0.12	0.07						
White spruce	0.09	0.09	0.07						
Balsam fir		0.03							
Totals	10.79	6.75	8.89						
Relative basal area	3.3	2.0	2.7						

¹From a 1977 quantitative analysis in Nopiming Provincial Park.

common shrub; while trembling aspen was the third most frequently encountered species in the shrub zone. Five species of trees were recorded in the shrub layer indicating forest regeneration within the stand. The number of tree stems in the shrub zone of 1885 per hectare is in contrast to the four per hectare estimated for the jack pine plot. Table 6 indicates the numbers of shrub stems by species, their relative density and their frequency of occurrence.

A ground cover percent of 84 was obtained for the amount of forest floor covered by non-woody vegetation. This is typical of a boreal deciduous stand according to Oosting (1956). Non-woody ground cover species recorded totaled 35 in the plot. The most abundant of these were dewberry, wild sarsaparilla, wild strawberry and unidentified grasses. Three species of ferns; spinulose wood, bracken and rock polypody were recorded in both the trembling aspen and jack pine plots. These shade tolerant plants appear able to tolerate a variety of mature forest cover types.

E.1.3 Semi-open Black Spruce Bog

According to Rowe (1972) black spruce is the climax forest community in the Boreal Forest Region of which Nopiming Park is a part. Forest inventory maps show that less than 15 percent of the park is now covered by black spruce dominated forests. Fires, local topographic features and logging have contributed to this situation. Large accessible blocks of mature spruce forests were not identified in the park so a bog situation was chosen for the analysis of this species. Black

TABLE 6 Shrub importance in the 15 hectare trembling aspen plot.

Species	Stems per hectare	Relative Density (%)	Frequency Percent ¹
Beaked hazelnut	17544	61.0	73
Saskatoon	3657	12.7	73
Trembling aspen	1458	5.7	59
Red osier	1211	4.3	23
Speckled alder	919	3.2	18
Bush honeysuckle	741	2.6	59
Wood's rose	628	2.2	41
Nannyberry	450	1.6	36
Downy arrowwood	358	1.2	36
Mountain maple	269	0.9	9
Wild plum	225	0.7	4
Balsam poplar	203	0.7	23
Wild red raspberry	202	0.7	14
Chokecherry	158	0.5	14
Willow spp.	136	0.4	9
Canada blueberry	135	0.4	9
Pincherry	124	0.4	18
Highbush cranberry	67	0.2	4
White birch	44	0.1	9
White spruce	44	0.1	4
Lowbush cranberry	22	0.1	4
Snowberry	22	0.1	4
Alder-leaved buckthorn	22	0.1	4
Northern gooseberry	22	0.1	4
TOTAL	28661	100.0	

¹ Frequency is a measure of distribution throughout an area. The frequency values represent the chances of recording a species in any one sub sample.

spruce and tamarack were the only tree species in the plot. The high water table conditions have affected the scattered, stunted forest to where the likelihood of trees attaining a greater than present eight meter height or 7.62 to 15.24 centimeter dbh is remote under present conditions. Table 7 illustrates the scattered nature, basal area, density and dominance of the tree species recorded in the plot.

The existence of shrub species more than 1.3 meters in height was restricted to dwarf birch. Black spruce and tamarack were represented in the shrub zone indicating a self-perpetuating forest community. In the zone of shrubs under 1.3 meters leatherleaf and bog rosemary were the largest contributors of stems. Table 8 illustrates shrub stems per hectare, shrub relative density and the frequency of each shrub species' occurrence.

Sphagnum mosses provided a platform for such common non-woody plants as buckbean, swamp pink and sundew.

Excessive rainfall during June raised the water table to a level which flooded out such species as bladderwort growing in sedge communities. Pitcher plants, swamp pinks and several orchid species were also found growing in excessive water conditions by late summer. Future studies, especially in areas where roads or other structures alter drainage patterns and nutrient levels would help document the effects of these alterations upon bog communities.

Table 7. Density, importance and basal area of tree species in a black spruce bog 1

Species	DENSITY				Total	Trees/hectare by species	Relative density by species	Basal Area (M ²)/hectare	
	# of trees in all circles by diameter size Class (cm)							Basal area by species	Dominance by species
	A	B	C	D					
	7.62	15.24	22.86	30.48					
	15.24	22.86	30.48	38.10					
Black spruce	104				104	104	88	1.04	90
Tamarack	11				11	10	10	0.11	10
Dead black spruce	3				3	2	2	0.03	
Totals	118				118	116	100	1.18	100
Trees/hectare by size class category	116				116				
Relative density by size class category	100				100				
	Basal area (M ²) cross section area of the trunk (dbh) by size Class								
	A	B	C	D					
Species	0.01	0.03	0.07	0.17					
Black spruce	2.5								
Tamarack	0.2								
Dead black spruce	0.1								
Totals	2.8								
Relative basal area	0.4								

1. From a 1977 quantitative analysis in Nopiming Provincial Park.

TABLE 8 - Shrub importance and stems per hectare in the black spruce bog

Species	Stems per Hectare	Relative Density (%)	Frequency Percent ¹
Leather-leaf	2560	37.2	80
Black spruce	1660	24.1	72
Bog rosemary	1200	17.3	44
Bog laurel	500	7.3	16
Tamarack	432	6.3	80
Labrador tea	320	4.6	16
Dwarf birch	108	1.6	20
Dry-ground cranberry	69	1.0	28
Swamp cranberry	40	0.6	4
TOTAL	6889	100.0	

¹ Frequency is a measure of distribution throughout an area. The frequency values represent the chances of recording a species in any subsample.

E.1.4 Vegetation Analysis Plots Collectively

The three stands chosen for the three major cover types were considered typical of the stands representing those cover types throughout the park. Seasonal conditions were a factor in the bog where excessive water levels occurred.

Differences in the development of shrub zones within the three plots is illustrated on Figure 5. The trembling aspen plot contains over four times the number of shrub stems present in the bog and over ten times the number recorded in the jack pine forest.

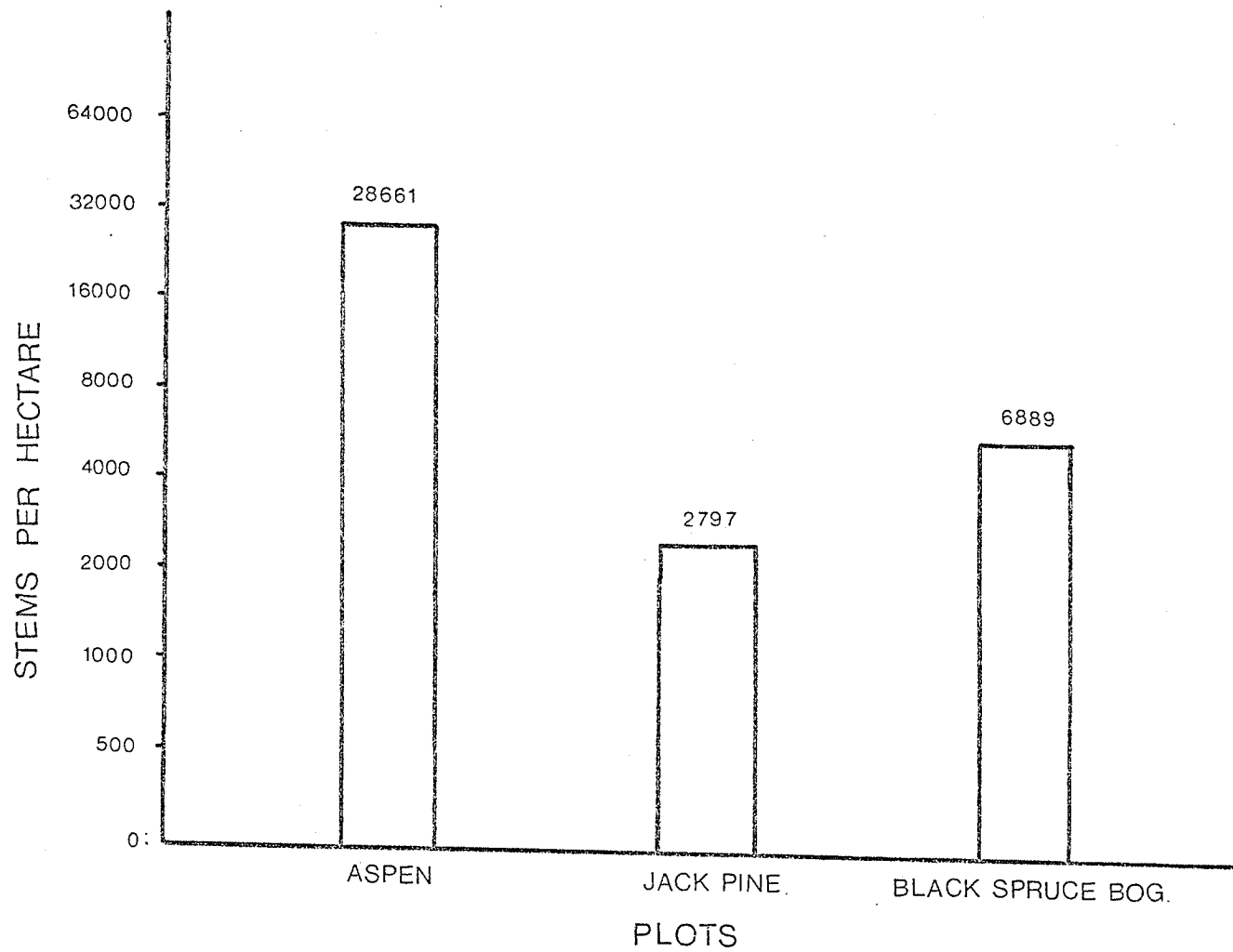


Fig. 5. Shrub stems per hectare under three Nopiming Park cover types. (From 1977 quantitative vegetation plots).

The number of tree stems per hectare for the major species present in the three cover plots is illustrated in Figure 6. The jack pine plot contained nearly double the tree stems found in the trembling aspen plot; while the stems present per hectare in the bog plot were extremely limited.

Based upon these plot results, the bog plot will not likely produce commercially valuable timber; while the trembling aspen and jack pine forests contain the wood fiber if a market is available.

E.2 Results and Discussion of the Quantitative Songbird Analysis in the Three Major Cover Types in Nopiming Provincial Park¹

E.2.1 Songbird Census Results in the Jack Pine Forest Plot

Surveys were done on May 29, 30 and on June 4, 12, 16, 17, 22, 26 and 30. All surveys were done between 04:55 and 08:00 hours, C.D.T. Species with at least one-half their territory in the plot included: ovenbirds, 5.5 territories; yellow-bellied flycatchers, 5 territories; chipping sparrows, 4.5 territories; yellow-rumped warblers, 3 territories; nashville warblers, 2.5 territories; hermit thrush and Swainson's thrush, one territory each. Species which were often recorded in the plot but whose territories were not confined to the plot included the common flicker and solitary vireo. A total of nine species representing 114 territorial males per square kilometer

¹ Songbird plot locations are within the jack pine, trembling aspen and black spruce bog vegetation plots located on Figure 2.

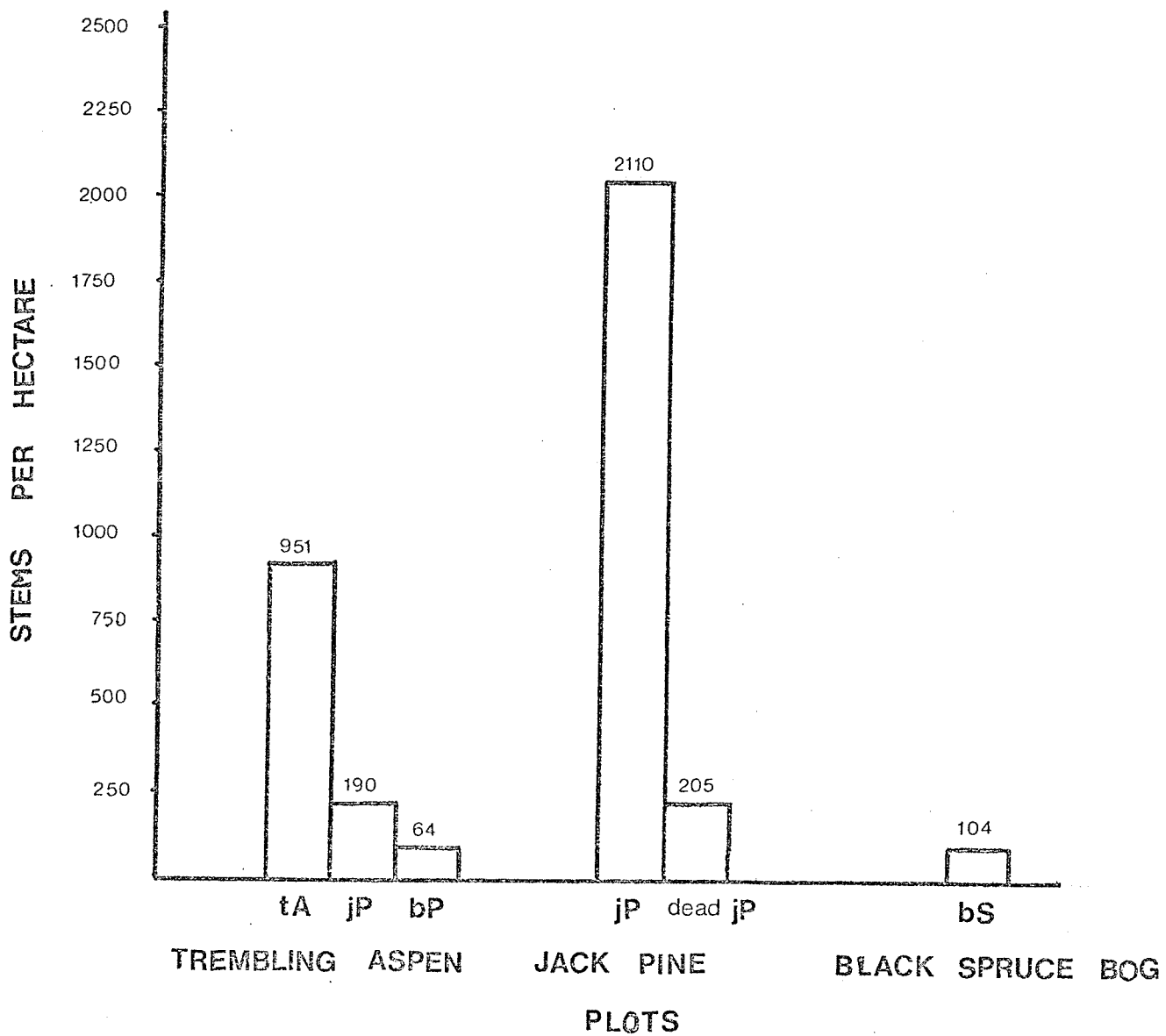


FIG. 6. Tree stems per hectare in three Nopiming Park cover types. (From 1977 quantitative vegetation plots).

were recorded in this habitat plot. A common flicker nest was located in the plot. This habitat is not productive in numbers or species of birds due to its lack of shrub and ground cover development.

E.2.2 Songbird Census Results in the Trembling Aspen Forest Plot

Surveys were conducted on May 25, 26, 31 and on June 1, 6, 7, 14, 19, 25 and 29 between 04:10 and 08:00 hours C.D.T. The month of June, 1977 was exceptionally rainy, although conditions were generally clear and warm on survey mornings. Species with one-half or more territory contained by the plot include:

ovenbirds	12	chestnut-sided warbler	2
least flycatcher	11.5	rose-breasted grosbeak	2
red-eyed vireo	9	white-throated sparrow	1.5
veery	3.5	ruffed grouse	1
Philadelphia vireo	3.5	eastern wood pewee	1
mourning warbler	2.5	Canada warbler	1
		hermit thrush	0.5

Species associated with the area but whose territories were not contained by the plot include: barred owl, downy woodpecker, nashville warbler, brown-headed cowbird and chipping sparrow. Nests of a barred owl, downy woodpecker, least flycatcher and veery were located in the plot.

This plot had the greatest species diversity, 19, and highest population density, 350 territorial males per square kilometer, of the three habitats studied. There was a single owlet banded from the barred owl nest.¹

¹ This owlet was the first for the species in the Province.

E.2.3 Songbird Census Results in the Black Spruce Bog Cover Type

The northeast half of the plot consists essentially of an open bog mat with scattered black spruce and tamarack trees. This open area grades into areas of more dense black spruce forest especially in the western portion of the plot. Surveys were conducted on May 28, June 2, 3, 9, 11, 20, 24 and 28. Species with at least one-half a territory contained in the plot include: the palm warbler, 4; savannah sparrow, 2.5; Connecticut warbler, 2; Lincoln's sparrow, 2; LeConte's sparrow, 1; hermit thrush and Nashville warbler, 0.5 territories each. Species which occurred in the vicinity but which were not confined to the plot include the common snipe and common yellowthroat.

E.2.4 Species of Birds Determined Most Probable to Breed in Various Nopiming Provincial Park Cover Types

Percentages of each cover type in the park were derived from forest inventory map analysis.¹ Probable breeding birds were determined from visits recording bird species use of these cover types.²

¹ Forest inventory analysis data is contained in Appendix C. Stand classification is from Forest Inventory Classification sheets (1969).

² Green and Niemi, 1978, described probable breeding bird species from many of Superior National Forests' habitats.

E.2.4.1 Probable Breeding Birds in Predominantly Hardwood Stands

This cover type occurs throughout the park, but is more common in northerly areas. Approximately 3.7 percent or 5520 hectares of the park is dominated by this cover type. Bird species include:

goshawk	black-capped chickadee
sharp-shinned hawk	house wren
Cooper's hawk	American robin
red-tailed hawk	Swainson's thrush
broad-winged hawk	veery
ruffed grouse	red-eyed vireo
mourning dove	Philadelphia vireo
black-billed cuckoo	Tennessee warbler
great horned owl	blackburnian warbler
barred owl	chestnut-sided warbler
whip-poor-will	ovenbird
common flicker	mourning warbler
pileated woodpecker	Canada warbler
yellow-bellied sapsucker	American redstart
hairy woodpecker	northern oriole
downy woodpecker	brown-headed cowbird
great crested flycatcher	scarlet tanager
least flycatcher	rose-breasted grosbeak
eastern wood pewee	purple finch
blue jay	indigo bunting
common crow	white-throated sparrow

E.2.4.2 Probable Bird Species Breeding in Marsh, Muskeg Habitats

This cover type dominates nearly 2 percent or 3,000 hectares of the park. Concentrations are in the south central portion of the park. Bird species include:

common loon	greater yellowlegs
red-necked grebe	lesser yellowlegs
horned grebe	black tern
pied-billed grebe	short-billed marsh wren
great blue heron	palm warbler
American bittern	northern waterthrush
Canada goose	Connecticut warbler
mallard	red-winged blackbird
sandhill crane	Savannah sparrow
Virginia rail	LeConte's sparrow
sora	Lincoln's sparrow
common snipe	swamp sparrow

E.2.4.3 Probable Bird Species Occurring in Unclassified Areas in the Park

These areas include road allowances, slag piles, recent gravel pits and other disturbed sites. Although they represent less than one percent or 500 hectares of the park, they are conspicuous and often contain species not occurring in natural areas of the park. Bird species include:

killdeer	common nighthawk
solitary sandpiper	belted kingfisher
spotted sandpiper	

E.2.4.4 Probable Breeding Bird Species in Areas of Treed Rock

Although rock outcrops are common in the park, extensive areas are limited. Township 18-17East in the southwestern portion of the park is nearly one-quarter treed rock while the overall park has less than 4 percent or 6000 hectares of this class. Bird species include:

turkey vulture	black-backed three-toed woodpecker
American kestrel	northern three-toed woodpecker
spruce grouse	golden-crowned kinglet
common nighthawk	ruby-crowned kinglet
common flicker	white-throated sparrow

hermit thrush	solitary vireo
gray jay	Nashville warbler
common raven	magnolia warbler
boreal chickadee	yellow-rumped warbler
red-breasted nuthatch	pine siskin
Swainson's thrush	dark-eyed junco
chipping sparrow	

E.2.4.5 Probable Breeding Bird Species in Areas of Willow-alder

Willow-alder habitat is typical of poorly drained lands, stream banks and areas with beaver ponds. The area represents less than 3 percent of the park with largest concentrations in the southeast corner. Bird species include:

ruffed grouse	cedar waxwing
common snipe	black-and-white warbler
solitary sandpiper	Nashville warbler
black-billed cuckoo	yellow warbler
eastern kingbird	chestnut-sided warbler
eastern phoebe	northern waterthrush
yellow-bellied flycatcher	mourning warbler
alder flycatcher	Wilson's warbler
black-capped chickadee	common yellowthroat
gray catbird	red-winged blackbird
brown thrasher	common grackle
veery	swamp sparrow
	song sparrow

E.2.4.6 Probable Breeding Bird Species in Areas of Treed Muskeg

This habitat is often extensive in poorly drained flat areas. The black spruce bog plot (Figure 2) is located near a large area of this cover type. In the park as a whole, nearly 10,000 hectares fall within this vegetation class.

Bird species include:

American kestrel	tree swallow
spruce grouse	boreal chickadee
sandhill crane	hermit thrush
common snipe	Nashville warbler
solitary sand piper	palm warbler
greater yellowlegs	Connecticut warbler
lesser yellowlegs	Savannah sparrow
Lincoln's sparrow	black-backed three-toed woodpecker
LeConte's sparrow	northern three-toed woodpecker
yellow-bellied flycatcher	gray jay
olive-sided flycatcher	common yellowthroat
red-breasted nuthatch	

E.2.4.7 Probable Breeding Bird Species in Areas of 51% or more Jack Pine

Half the park, or 608,560 hectares, is covered by forest cover with 51% or more jack pine. Bird species include:

spruce grouse	black-backed three-toed woodpecker
common flicker	northern three-toed woodpecker
yellow-bellied flycatcher	gray jay
boreal chickadee	common raven
red-breasted nuthatch	hermit thrush
golden-crowned kinglet	solitary vireo
ruby-crowned kinglet	Nashville warbler
yellow-rumped warbler	ovenbird
blackburnian warbler	pine siskin
white-winged crossbill	dark-eyed junco
white-throated sparrow	chipping sparrow

E.2.4.8 Probable Breeding Bird Species in Areas of 51% of More Black Spruce

This habitat comprises nearly 13.5% or 20,000 hectares in the park. Extensive sections of this type occur in the park's northern portion. Bird species include:

spruce grouse	black-backed three-toed woodpecker
common flicker	northern three-toed woodpecker
olive-sided flycatcher	gray jay
boreal chickadee	brown creeper
red-breasted nuthatch	winter wren
Swainson's thrush	hermit thrush
golden-crowned kinglet	Nashville warbler
ruby-crowned kinglet	palm warbler
yellow-rumped warbler	Connecticut warbler
blackburnian warbler	common yellowthroat
white-winged crossbill	dark-eyed junco
white-throated sparrow	chipping sparrow

E.3 Quantitative Analysis of Small Mammal Plots¹ and Fur Production Data Analysis from Existing Data

E.3.1 Introduction

Due to the limited study duration and the normal fluctuations in populations of boreal small mammals, density determination of species in various habitats was not possible. Snap trapping was used to establish presence of a species and to indicate how relatively abundant the populations present were in the three major park habitats. Results indicate presence of species and do not document absence as some species in an area may be missed entirely (Olson, 1975). Additional information from three seldom encountered park habitats is included in this section.

¹ Small mammal plots were constructed in the jack pine, trembling aspen and black spruce bog plots described in the vegetation analysis (Figure 2).

E.3.2 Jack Pine 1.2 Hectare Plot Results

Red-backed voles and masked shrews were the most frequently captured species (Table 9). This plot had an abundance of small mammals, as compared to other plots trapped, despite a scarcity of shrubs and non-woody ground cover.

E.3.3 Trembling Aspen 1.2 Hectare Plot Results

The aspen plot recorded the greatest variety of species of any habitat in the park (Table 9). One shrew, two mice and one vole species were included in the catch. This diversity was probably due to variations in soil type, moisture conditions and diverse flora found in the plot.

E.3.4 Black Spruce Bog 1.2 Hectare Plot Results

Two separate plots were established in the black spruce bog area. One was set up in an open bog area, the other in a semi-closed spruce stand. Small mammal species diversity was high considering the excessive moisture conditions in the sample area (Table 9). The adaptability of the species involved is probably the most important reason for several species being caught. Arctic and masked shrews adapt to many boreal habitats as do red-backed voles while meadow voles inhabit open areas.

E.3.5 Random Small Mammal Trapping Results

Random traplines using small numbers of traps in limited areas were set out in some less common cover types. This was an attempt to determine if species not found in major habitats might reside in these limited areas. No unique species were captured. The results of this effort are included in Table 9.

Table 9. Number of small mammals captured in 1.2 hectare plots¹ and in random traplines.²

Species	Small wooded Ravine (40)	Speckled alder Swale (40)	Mature black Ash (20)	Mature aspen (363)	Jack pine (363)	Open bog (363)	Semi-open Bog (363)
Masked shrew	2	0	0	6	9	1	0
Short-tailed shrew	0	0	1	0	0	0	0
Arctic shrew	0	0	0	0	0	1	0
Meadow vole	0	0	0	0	0	2	0
Red-backed vole	1	0	2	5	11	0	2
Deer mouse	4	3	6	7	0	0	0
Meadow jumping mouse	1	0	0	1	0	0	0
Least chipmunk	3	0	0	0	0	0	0
Flying squirrel	0	0	0	0	1	0	0

¹In August 1977, 1.2 hectare grid plots were run for three nights in jack pine, aspen and two bog communities.

²Numbers in parenthesis represent the number of trapnights in each Nopiming Park plot.

E.3.6 Analysis of Fur Species from Existing Data

Furbearers have been used in many areas as sources of food and income. For many remote Manitoba communities fur represents the major source of income other than social assistance. Nopiming Park was divided into registered trapline districts more than 25 years ago (Stardom, pers. comm.). These identified traplines (Figure 7) are intended to provide data on fur output as well as to limit over-trapping and fur theft. Once a trapper gets a line, he retains it until he no longer wants to trap. This allows trappers to become familiar with their area and to establish trails, cabins or other conveniences with assurance that the area under their control will not be trespassed. The system appears to work well until easy road access is made into remote trapline areas. Furbearers which cross the main road are often taken when encountered no matter if the taker has a license to trap that area or not.

Cash value of fur varies yearly and regionally. Beaver pelts have provided the most money for a species in all but one of the last 15 years (Stardom, pers. comm.). The average number of pelts taken in the park between 1960 and 1977 included: 217 beaver, 75 muskrat, 42 squirrel, 34 mink, 23 ermine, 13 fisher and 10 otter, with lesser numbers of several other species (Table 10). The average number of traplines and the catch per line is also illustrated on Table 10.

Nopiming Park contains several major river systems. In addition, 16 percent of the area is covered by water. In

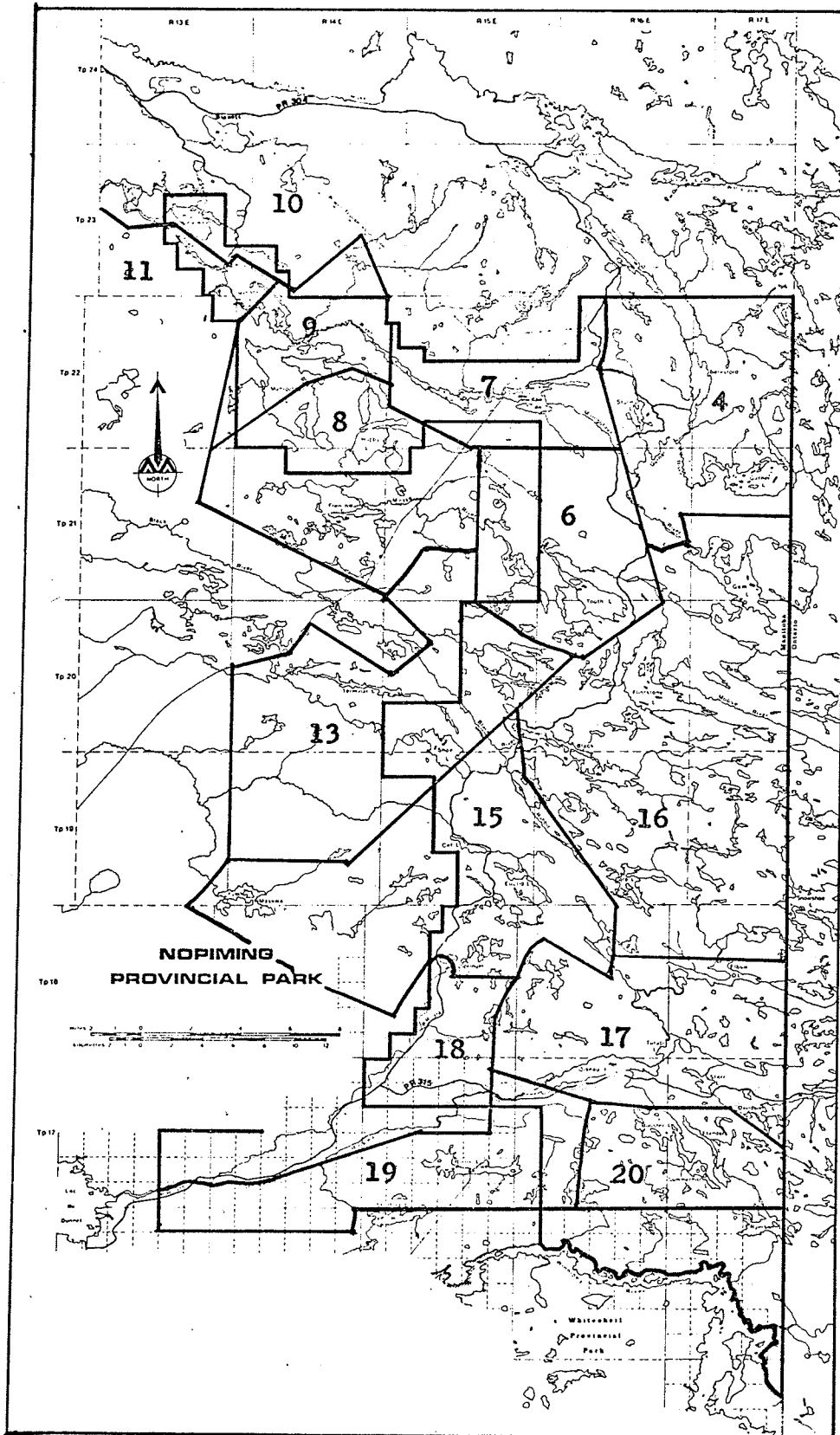


Fig. 7. Nopiming Park illustrating registered traplines with boundaries.

Source: Stardom and Bilan. 1978. Manitoba fur fact book.

Table 10. Nopiming Provincial Park's fur production by traplines active, (1960-1977).¹

Trapline No. 4	No. of trappers	Beaver	Ermine	Fisher	Fox	Lynx	Mink	Muskrat	Otter	Squirrel	T. Wolf	Coyote
1962-63	1	89	2	1	0	1	15	10	3	0	0	0
1963-64	1	41	4	5	0	4	14	14	2	0	0	0
1975-76	2	37	0	2	0	0	3	61	0	0	0	0
1976-77	2	20	10	2	0	2	19	18	7	0	0	0
Trapline No. 6												
1962-63	2	31	0	0	0	0	0	19	0	0	0	0
1963-64	2	37	3	1	0	0	6	45	2	19	0	0
1976-77	1	41	0	0	0	0	0	5	0	0	0	0
Trapline No. 7												
1963-64	4	42	0	0	0	0	0	29	3	10	0	0
1971-72	1	3	0	1	1	5	0	1	0	2	0	0
1975-76	1	49	12	0	0	6	2	3	0	93	1	0
1976-77	1	55	5	6	4	3	15	12	21	35	0	0
Trapline No. 9												
1963-64	1	79	11	4	0	0	8	38	2	9	0	0
1971-72	1	2	3	7	1	1	9	23	0	0	1	0
1973-74	1	31	2	7	0	1	3	60	6	10	0	0
1974-75	1	7	2	7	0	0	6	8	0	0	0	0
1975-76	1	28	0	4	0	0	1	24	1	0	0	0
1976-77	1	24	15	3	2	0	17	27	1	21	1	2

1. Source: Manitoba Department of Mines, Natural Resources and Environment. 1960-1977. Fur Statistics Files.

Table 10. (Cont)

Trapline No. 15	No. of trappers	Beaver	Ermine	Fisher	Fox	Lynx	Mink	Muskrat	Otter	Squirrel	T. Wolf	Coyote
1962-63	2	142	9	3	0	2	9	62	2	23	0	0
1963-64	1	141	16	4	0	1	21	71	2	29	1	0
1964-65	1	99	2	0	0	0	2	24	0	11	0	0
1965-66	1	136	29	3	0	1	23	49	1	27	0	0
1966-67	1	101	12	1	0	0	21	64	1	38	0	0
1967-68	2	69	2	3	0	0	5	26	0	0	0	0
1968-69	1	35	1	2	0	4	7	73	1	2	0	0
1971-72	2	77	0	0	0	1	0	51	0	0	0	0
1972-73	2	70	18	19	6	13	10	22	3	10	2	0
1973-74	2	26	8	5	2	4	8	18	3	11	0	0
1974-75	2	30	6	8	0	0	1	18	2	5	0	0
1975-76	1	55	3	3	0	0	2	10	0	2	0	0
1976-77	1	89	13	6	0	8	24	25	6	9	3	2
Trapline No. 16												
1961-62	1	46	0	2	0	0	1	2	0	0	0	0
1962-63	1	9	3	0	0	0	1	0	0	0	0	0
1963-64	2	91	14	6	0	2	13	32	4	36	0	0
1964-65	1	19	11	5	0	0	6	2	1	53	0	0
1965-66	1	25	12	3	1	0	5	2	1	5	0	0
1966-67	1	14	0	1	0	0	2	5	3	3	0	0
1967-68	1	3	0	0	0	0	0	0	0	0	0	0
1969-70	1	20	0	0	0	11	5	1	1	5	0	0
1975-76*	2	48	2	3	1	0	0	38	2	8	0	0
1976-77	2	68	1	5	0	0	15	17	9	25	0	0

*One Raccoon

Table 10. (Cont)

Trapline No. 17	No. of trappers	Beaver	Ermine	Fisher	Fox	Lynx	Mink	Muskrat	Otter	Squirrel	T. Wolf	Coyote
1961-62	1	54	3	2	0	1	16	1	1	0	0	0
1962-63	1	83	2	0	3	0	14	1	3	0	0	0
1963-64	2	55	21	1	1	1	9	6	0	37	0	0
1964-65	1	49	3	0	0	1	1	83	1	1	0	0
1965-66	2	94	6	0	0	0	6	2	2	4	0	0
1966-67	2	114	7	0	0	0	27	7	5	4	0	0
1967-68	1	64	4	2	3	0	10	4	7	15	0	0
1969-70	2	53	1	6	0	0	17	56	4	2	0	0
1971-72	1	0	1	1	0	1	3	0	1	1	0	0
1972-73	1	68	18	12	6	6	9	3	1	4	0	0
1973-74	1	60	3	9	4	2	0	10	0	3	0	3
1974-75	1	38	10	6	2	2	4	13	6	3	1	1
1975-76	1	27	1	2	1	0	2	3	0	0	2	0
1976-77	1	60	15	7	1	0	19	8	12	10	1	0
Trapline No. 20												
1961-62	1	22	1	0	0	0	34	0	0	0	0	0
1962-63	1	32	0	1	1	3	4	5	0	0	0	0
1963-64	2	72	3	1	4	0	0	6	0	1	0	1
1964-65	1	7	7	2	0	0	23	1	1	2	0	0
1965-66	1	21	0	0	0	0	0	26	0	5	0	0
1966-67	2	40	3	0	0	0	4	6	0	9	0	0
1967-68	1	46	4	2	0	0	0	22	1	30	0	0
1969-70	1	25	0	1	0	0	0	12	3	0	0	0
1971-72	1	18	0	4	0	1	4	0	1	0	0	0
1972-73	1	57	0	3	4	0	1	8	2	0	0	0

Table 10. (Cont)

Trapline No. 20 Cont.	No. of trappers	Beaver	Ermine	Fisher	Fox	Lynx	Mink	Muskrat	Otter	Squirrel	T. Wolf
1973-74	1	5	0	6	2	1	1	0	2	2	1
1974-75	1	5	0	0	0	0	0	10	1	0	0
1975-76	2	30	0	0	0	0	0	23	6	0	1
1976-77	2	19	0	1	1	0	6	5	5	0	1

the past these river and lake systems provided the major travel routes into traditional trapping areas. Recently, however, a north-south road was constructed through the park. This increased access into the area contributed to a doubling of the area's reported fur production in 1976-77. Because of the increased kill, concern must be given to large carnivores, such as lynx, fisher and otter whose territories are considerable.

APPENDIX F

LAND USE ZONES FOR MANITOBA'S PARK LANDS¹

Class I: Special Areas

- a. Purpose - To preserve unique features or situations only.
- b. Characteristics - The area is of unique provincial significance for history, geology, ecology, or the like, or for scientific purposes.
- c. Activities and Development - Activities shall be oriented only to understanding and appreciating the unique feature(s). Development will be solely those necessary for the utilization and interpretation of the unique features of the area. Preservation of the unique features will dictate the scale and intensity of development.

Class II: Primitive Environment Areas

- a. Purpose - To preserve a primitive or isolated environment.
- b. Characteristics - The area is undisturbed by commercial utilization, resource exploitation or mechanized transportation, and provides for compatible recreational use.

¹ Manitoba Department of Mines, Natural Resources and Environment. 1974. Criteria for the Provincial Park Lands System.

- c. **Activities and Development** - Such appropriate uses as hiking and other foot travel, horseback riding, nature study, fishing, hunting, canoeing and other non-power boating will be encouraged with the development of trails, water and portage routes, primitive camping sites and shelters and the provision of interpretative and information material.

Class III: Natural Recreation Areas

- a. **Purpose** - To create an area of low density nature-oriented recreation and be used also as a buffer protecting Class I and Class II areas.
- b. **Characteristics** - This is a rural environment which is largely, though not totally free of unrelated intrusions of facilities and management practices.
- c. **Activities and Development** - Emphasis is on natural activities. Recreational activities include low density car-access, camping, interpretative walks, picnicking, pleasure driving, boating, swimming, fishing and hunting. Facilities would include car-access campgrounds, nature centres and trails, parking lots, boat launching, and group-camping sites. Also, it may provide supply stations for travellers into Class I and Class II areas.

Class IV: General Outdoor Recreation Areas

- a. Purpose - To provide a wide range of outdoor recreational opportunities in a natural setting.
- b. Characteristics - By virtue of its natural features and through development of facilities the area is capable of sustaining a high level of recreational opportunities and activities.
- c. Activities and Development - In addition to the facilities acceptable for Class III, activities at a higher density and in less relative isolation are acceptable. In the development of these facilities, it is desirable to retain a relatively natural setting. Other facilities include golf courses, tennis courts and ski hills.

Class V: Intensive Use Areas

- a. Purpose - To provide a concentration of service facilities and recreational activities, including complementary recreational developments suitable for the provision of a balanced recreational experience.
- b. Characteristics - Location relative to visitors' entry points or concentrations dictate the choice of site more than the physical or environmental aspects of the area. It is desirable, however, to provide areas suitable from all three aspects.

c. Activities and Development - Those services and facilities necessary to support recreational activities and developments are contained in these areas. These may include motels, restaurants, service stations, stores, and staff housing groups.

APPENDIX G

NOPIMING PARKWAY INTERPRETATIVE BROCHURE,
BASED UPON THE FLORA AND FAUNA¹

I. PROCESS

- A. Park Planners and developers should consider the floral and faunal concerns expressed in this study before developing any of the sites listed in this brochure.
- B. This brochure is suitable for visitor use. It describes major interpretive features occurring along Provincial Road #314 and the Nopiming Parkway.
- C. Once official markers are in place, the brochure should be made available to all visitors travelling the highway through Nopiming Park.

II. STORYLINE

The brochure storyline is coordinated with features along the highway through Nopiming Park and was written to correspond to numbered posts going from south to north along Highway #314 and the Nopiming Parkway.

No. 1 (0.0 km)

Junction of Provincial Road #314 and Provincial Road #315: This area, showing evidence of recent fires, has numerous broken off black poplar and aspen snags. These snags provide nesting sites and food for cavity nesting birds, especially woodpeckers. These include the common flicker, downy, hairy, black-backed-three-toed and northern-three-toed woodpeckers. In the boreal forest, trees are seldom all killed by fires. The surviving trees are often scarred and susceptible to wind damage. Barring natural or man-made disaster, this area will become spruce dominated as evidenced by the spruce understory growing under the aspen canopy.

¹ The distance markers were derived by W. Steski; the information in this brochure was supplied by W. Koonz.

No. 2 (1.3 km)

Rough road east into an active mineral claim: This site illustrates white spruce growing through the aspen canopy. White spruce is sought after for commercial purposes. Barring successional setbacks, the area will be important for timber operations in the future.

No. 3 (2 km)

Logging road to the west: The road cut has gone through some stands of tall aspen trees which have lost their lower branches. These trees illustrate natural pruning and their slim trunks demonstrate their vulnerability to wind when the canopy is opened up, as illustrated by the road cut. A number of these trees have already broken off.

No. 4 (2.7 km)

Willows, alders and grasses in a wet area along the road: These wet areas provide ideal habitat for the Wilson's, yellow and the common yellow-throat warblers as well as alder flycatchers. Bird species are often restricted to a single plant community, so generally, the more communities represented, the more bird species found in an area.

No. 5 (4.5 km)

Road east into a major gravel pit and logged area: Disturbed sites, due to a temporary lack of competition, are often colonized by species which are not likely to attain maturity. Observe the aspen, tamarack, spruce or jack pine trees which have sprouted on similar habitats. The light, nutrients and water requirements are different for each of these species and thus they will not all attain maturity at this site.

No. 6 (4.8 km)

Open water on both sides of the road: Aquatic furbearers such as mink and otter require open water in order to gain entry into lakes and streams during winter. Areas which provide access are essential for those aquatic species to survive in a water system. Much of the high ground in this area has recently burned. Debris from this fire is evident in the creek. This has lowered the productivity of the creek and will speed up sedimentation of the channel causing it to meander more. Fires

burn slowly in this area due to the rock outcrops, bogs and lakes. Seldom do fires burn all the trees because islands remain protected by rocks, water or other barriers.

No. 7 (5.5 km)

Logging road to the east: This location illustrates how disturbed and regenerated sites can give rise to the occurrence of species not normally found in association with each other. Jack pine, tamarack and black spruce have trunks less than two meters from each other. New growth areas provide food for many ground animals because the growing shoots of trees are within easy reach from the ground.

No. 8 (6 km)

Logging road to the west: The small patch of mature jack pine on a rock knoll illustrates a number of things: natural pruning of lower branches, competition for sunlight (as illustrated by straight, tall trunks) and lack of a shrub zone illustrates poor growing conditions and a lack of light penetration. Black spruce regeneration demonstrates the shade tolerance of that species while lack of jack pine regeneration shows the shade intolerance of jack pine.

No. 9 (7 km)

Logging road to the east and west: Plant communities are slow to repopulate where soils are thin and rock outcrops protrude. Clear-cutting should be avoided in these areas while slash burning should be considered as a tool to open up jack pine cones to reseed the area. Fruit producing shrubs such as blueberry, raspberry and buffaloberry often invade these cut-over areas providing ground cover and food for bird and mammal species for many years.

No. 10 (7.2 km)

Bindweed growing along the roadside: This plant is tolerant of direct sunlight and dry conditions. It will soon be replaced by more shade tolerant species. At present, it helps to stabilize the roadbed and traps dust and other flying objects. The wild morning glory climbing on the shrubs and tree trunks is more shade tolerant and provides the observer with flowers for most of the summer.

No. 11 (7.3 km)

Logging road to the east: This area illustrates disrupted drainage, succession, plant invasion and browsing sign. Recent logging and road construction have altered drainage and set back succession but have increased available browse for small mammals and ungulates.

No. 12 (7.5 km)

A road to the west leading into a logging area: Because this road interfered with the natural drainage, it has flooded out and a marsh has formed. Wherever natural drainage is altered, care must be taken to ensure that habitats to be preserved are not adversely affected. Numerous locations along the Nopiming Parkway illustrate how plant communities have been altered by changes in the natural drainage. Some of these were due to the beaver; while many were the work of man.

No. 13 (7.6 km)

Drainage along the road: Between 13 and 14 is a man-made ditch. Note that the width of the area associated with the drain is very narrow and straight as compared to natural drainages. This drain will quickly draw down the water table and dry out the area, making it more susceptible to drought and fire. Also, rapid water movement carries more suspended material and will likely pollute the outlet waters. These narrow bands of vegetation along a drain make the wildlife inhabitants vulnerable to predators from adjacent vegetation zones.

No. 14 (8.2 km)

Logging roads to the east and west: Blow-downs and trees snapped off in this area are examples of what can happen when only a few trees are left standing after logging.

No. 15 (8.9 km)

Water on both sides of the road-creek: This creek illustrates another access route for otters and mink. It also provides areas for invader plant species (those which invade when habitats are disturbed). Goldenrods

and several composites are present and provide food for bird and mammal species. These habitats illustrate effects upon plant communities by both human disturbance and fluctuating water levels. As water tables rise and fall, plants with differing tolerances increase and decrease.

No. 16 (9.2 km)

Roads east and west into logging areas: In areas where a single climax forest community existed, the probability of that forest type re-establishing are slight. Since earlier stage species were not present, succession is slow and long periods of time will be required before a forest community can re-establish.

No. 17 (9.5 km)

Logging road to Springer Lake: Shade intolerant species such as aspen usually reproduce vegetatively. Where mature aspen trees were present at the time of a logging operation or fire, there is good aspen regeneration. Where aspen was not represented in the destroyed forest, it will regenerate poorly. That is one reason why much of this cut-over area has yet to recover into forest.

No. 18 (10.2 km)

Trees blown down by a tornado: A tornado passed through this area in 1974 (Steski, pers. comm.). Tree species growing either on rock or over bogs have shallow root systems. This stop illustrates numerous uprooted trees whose anchorage could not withstand gale-force winds. This tornado damage zone was the only place in the park where red-headed woodpeckers were recorded. The numerous dead trees and other local factors allowed this species to exist north of its normal range.

No. 19 (10.5 km)

Spruce bog (Steski, pers. comm.): In southern Manitoba black spruce is most often found in bogs or wet habitats. Note the even heights of the trees in this stand. Trees which rise above the rest of the canopy are susceptible to wind damage and drying conditions. Trees growing over a bog where soil is poorly developed are vulnerable to water fluctuations in the bog.

No. 20 (10.8 km)

Logging road to the north side of Springer Lake: The ditch along the road has filled with brown tannins and acids from the surrounding peat. This water will take a long time to clear up and will pollute areas downstream. The ditch banks are susceptible to periodic drought and plant communities establishing on them will be temporary. The land above the ditch banks will also drain more quickly than natural and the plant communities colonizing them will be quite temporary.

No. 21 (11.3 km)

Exposed bedrock: Exposed bedrock with few cracks and little soil is extremely difficult for plants to colonize. Even the acids of lichen colonies have not altered the face of these rocks in over 10,000 years. These open areas of exposed rock do provide nesting sites for the common nighthawk; while heating of the rock surface helps provide lift for turkey vultures.

No. 22 (11.5 km)

A stand of tamarack on the west side of the road: Some tall stands of aspen can be seen along the road as one approaches this site. The tall tamarack trees represent the only North American conifer which loses its needles each fall. These trees were generally more numerous when the white man came to this country. Shortly after 1900, the larch sawfly attacked the populations of North American tamarack (Nairn, 1960). Tamarack are preferred food for porcupines; while spruce grouse and snowshoe hares eat the buds and tender shoots.

No. 23 (15.3 km)

Moss and lichens are plentiful: The light-colored feathery plants among the rocks are clumps of reindeer moss; the wispy, dark plants hanging from the trees are arboreal lichens, often called "old man's beard." These are preferred foods for woodland caribou which can only occur in mature forest. These habitats and open bogs appear essential for woodland caribou survival.

No. 24 (16.6 km)

Sausage Lake to the west, Mink Lake to the east: Trees growing on the rock ridges illustrate that sunlight is not the most important factor to survival there. Notice that they are short, stocky, often crooked and have live branches clear to the ground. Trees growing in rock cracks suffer from lack of nutrients, water and proper anchorage. When the bedrock is exposed by construction or other factors, the area is prone to erosion. This sets back plant succession and can wipe out plant communities indefinitely.

Just past this stop is the natural drain between Sausage and Mink Lakes. This water corridor is wide compared to a man-made ditch. It contains abundant speckled alder. The thin band of spruce along its edge, with aspen and jack pine above, is a good example of how consistent water levels are. Although wet in the summer, these alder thickets can provide food for ground feeding small mammals, hares and birds in the winter.

No. 25 (19.8 km)

Trail to Euclid Lake: Just a few hundred meters past this stop on the west side of the road is a mature white spruce tree. It has a large triangular shaped hole at its base made by a pileated woodpecker (Canada's largest woodpecker). This ant infested tree is covered with arboreal lichen and is a good example of the difference between white and black spruce trees. Black spruce trees are generally thin crowned and contain a gap between the terminal leader and the rest of the tree. White spruce are generally thicker crowned with larger cones and have a more symmetrical shape.

No. 26 (20.5 km)

Creek draining Euclid Lake into Cat Lake: This area is a good illustration of the value of a creek for water level stability for year-around habitat for various species, corridor routes for numerous bird, fish and mammal species; and winter food for herbivores once ice develops. A creek also provides an area where oxygen can enter the system through fast water areas during the ice cover season.

No. 27 (20.6 km)

Trapper McDougall's cabin and winter roads: Trappers often establish cabins and caches within their traplines. This cabin has become a year-around residence. The winter roads provide access into various trapping areas.

No. 28 (21 km)

View of Cat Lake through the trees: The Parkway along Cat Lake is high on the bank with a steep slope down to the water's edge. The lack of dense ground vegetation on the slope will not trap debris and pollutants from the road. The road cut has opened up the tree canopy, making it prone to wind damage. The lack of an understory will allow increased wind velocities to reach the water causing large waves. This will disrupt the shorelines and increase turbidity and fertility in the lake. Roads are best kept from paralleling lake shorelines; while shrubs and low vegetation around lakes should remain to help prevent disruptive action of waves.

Cat Lake has an average depth of only six feet, but it is two kilometers by one-quarter kilometer in size. Fish, including perch, pike and suckers, are present in small numbers. Fish cannot survive in lakes which freeze to the bottom. Shallow lakes often suffer oxygen depletion once they freeze over. Cat Creek helps provide a winter oxygen supply. Care must be taken to prohibit lake pollution which will increase productivity but also increase the chances of oxygen depletion causing a fish kill.

No. 29 (21.6 km)

Road into the abandoned Cat Lake mine: This old road disrupted drainage causing the flooding out of some species and providing temporary habitat for others. A considerable amount of land surface has been disturbed and is being reclaimed by vegetation. This reclamation is of value to herbivores whose browsing sign is evident.

No. 30 (23.5 km)

Cat Creek: Open water during the winter in the creek is another example of a winter entrance area for aquatic furbearers. It also is a place where oxygen can enter the water in winter and be a benefit to all aquatic organisms requiring oxygen. Care must be exercised to prevent overusing this area which would eliminate it as a wildlife corridor. The creek shores show a good example of wet to dry succession - sedges near the water to willows to alders to spruce to aspen to jack pines growing on the rock ridges. The stocky, spreading nature of jack pines growing on the rock ridges illustrates that soil and anchorage and not sunlight is the limiting factor to growth in this location.

A large white spruce tree is obvious on the east side of the road. The bay area near the lake outlet produces wild rice while the rock outcrops provide habitat for common nighthawks and other birds to feed upon the insects produced in the lake and creek.

No. 31 (25 km)

Winter roads: Trees growing on the better drained sites on the east side of the road are larger and more robust than those on the west side. Differences in soil and drainage conditions can be detected from the vegetation in a particular area.

No. 32 (26.3 km)

Borrow pits, east and west: Although often an unsightly scar on the landscape, borrow pits can be a benefit for a number of species. Areas opened up provide habitat for invader plant species which are only temporary but which produce tremendous numbers of seeds. Seeds are used for food by many species of wildlife. In addition, the plants which succeed these invaders are available to small mammals, hares, deer and moose. Often borrow pits are deep enough to hold water, thus providing a variety of aquatic habitats. Borrow pits are often utilized by bird species for dusting, sunning, and grit gathering as well as feeding. When used as dumps by humans, borrow pits provide food and attraction for numerous wildlife species. These species need not be observed in the dump; their increased numbers in the area increase their chance encounters with humans.

No. 33 (26.6 km)

Rock outcrop: Rock outcrops such as these demonstrate resistance to weathering and the constant attempts of plants to colonize them. Fire, wind, drought conditions and lack of soil fertility also limit the extent to which plants are able to colonize rock surfaces.

No. 34 (26.9 km)

Pure jack pine on sand: Jack pine stands can thrive despite severe nutrient and moisture deficiencies. Sand, being composed of large grains, does not provide the surface area necessary to prevent leaching of minerals and the seeping away of water. Look in this area for woodchucks. Sand provides one of the few places in the park in which burrows can be dug below the frost line. Roadbeds often provide corridors for species like the woodchuck to extend their ranges through a natural barrier.

No. 35 (27.4 km)

Water pump on the east side of the road: This feature illustrates the holding capacity of rock basins. This sand point, down only a few meters, provides available fresh water. The depth of the point is not near the level of the land surface to the west. Sand is a good filter as the taste of the water indicates.

No. 36 (27.7 km)

Shoe Lake temporary camping area: The shorelines of Shoe Lake are mostly bedrock with some sandy beaches. These shorelines are vulnerable to erosion from wind and wave action. Motor boats on such a lake will expose large areas of rock shoreline. Pollutants from the road and campground are threats to the waterbody.

A bald eagle nest in the southwest bay of Shoe Lake produced two fledglings in 1977. Human activity must be restricted from that area if eagles are expected to continue to reproduce there. During the summer of 1977, gulls and terns were attracted to some of the rock islands and peninsulas. Vegetation over rock quickly disintegrates under human foot. Long term use of this campground will likely reduce the ground cover to bare rock.

No. 37 (28 km)

The boat launch: The boat launch goes directly off the Parkway down a steep slope. Note the rock outcrop around the lake. It also forms islands and peninsulas. This rock formation under the water surface appears to provide habitat for small-mouthed bass which have been stocked in the lake. Pickerel have not established themselves in this lake. Boat launches are best constructed in sheltered bays where wave action will have less effect on both boat launchers and shorelines.

No. 38 (31 km)

Jack pine on sand: Only the tops of these trees are green indicating the low value to the trees of branches not receiving direct sunlight. Only those branches receiving direct sunlight will continue to grow. Very little ground vegetation is evident under this forest cover.

No. 39 (31.5 km)

Rabbit River: This drainage provides the restricted habitat required by the alder flycatcher while the creek produces insects which are utilized by other flycatchers, swallows and nighthawks, as well as fish and various insects. These drainage areas are good places to look for signs of many wildlife species which follow the creeks between larger bodies of water.

No. 40 (32.7 km)

Road to the east into a borrow pit: This disturbed area is of interest due to the plant succession which provides habitat for various animal species. First plants to move into disturbed sites are called invaders. These plants often produce huge numbers of small, light seeds which disperse over a large area.

No. 41 (33.5 km)

Road to Black Lake: Fish populations in these lakes are vulnerable to many factors including turbidity, pollution with nutrients, low oxygen levels and obstructions in the creeks used as spawning runs. Care must be taken to limit these problems if the water bodies are to provide recreation for future generations.

No. 42 (34.5 km)

Black River: Rivers and creeks are used as travel corridors by waterfowl, herons, eagles and ospreys as well as fish and mammals during the summer. They are also important for many wildlife species during the ice season. These water courses provide year around viewing potential and must be kept intact and not broken into pieces by human activities in particular sections.

No. 43 (36.3 km)

Black spruce stand: Black spruce stands provide the unique habitat required by such species as golden-crowned kinglets, boreal chickadees and cape may warblers. This stand will likely illustrate the change in natural drainage due to construction of the Parkway.

No. 44 (37.1 km)

The existence of tamarack in a bog situation: These semi-open bogs provide the habitat requirements for palm warblers and, in some areas, great gray owls. Pitcher plants, sundews and leafy white orchis are common in this area. Care must be exercised to prevent walking on bog plants. Due to the poor nutrient value and wet conditions, plants growing in bogs are often fragile and vulnerable to crushing, root disturbances and water table changes.

No. 45 (38.4 km)

A survey line transecting the Parkway from north to south: Note the lack of an understory in this forested area. This reflects the acid dark conditions existing under a black spruce forest. The spruce bog in this area supports sphagnum moss. This moss continues to grow on top of itself and may form a mat several meters thick. Like a giant sponge it is nearly 99 percent water.

No. 46 (40.3 km)

Bog on the east side of the road: Since sphagnum retains water, it is nearly impossible to drain a bog. A ditch through a bog will only drain a few meters on either side of the trench. Peat (condensed sphagnum) is being used in several parts of the world to produce fuel. Once peat is removed, the cavity can be drained or used for many purposes.

No. 47 (42.1 km)

Bindweed vines along the roadside: Bindweed is constantly attempting to establish a hold on the roadsides. This plant expands by vegetative runners as strawberries do. They help limit erosion by wind and water along recently completed roadsides. They are shade intolerant and will disappear as other plants become established.

No. 48 (42.9 km)

No. 49 (43.7 km)

No. 50 (44 km)

No. 51 (44.4 km)

All four of the preceding sites are borrow pits: These are areas where glacial till accumulated during the last ice age. Removal of this till will alter groundwater and natural drainage patterns. Look for the effects of these changes as well as plant regeneration in the pits themselves. These pits provide grit and dusting areas for numerous bird species. Food and cover areas are developing from the outsides toward the center of these disturbances. They will provide food and shelter for many small mammal, bird and herbivore species as plant succession continues toward mature forest.

No. 52 (45.2 km)

A bog in a late stage of succession (dry land): Bogs often begin as small lakes, then are colonized by grasses and sedges. In boreal areas, sphagnum mosses, spruce and tamaracks often become established around the edges. As plants die, they form an organic layer which can support larger water tolerant species. As these plants die, their decaying material is added to the organic mass. Eventually other less water tolerant species such as aspen can become established. This series of events is a form of succession and is constantly taking place. Succession on disturbed sites such as borrow pits or road edges occurs much more quickly.

No. 53 (45.3 km)

Small creek connecting Flintstone Lake with a small un-named lake to the west: Care must exercised when

developments are planned in this area. Excessive development along both sides of such a stream will effectively split the populations of species using this stream as a corridor between the two water bodies. For some species the creek itself provides the only suitable breeding area.

No. 54 (45.6 km)

Jack pine growing on sand: Little understory is present with tall straight trees in the canopy. These trees are competing for sunlight and differ from the short broad-crowned jack pines growing on rock outcrop.

No. 55 (46.1 km)

Trail into Flintstone Lake: These trails provide access for trappers and other human users. Animals also use these trails both as access and as feeding areas as the forest regenerates. Like humans, animals will choose the easiest route between points A and B.

No. 56 (47.6 km)

Rust-colored rocks containing iron: The color of these rocks is from oxidation of the iron pyrite. Natural iron rusts much the same way that cars do! Hundreds of years will pass before vegetation will cover the scar made when the road was blasted through this area.

No. 57 (50.8 km)

Nest hole in a jack pine trunk: The nest hole was used by a black-backed-three-toed woodpecker in 1977.

No. 57A (51.3 km)

Jack pine tree with a "broom" top: Nopiming Park is fortunate that the dwarf mistletoe is not very common. This saprophyte grows in the tree tissues and eventually kills the host tree. Infected trees often grow a thick or broom top.

No. 58 (52.4 km)

Rock outcrop illustrating a possible fault line: Faults occur when a rock mass splits and one side shifts up or down more than the other side. They are caused by the earth's internal forces acting upon the rocks making up the crust.

No. 59 (53.5 km)

The moose River - a major canoe route: These waterways are extremely important for insect and other fish food during the summer, and as transportation routes for many wildlife and fish species. Because of the narrow bands of habitat along the shorelines and the water and lush growth along streambanks, species of wildlife often congregate near streams.

No. 60 (56.6 km)

A black ash stand on both sides of the Parkway: Black ash with an understory of alder and ash, although uncommon in the park, shows good regeneration in the understory. The mature clump of white spruce trees on the east side of the road is also atypical of the area. Ash is tolerant of moist soil which is not acid. It is intolerant of excessive soil compaction and trails through the area should be avoided. White spruce also requires neutral soil conditions, preferring drier sites than does black ash.

No. 61 (56.8 km)

Road east leading to borrow pit: These borrow pits illustrate till deposits from the last ice age. They provide the surface for the road. These disturbed sites provide areas for many plants to grow. These openings in the forest canopy provide habitat for plant species which are fed upon and used for cover by many animal species.

No. 62 (59.5 km)

Small burned area showing evidence of a crown fire: This site illustrates why jack pine can regenerate quickly after a fire. Many of the burned jack pines still retain their now opened cones. Jack pine cones do not open and drop to the ground as most conifer cones do. Many cones require heat to open and release the seeds. Cones often remain on the trees for several years. A fire triggers the cones to open thus releasing seeds onto a recently burned forest floor. Look for jack pine seedlings under the fire scarred parents.

No. 63 (60 km)

To the west is one of the largest bogs in the park: Note the vegetative changes as you descend from the road. This habitat supports sandhill cranes, Canada geese, palm warblers, Connecticut warblers, LeConte's sparrows and greater yellowlegs. Flora include carnivorous plants such as sundews and pitcher plants. Leafy white orchis, bog birch, meadow sweet, horsetail, labrador tea, bog goldenrod, bog myrtle (used by early settlers as a moth repellent), cotton grass, along with low and rock cranberries are also present. Insectivorous plants attest to the nutrient deficiencies in the bog. Nutrients may be present but are unavailable due to the local acidic conditions upsetting the water balance in plant tissues. Plants growing in bogs are often easily crushed as both their above and below ground systems are poorly developed. These structures are often fragile due to a lack of available nutrient building blocks and anchorage. Trees growing in bogs may live more than 100 years yet are often less than an inch in diameter. Bogs are sensitive to disturbance, hence human excursions in bogs during summer should be avoided.

No. 64 (60.8 km)

A mixed stand of aspen and birch can be seen on either side of the Parkway: These paper birches are the type Native people used to make canoes. Birches are easily recognized by the papery appearance of their white bark. A peeled tree is exposed to insects, sunburn and disease. Birch lumber is used for fine cabinets, interior finishing, spools and clothes pins. Seeds and buds are eaten by songbirds and upland game birds, while mammals often consume the twigs.

No. 65 (63.1 km)

The Manigotogan River crossing: The Manigotogan River is a major corridor for various wildlife species as well as a spawning area for fish. It is important as an access route for various wildlife species into Gem and Garner Lakes to the east, Beresford Lake to the north and Long, Manigotogan, Quesnel and Lake Winnipeg to the west. Culverts must be placed so that the current is not too great for spawning fish to overcome.

No. 66 (64 km)

Coniferous forest community: This area indicates a mature forest with little understory and a ground cover of various mosses and clubmoss. The shrub zone is largely absent. Few wildlife species inhabit this area. It lacks both food and cover.

No. 67 (64.8 km)

Parking lot for Stormy Lake interpretative display and trail:

No. 68 (65 km)

South end of Stormy Lake: The wet area to the north illustrates a marsh with cattails and sedges; note the differences from a bog. The large number of water-killed trees and remnants of a beaver dam near the culvert illustrate natural water level manipulation. Wild rice is common in the lake while wood ducks, buffleheads, common goldeneyes, and hooded mergansers may nest in the old dead trees. Beaver not only provide ponds for fish, but they provide nest cavities and food for birds. When the beaver no longer repair their dam, the pond drains and meadows form. Lakeside bird species include yellow warblers, eastern kingbirds, grebes, water thrushes and tree swallows. Bird species found in deciduous habitats along the trail include flycatchers, warblers and thrushes.

No. 69 (68.1 km)

Rock outcrop showing green andesite: When rocks form deep in the earth's crust, they are first heated to a molten state. As they cool, different minerals separate out as they solidify. Often minerals separate into aggregates in nearly pure forms.

No. 69A (Between stops 69 and 70 on the right-hand side of the road is a pileated woodpecker's feeding hole at the base of a large white spruce snag).

No. 70 (69 km)

Turn-off to Beresford Lake. Wolf tracks were observed along the Parkway between Stormy Lake and the Long Lake turn-off on winter visits to the park in December, 1977 and March, 1978. Animals often use roads and man-made trails, especially in winter because roads are easy to travel compared to floundering in deep snow.

No. 71 (69.2 km)

Blasted rock outcrop containing pyrite or fool's gold: Fool's gold made fools of several early explorers who returned to Europe with their treasure only to find it was worthless pyrite. It will be many years before vegetation will cover the scar left when rock was blasted away.

No. 72 (70.2 km)

North end of Stormy Lake: Beaver have been manipulating water levels in this area. Several species of waterfowl, flycatchers, and a swallow utilize this area's dead tree cavities for nesting.

No. 73 (73.9 km)

Long Lake turn-off.

No. 74 (74.4 km)

Lone grave: This human grave site illustrates the transportation problems and priorities which existed in the Nopiming Park area only a few decades ago.

No. 75 (75.3 km)

Rock seams: Strings of white quartz appear in the rock outcrop. This type of rock is resistant to plant colonization. It resists weathering and its surface has few cracks in which plants can gain a foothold.

No. 76 (76.1 km)

Fine sandy material along the road: This sand represents some of the mine tailings from the once boom town of Wadhope. This area has virtually no vegetation growing on it despite the fact that the mine operation shut down in 1935. Although not colonized by plants, the area is used by several animal species - foxes as a corridor, deer to play in, woodland caribou to loose flies in, and some migrating shorebirds to rest in. There was a belted kingfisher's nest found by the author in this area in 1971.

No. 77 (76.8 km)

Road to the east connecting several mines with Wadhope: Look for regeneration and various species growing out of place in this area. Succession is slow where rock and sand and low fertility limit footholds and productivity.

No. 78 (77.1 km)

Wadhope, hydro line trail, tailings: Note the plant species colonizing the townsite. They are not typical of plants in the surrounding area. When areas are disturbed, the natural flora is often destroyed. Seeds are often transported by humans from distant sources. These seeds could be transported in grain, hay, clothing or other containers. Foreign seeds sometimes grow and establish communities of that species far from the nearest known colony.

No. 79 (79.5 km)

North entrance sign to Nopiming Park.