THE SPUR WOODS

A PLAN FOR PROTECTION AND MANAGEMENT

BY JEFF SUGGITT

A PRACTICUM SUBMITTED IN
PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE
MASTER OF NATURAL RESOURCES
MANAGEMENT

NATURAL RESOURCES INSTITUTE
THE UNIVERSITY OF MANITOBA
WINNIPEG, MANITOBA

ISBN 0-315-81811-5

Name Jeff Suggitt

Dissertation Abstracts International is arranged by broad, general subject categories. Please select the one subject which most nearly describes the content of your dissertation. Enter the corresponding four-digit code in the spaces provided.

Environmental Sciences.

SUBJECT TERM

0768

SUBJECT CODE

U·M·I

Subject Categories

THE HUMANITIES AND SOCIAL SCIENCES

COMMUNICATIONS AND THE ARTS

Architecture 0729
Art History 0377
Cinema 0900
Dance 0378
Fine Arts 0357
Information Science 0723
Journalism 0391
Library Science 0399
Mass Communications 0708
Music 0413
Speech Communication 0459
Theater 0465

EDUCATION

General 0515
Administration 0514
Adult and Continuing 0516
Agricultural 0517
Art 0273
Bilingual and Multicultural 0282
Business 0688
Community College 0275
Curriculum and Instruction 0727
Early Childhood 0518
Elementary 0524
Finance 0277
Guidance and Counseling 0519
Health 0680
Higher 0745
History of 0520
Home Economics 0278
Industrial 0521
Language and Literature 0279
Mathematics 0280
Music 0522
Philosophy of 0998
Physical 0523
Psychology 0525
Reading 0535
Religious 0527
Sciences 0714
Secondary 0533
Social Sciences 0534
Sociology of 0340
Special 0529
Teacher Training 0530
Technology 0710
Tests and Measurements 0288
Vocational 0747

LANGUAGE, LITERATURE AND LINGUISTICS

Language
- General 0679
- Ancient 0289
- Linguistics 0290
- Modern 0291

Literature
- General 0401
- Classical 0294
- Comparative 0295
- Medieval 0297
- Modern 0298
- African 0316
- American 0591
- Asian 0305
- Canadian (English) 0352
- Canadian (French) 0355
- English 0593
- Germanic 0311
- Latin American 0312
- Middle Eastern 0315
- Romance 0313
- Slavic and East European 0314

PHILOSOPHY, RELIGION AND THEOLOGY

Philosophy 0422
Religion
- General 0318
- Biblical Studies 0321
- Clergy 0319
- History of 0320
- Philosophy of 0322

Theology 0469

SOCIAL SCIENCES

American Studies 0323
Anthropology
- Archaeology 0324
- Cultural 0326
- Physical 0327

Business Administration
- General 0310
- Accounting 0272
- Banking 0770
- Management 0454
- Marketing 0338

Canadian Studies 0385
Economics
- General 0501
- Agricultural 0503
- Commerce-Business 0505
- Finance 0508
- History 0509
- Labor 0510
- Theory 0511

Folklore 0358
Geography 0366
Gerontology 0351
History
- General 0578
- Ancient 0579
- Medieval 0581
- Modern 0582
- Black 0328
- African 0331
- Asia, Australia and Oceania 0332
- Canadian 0334
- European 0335
- Latin American 0336
- Middle Eastern 0333
- United States 0337

History of Science 0585
Law 0398
Political Science
- General 0615
- International Law and Relations 0616
- Public Administration 0617

Recreation 0814
Social Work 0452
Sociology
- General 0626
- Criminology and Penology 0627
- Demography 0938
- Ethnic and Racial Studies 0631
- Individual and Family Studies 0628
- Industrial and Labor Relations 0629
- Public and Social Welfare 0630
- Social Structure and Development 0700
- Theory and Methods 0344

Transportation 0709
Urban and Regional Planning 0999
Women's Studies 0453

THE SCIENCES AND ENGINEERING

BIOLOGICAL SCIENCES

Agriculture
- General 0473
- Agronomy 0285
- Animal Culture and Nutrition 0475
- Animal Pathology 0476
- Food Science and Technology 0359
- Forestry and Wildlife 0478
- Plant Culture 0479
- Plant Pathology 0480
- Plant Physiology 0817
- Range Management 0777
- Wood Technology 0746

Biology
- General 0306
- Anatomy 0287
- Biostatistics 0308
- Botany 0309
- Cell 0379
- Ecology 0329
- Entomology 0353
- Genetics 0369
- Limnology 0793
- Microbiology 0410
- Molecular 0307
- Neuroscience 0317
- Oceanography 0416
- Physiology 0433
- Radiation 0821
- Veterinary Science 0778
- Zoology 0472

Biophysics
- General 0786
- Medical 0760

EARTH SCIENCES

Biogeochemistry 0425
Geochemistry 0996
Geodesy 0370
Geology 0372
Geophysics 0373
Hydrology 0388
Mineralogy 0411
Paleobotany 0345
Paleoecology 0426
Paleontology 0418
Paleozoology 0985
Palynology 0427
Physical Geography 0368
Physical Oceanography 0415

HEALTH AND ENVIRONMENTAL SCIENCES

Environmental Sciences 0768
Health Sciences
- General 0566
- Audiology 0300
- Chemotherapy 0992
- Dentistry 0567
- Education 0350
- Hospital Management 0769
- Human Development 0758
- Immunology 0982
- Medicine and Surgery 0564
- Mental Health 0347
- Nursing 0569
- Nutrition 0570
- Obstetrics and Gynecology 0380
- Occupational Health and Therapy 0354
- Ophthalmology 0381
- Pathology 0571
- Pharmacology 0419
- Pharmacy 0572
- Physical Therapy 0382
- Public Health 0573
- Radiology 0574
- Recreation 0575
- Speech Pathology 0460
- Toxicology 0383

Home Economics 0386

PHYSICAL SCIENCES

Pure Sciences

Chemistry
- General 0485
- Agricultural 0749
- Analytical 0486
- Biochemistry 0487
- Inorganic 0488
- Nuclear 0738
- Organic 0490
- Pharmaceutical 0491
- Physical 0494
- Polymer 0495
- Radiation 0754

Mathematics 0405
Physics
- General 0605
- Acoustics 0986
- Astronomy and Astrophysics 0606
- Atmospheric Science 0608
- Atomic 0748
- Electronics and Electricity 0607
- Elementary Particles and High Energy 0798
- Fluid and Plasma 0759
- Molecular 0609
- Nuclear 0610
- Optics 0752
- Radiation 0756
- Solid State 0611

Statistics 0463

Applied Sciences

Applied Mechanics 0346
Computer Science 0984
Engineering
- General 0537
- Aerospace 0538
- Agricultural 0539
- Automotive 0540
- Biomedical 0541
- Chemical 0542
- Civil 0543
- Electronics and Electrical 0544
- Heat and Thermodynamics 0348
- Hydraulic 0545
- Industrial 0546
- Marine 0547
- Materials Science 0794
- Mechanical 0548
- Metallurgy 0743
- Mining 0551
- Nuclear 0552
- Packaging 0549
- Petroleum 0765
- Sanitary and Municipal 0554
- System Science 0790

Geotechnology 0428
Operations Research 0796
Plastics Technology 0795
Textile Technology 0994

PSYCHOLOGY

General 0621
Behavioral 0384
Clinical 0622
Developmental 0620
Experimental 0623
Industrial 0624
Personality 0625
Physiological 0989
Psychobiology 0349
Psychometrics 0632
Social 0451

THE SPUR WOODS: A PLAN FOR PROTECTION AND MANAGEMENT

A practicum submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of Master of Natural Resources Management.

By

Mr. Jeff Suggitt

1993

ABSTRACT

This document represents a Plan For Protection and Management of the Spur Woods, describing the natural and historical features, and present uses of the area. It provides guidelines for future development and management of the Spur Woods through the identification of land use zones, trail management and development proposals and by recommending that the site be designated as a protected area under provincial legislation.

A primary focus of the study was a field inventory of the natural resources of the Spur Woods. Field Observations were supplemented by literature and information gleaned from local area residents in interviews and correspondence. The Spur Woods contains over 130 species of plants, 27 species of mammals and 29 species of birds. The field study also revealed 6 trails in the area one of which being an abandoned railway right-of-way. The results indicate that outdoor recreation is feasible in the area.

Interviews and conversations involving local people and government staff were important in determining present and future proposed uses of the area. This information in combination with the resource inventory was used to determine use zones and to develop a trail management plan to meet local and broader interests.

The Department of Natural Resources will continue to manage the Spur Woods in the future, however concerns for protection of the area and development for recreation are part of the rationale for giving the area a new designated status. An important part of this project involved consideration as to the most appropriate designation. Analysis of various provincial land categories was completed in order to identify the best fit for the Spur Woods, which proved to be a wildlife management area or forest conservation area.

ACKNOWLEDGEMENTS

I would like to thank my academic committee for their guidance and support throughout the completion of this document: Mr. Grant Baker, Department of Natural Resources; Dr. A. John Sinclair, Natural Resources Institute; Dr. Karen Fox, Department of Physical Education and Recreation Studies and Mr. Gordon Jones, Parks Canada. In the early stages of this study there were two important people who assisted me in the research, Chris Higgs and my fiancee Carol Dupras. Special thanks are also extended to my fellow students at the Natural Resources Institute, Ms. Gloria Kehler of the Botany Herbarium for her identification skill and Mr. Bill Koonz for his assistance and editing efforts throughout the process. My sister Leanne is also recognized as an editor.

Many other people with resource expertise were also consulted during the course of this study, their names appear under personal communication and my deepest thank you is extended to each of them.

This practicum was funded by the Honourable Harry J. Enns, Minister of Natural Resources and the Spur Woods Heritage Reserve Association.

The work ethic and personal skills required to complete such an undertaking are the results of ones parents, and I solely dedicate this practicum to Jim and Lesley Suggitt.

TABLE OF CONTENTS

CHAPTER 5 - HISTORICAL AND EXISTING CONDITIONS PAGE

CHAPTER 6 - ZONING

CHAPTER 7 - TRAIL MANAGEMENT PLAN

CHAPTER 8 - DISCUSSION OF THE APPROPRIATE DESIGNATION

CHAPTER 9 - CONCLUSIONS AND RECOMMENDATIONS

APPENDICES **PAGE**

LIST OF TABLES

LIST OF MAPS , FIGURES AND PHOTOS

CHAPTER ONE

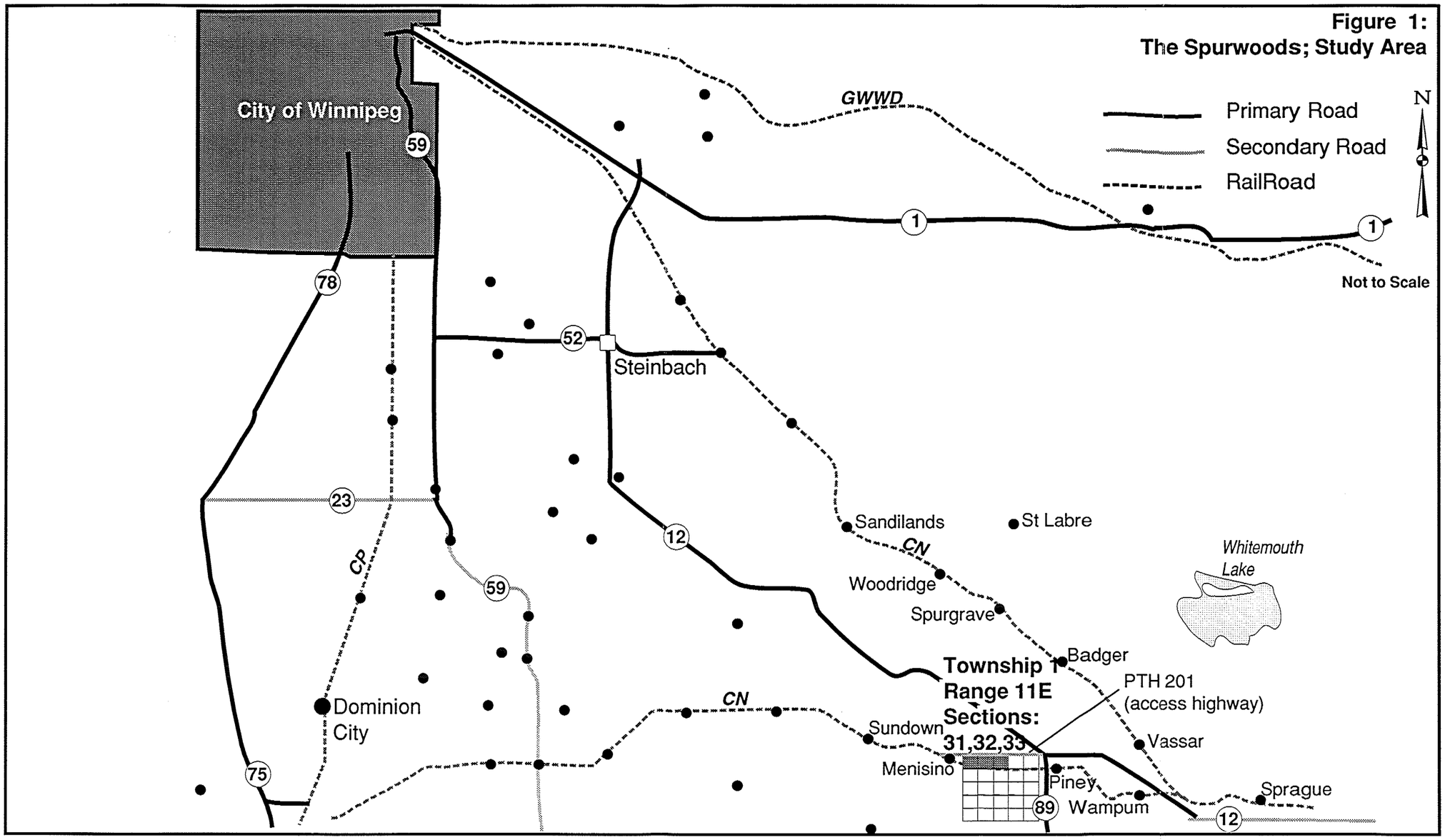
INTRODUCTION

1.0 BACKGROUND

The preservation of 12% of the terrestrial landbase was set out in Our Common Future, and through international cooperation many countries, including Canada, have committed themselves to fulfilment of this goal. The provincial government is committed to the notion of preserving 12% of the land base of the province for the conservation of biodiversity. The global concern for the preservation of wildlands has been expressed by citizens' groups throughout Canada and Manitoba and is reiterated by the Manitoba Round Table on Environment and Economy. In particular, the citizens of the Southeastern part of the province have expressed concern over the decrease in old-growth forested areas, and the increase in clear-cut areas which many find unpleasing due to the loss of wild plant species diversity. Within the remains of this forested zone is a particular piece of forest in the area between Piney and Menisino which has been identified by local citizens as an important forest recreation area which is dependent on the plant and animal communities currently associated with the area. The most notable activities in the area include nature walks, berry-picking and hunting. The area is also within a provincial forest and cutting proposals have been developed.

This old-growth forest is known as the Spur Woods. The area covers sections 31, 32 and 33 of Township 1, Range 11E (see figure 1). These 3 sections are crown land and represent the most southerly portion of the Sandilands Provincial Forest. The south-east quarter of section 33 is privately owned and is not included as part of the Spur Woods, there is also extensive crown ownership of land south of the Spur Woods which

Figure 1:
The Spurwoods; Study Area



may provide linkages between ecological communities in the area.

A private interest group, the Spur Woods Heritage Reserve Association, is an active group of citizens of the towns of Piney and Menisino, in the Local Government District of Piney, and together they have worked to protect the area from logging. This preservation effort was brought to the attention of the Minister of Natural Resources (DNR). This initial resource inventory, trail management plan and analysis of preservation potential was part of the cooperative effort between the government and the local group. This project is in response to the efforts of the Department of Natural Resources and the Spur Woods Heritage Reserve Association, who needed guidance on the resource potential within the Spur Woods.

1.1 PURPOSE

The Department of Natural Resources in consultation with the Spur Woods Heritage Reserve Association considered the preservation of part(s) of the Spur Woods as a "natural area". The first proposition by the DNR in 1991 was to have the area inventoried and have it designated as an ecological reserve. This ecological reserve designation was opposed by local residents because it would preclude recreational use of the area. The purpose of this assessment study therefore is twofold:

1. To develop options and recommendations to protect and use the area, consistent with provincial government programs and policy and the views of local area residents; and
2. To identify and recommend ways to use and manage the area for recreational purposes in order to maintain its natural beauty and character.

1.2 OBJECTIVES OF THE STUDY

1. To complete a resource inventory to identify natural and historical resources to understand the area's communities, assess its significance and develop concepts for future use and management.

2. To describe existing conditions in the Spur Woods, focusing on physical attributes and trails already present in the area.

3. To identify unique or sensitive features and resources which require a high level of protection.

4. To develop recommendations for the establishment and management of motorized and non-motorized recreational trails.

5. Given objective (3) and the trail management plan in objective (4), to identify to the Department of Natural Resources the prefered land class designation which will preserve part(s) of the area while allowing many traditional recreational pursuits to continue in most area(s).

1.3 ROLE OF PARTICIPANTS

The Manitoba Department of Natural Resources (DNR) is the primary client in this investigation. The Spur Woods Heritage Reserve Association initiated the study in cooperation with DNR and acted as an advisory committee. This group also performed preliminary investigations into topography, trail location and history of the area prior to the formal study. The group was also consulted for opinions and information at each phase of the study, for example consultation was sought for an exhaustive list of current uses. It is expected that the group will be consulted by the DNR when a managemnt plan, designation and site plan are prepared for the area.

There are also secondary participants who have a vested interest in this study, the following were contacted:

1. Mr. Jack Penner (the local MLA),
2. The forestry branch,
3. The parks branch,
4. The wildlife branch,
5. The coordinator of the "Watchable Wildlife" program,
6. A local loggers association and
7. local citizens.

The role of each participant was to give advice during the course of the study relating to his or her particular position or area of expertise. Each individual is named in the methodology section. They also provided information used in the methodology during the study.

1.4 LIMITATIONS

This project developed from a cooperative effort between local citizens and the department of Natural Resources. Input of both of these groups was implicit throughout the study. The conclusions and recommendations presented here reflect that consultation and the resource inventory. The forest industry had little input in the study. This industry input may be important in the final decision by the Department of Natural Resources and may result in the DNR arriving at a different conclusion than that of this study.

1.5 ORGANIZATION

There are seven chapters in this practicum. The next chapter provides the literature background for the study. The third chapter details methodologies used and how they were used. The fourth chapter presents the historical and existing conditions within the Spur Woods, these data provide information for zoning, trail management and a final area designation. Chapter 5 discusses the implications of the zoning process, the information used in deciding on trail management and the final designation of the Spur Woods. Chapter 6 recommends the zoning to be used in the Spur Woods and follows with a recommended designation and trail management plan for the area. Chapter 7 ends the paper and presents conclusions and final recommendations for the Spur Woods.

CHAPTER TWO

THE RESEARCH SETTING:

FORESTS IN MANITOBA

2.0 SUMMARY

The changing attitudes toward forests and wildlife discussed in the literature review have placed pressure on government to conserve and protect these aspects of the Canadian heritage. The new attitudes exhibited by most Canadians have placed emphasis on the beneficial non-economic values of natural lands and the organisms which inhabit them. Many parts of the world have tried to sustainably develop these wildlands and encourage industries such as eco-tourism to merge protection and regional development. The appropriate designation of natural areas in Manitoba can provide for this sustainable use of the forest and wildlife resources. There is value to land when it is preserved, the value lies in recreational and life support values which are dependent on the ecological integrity of the area.

2.1 THE VALUE OF FORESTED WILDLANDS

In Canada's National Forest Strategy, the value of forests to Canadians was summarized in the following way:

"Canadians feel strongly that the forest is a vital part of their heritage. The economic, social, cultural, environmental and spiritual contributions {values} of the forest are tightly woven into our national fabric, playing a unifying role among all regions. Canadians see that the distinctive types of forest across our country contribute to the Canadian quality of life, just as our prized regional distinctiveness characterizes our people. Canadians expect responsible forest stewardship to support a strong economy and healthy environment."

Obviously, Canadian's feel that there is more value to our forest wildlands as a resource than as purely a source of financial revenue. Wildlands are areas that have not been significantly modified by human activities. Until the post World War II era, a large

proportion of the world's wildlands were protected by their remoteness, their vastness and their marginal usefulness for economic pursuits (Leduc and Goodland, 1988). This situation changed over the last 50 years however, and wildlands are rapidly disappearing in both developed and undeveloped countries. Improved access and the pressures of population growth, lack of land resource base, and economic development are rapidly converting wildlands to other uses. But wildlands that are maintained in their natural state can also contribute significantly to economic development. It is therefore important to seek a balance between preservation and exploitation (Leduc and Goodland, 1988).

Wildlands, kept in their natural state and properly managed, provide a refuge for plant and animal species that may prove to have yet unrealized economic uses, and that, more importantly, form part of the vast and little understood web of connections between all ecosystems, even when surrounded by development. Wildlands are also essential for the maintenance of environmental services including water control which prevents erosion and aids soil conservation, carbon dioxide uptake and oxygen production. Most such benefits are unpriced public goods (positive externalities) that are indispensable in meeting human needs and supporting the interconnections for all life. In support of these direct benefits of wildlands, Rolston (1988, p. 3-27) also lists the following as the values (or benefits) carried by natural areas.

Life Support

The ecological movement has made it clear that culture remains tethered to the biosphere and that the options within built environments, however expanded, provide no release from nature.

Recreational value

This poses one serious question: why do humans enjoy nature even when we no longer need it for economic or life supportive reasons, when the sense of "enjoy" alters from beneficial use to pleasurable appreciation? For some nature is instrumental to an active human performance. They want a terrain only to test their hiking skills or a cliff sound enough for pitons. For others the natural qualities are crucial in contemplating an autonomous performance. They watch a porcupine lumber through the forest, or two buck deer jostle for a mate. For the first group nature is a place to show what they can do, for the second, values are reached when they are let in on nature's show. Here humans value the wildland non-economically for its unbuilt characteristics. Is this only some sort of escape value? Or is there some more positive characteristic in wilderness that **re-creates** us.

Scientific Value

Natural science is our latest and perhaps most sophisticated cultural achievement, but we should not forget that it's focus is on primitive nature. Odd, presently useless, and often rare things typically have high scientific value, they teach us life's development and survival patterns. Who is to say where tomorrow's scientific values may lie? Science tells the natural tale: how things are and how they came to be. That story can not be worthless, not only because human roots lie in it, but because we find it a delightful intellectual pursuit (Rolston,1988).

Economic Value

Forested wildlands have economic value in resource based economies. These

monetary values include forestry (logged) value and hunting value of the wildlife present in the forested area (Robinson, 1976).

Aesthetic Value

In response to the utilitarian use of natural resources and critics of the wilderness idea, twentieth century defenders of wild things struggled to be accepted.

Wilderness aesthetics and the appreciation of them, (within a philosophical framework) is important. Many have argued that wilderness has a right to exist for its own sake, independent of whether humans value it or not. There are several problems with this human concept for defending wilderness. Objects that compose a wilderness, such as wild animals, virgin forests, or untravelled rivers, might be thought of as having rights to exist independent of peoples' interest, but it is difficult to use the same logic for a concept that exists solely in the human mind, that of a wildland. Thus the aesthetics associated with wildlands can be said not to exist unless they are incorporated into the thoughts of a human being. The appreciation of wilderness, and the associated thought processes while experiencing outdoor recreation, lead to a greater appreciation for the educational and aesthetic values of attributes such as an old-growth forests (Dearden, 1980).

The importance of wilderness aesthetics to recreation in Canada is of monumental importance (Filion, 1983). The recreation resource base is made up of a combination of the natural qualities and the public's enjoyment of them. The values listed above can be used to justify the preservation of wildlands. The preservation can also be augmented

by the fact that thousands of people over time can enjoy a public use area which in itself is a reason to defend wildlands. Many Canadians value the life support, recreational, scientific and aesthetic values of wildlands more than the economic value of said places. The values listed above are generally recognized in North America and can be used to justify the protection of some wildlands.

The Manitoba government has a draft policy regarding valuable wildlands. This policy, numbered 1.2 in the Natural Lands and Special Places Workbook, states that "Areas of significant natural, cultural, historical and heritage value shall be identified and designated under the authority of legislation as parks, ecological reserves, wildlife management areas, heritage sites, provincial forests or other special designations". This quote demonstrates that the values similar to that listed by Rolston do exist and are reiterated in policy in the province of Manitoba.

Thus, given the discussion of the values listed above, there exist many values of wildlands which are not economic. It is these values, including: life support values, recreational value, scientific value, natural value, cultural and heritage values which can be used to justify the protection of a valuable parcel of land. It is these values that the public is demanding be addressed in public policy as demonstrated in this discussion.

2.2 PROGRAMS AND POLICY AFFECTING WILD PLANTS AND WILDLIFE

The realization by the world community of increasing species extinction and loss of biodiversity has spearheaded many programs and policies at the federal and provincial

government level, and has also been communicated by non-government organizations (NGO's).

2.21 Federal programs and policy

A Wildlife policy for Canada is a national policy providing a framework for federal, provincial and territorial governments' policies toward wildlife. This document expresses " the will of Canadians to conserve wildlife for its own sake and for the benefit of present and future generations of Canadians" (Environment Canada, 1990, p.5). Recently, public concern for wildlife has expanded to embrace the variety of life in all of its forms. Thus, wildlife in the above policy refers to all wild organisms and their habitats, including **wild plants**, invertebrates and microorganisms as well as the fishes, amphibians, reptiles, and the birds and mammals traditionally regarded as wildlife.

Forestry Canada (1991, p.4) states "government policies are changing to reflect evolving values and demands. Today, the forests must be managed not just for commercial timber supply, but for wildlife, for watersheds, recreation and biodiversity." Both the Canadian Wildlife Service and Forestry Canada recognize the need and demand for the conservation of wildlife in forestry planning. Provincial governments are expected in partnership agreements in forestry to implement the federal government policies concerning wildlife including wild plants.

2.22 NGO Programs and Policy

In 1989, Monte Hummel, the president of the World Wildlife fund noted, " If Canadians do not make the decision to reserve natural areas in this country within the next ten years, we will have lost the option to do so". In 1991, the Endangered Spaces

Campaign was initiated in Canada to direct the government in the protection of the terrestrial land base from development.

2.23 Provincial Programs and Policy

The Manitoba government has accepted the goals of the Endangered Spaces campaign and in the Natural Lands and Special Places workbook, has proposed draft policy for public review. Draft policy 1.1 states " by the year 2000, at least 12% of Manitoba that is representative of its natural lands and special places will be protected from commercial logging, mining, hydro development and other activities which adversely affect {wildlife} habitat". This goal can largely be accomplished by the preservation of Crown land, which can be of little current direct cost to the public. As owners of this public land, Canadians have the right to expect that some of its biological diversity will be preserved, for the benefit of future generations of wildlife and people. By symbolic samples of our provinces natural regions, the Endangered Spaces Campaign will ensure Canadians Maintain this entitlement.

National, provincial and NGO programs and policy all support the preservation of land for habitat for wildlife {including wild plants}. These policies are reflective of broader societal opinions and thus indicate the will of Canadians to preserve wild things.

2.3 RECREATIONAL USE OF FORESTS

Forests are an integral component of the resource base for rural recreation. Whereas the essential role which water plays in outdoor recreation has been well established, the contribution of forests is not so well documented. Yet, forests have been providing

recreational opportunities for a considerable length of time. Historically, the forests of Europe were valued more for recreation than for production and foresters were employed by the nobility to maintain a suitable habitat for game animals and to guard against poaching (Pigram, 1983).

Recreational areas, are considered by some to be a valuable natural resource. O'Riorden (1971) defines a recreation resource as:

"An attribute of the environment appraised by humans to be of value over time within constraints imposed by social, political, economic and institutional framework."

The process of creation, use and eventual depletion of resources for outdoor recreation differ little from that of other resources. Cawlson and Knetsch (1966) state "there is nothing in the physical landscape or features of any particular piece of land or body of water that makes it a recreation resource; it is the combination of the natural qualities and the ability and desire of people to use them that makes a resource out of what might otherwise be a more or less meaningless combination of rocks, soil and trees". Hart (1966) uses the term "recreation resource base" to describe the total natural values of a particular forest landscape. In his definition, he includes such attractions as the view of a quiet, moss covered forest floor, along with the more tangible phenomena such as sites for picnicking, camping and skiing.

It has been suggested by Wall (1989) that the aging of "baby boomers" will actually increase the need for outdoor recreation areas in Canada. This is due to the fitness boom, the large amount of disposable income that this group has obtained, the increased free time of this group and the popularity of bus tours. These people have grown up accustomed to camping and hiking and it is expected that these activities will not decrease

with age (Wall, 1989).

In Manitoba there is a large demand for viewing wildlife and associated habitats throughout the province. Often the wildlife is the main attraction, however just knowing that wildlife are present in the area satisfies most people. Often the traveller is fulfilled by viewing tracks or just being exposed to the habitat of their target species. The actual viewing of wildlife itself does have quantifiable demand and such viewing can be divided into incidental viewing and primary viewing. Incidental wildlife encounters include watching, photographing, feeding or studying wildlife on trips or outings which were taken primarily for other purposes. In 1987, 45% of Manitobans reported such trips. Based upon a 1987 Manitoba population of 812,000 aged 15 years and over, the above proportion represents 365,400 people (Matrix, 1991). Lime and Cushwa (1969) found that 96% of campers interviewed in a study in the northern United States said the opportunity to see wildlife in its natural setting has added to their outdoor experience. The objective of trips primarily related to wildlife is to watch, photograph or study wildlife. In 1987, 22% of Manitobans took such trips which represents 178,600 person trips directly related to wildlife activity (Matrix, 1991).

In Manitoba, the linkage between natural environments and tourism has been recognized by the provincial government. A cooperative effort has been established between the Department of Natural Resources and the Department of Industry, Trade and Tourism, resulting in the creation of a Watchable Wildlife program in the province. New sites will be included in this program and the piney old-growth forest in the Sandilands provincial forest has been targeted by the program.

Matrix Management identifies that potential areas for the Watchable Wildlife program are in the provincial forest and are in need of protection to assist in the development of said program. The theme ideas which may be lost by logging include the presence of rare plants such as the showy lady slipper, good examples of northern forest ecosystems, wide diversity of species and habitats, exceptional birdwatching opportunities and prime viewing of mammals associated with coniferous forest (Matrix, 1991).

The logging of such forested areas will have obvious impacts on recreation, however recreation itself can cause degradation of the resource base unless appropriate management techniques are used.

Any program such as watchable wildlife, interpretation or outdoor education which deals with the use of an outdoor forum must deal with the possibility of a number of impacts which people may have on the resource. Viewing wildlife in natural settings must consider the possibility that the presence of viewers may adversely affect the wildlife they seek by destroying or degrading wildlife habitat or disturbing animals or significantly disrupting their normal activities (Matrix, 1991).

To promote the sustainable development of these wildlife orientated recreation areas the Manitoba Department of Natural Resources has proposed the following management options at Watchable Wildlife sites.

Site preparation. Areas likely to experience heavy pedestrian traffic should be provided with fixed trails and observation towers located in areas where they will cause the least disturbance to wildlife and the terrain. Such measures are essential where

terrain and vegetation are easily damaged and where critical habitats are vulnerable to human interference. Points of access and restricted areas should be clearly marked, with explanations provided (DNR, 1993).

Education. Brochures, signs, public presentations and special displays should be prepared that show how undesirable impacts on wildlife may be avoided. Such information on protection of wildlife at "tour" sites should be readily available across the province and should be distributed through participating travel and tour agencies.

Interpretation and Outdoor Education. Learning about animals and plants is an important aspect of eco-tourism. People not only want to see wildlife, they want to know how they live and why certain aspects of their environment are more important than others. They can get this information from a number of sources:

> Interpretive centres that provide self-guided trails, and special teaching aids;

> Brochures that apply to specific viewing sites and that offer tips on how to view wildlife,

> Well designed signs and notices on-site and along self-guided trails.

All of these information sources are important and should be addressed in an overall plan for viewing tourism development.

Developmental conclusions

Matrix (1991: p.7.2) indicated that in developing wildlife tours and related programs for public viewing, it is essential that management procedures be established to ensure that viewing activities and site improvements do not degrade animal habitats and unduly disturb resident wildlife. Protection of Manitoba's valuable wildlife resources can be

guaranteed only through an integrated planning process that addresses the characteristics and sensitivity of individual viewing sites in light of anticipated levels of public use. In addition to dealing with issues of site preparation, facility development and public access for specific viewing locations, managers of a province wide program must provide education/information/interpretation packages designed to heighten public awareness of environmental sensitivity, and develop strategies to minimize potential land use conflicts.

DEVELOPMENT OF PROGRAMS

For satisfaction to be sustained for this increasing segment of the population which partakes in outdoor recreation, environmental factors must not be used up faster then they are produced. The capability of the resource base to continue to provide for recreational use raises the question of sustainable development and carrying capacity. Carrying capacity is concerned with the maximum level of recreational use, in terms of numbers and activities that can be accommodated by an ecosystem before an unacceptable or irreversible decline in ecological integrity occurs. Any use of an ecosystem will result in some change over time. This change, however must be balanced with management. Over-restrictive carrying capacity management could exclude recreational activity from an area totally (Edington, 1986).

There are two different kinds of carrying capacity of a natural area, social and ecological. Social carrying capacity relates to the number of people who can use an area without reducing the enjoyment of other individuals in the same area. The main parameter in this is crowding. Crowding is the "negative evaluation of a certain density, a value judgement which specifies that there are too many people" (Graefe, 1984, p.396).

Different recreational areas have differing social carrying capacities depending on the size of the area and the preferences of the users. An example of the difference in social carrying capacity is the inherent difference between Oak Hammock Marsh and the Sandilands Provincial Forest. Oak Hammock Marsh is expected to have in excess of 100,000 visitors in 1993. The social carrying capacity of such an area is huge as most people who visit such an area expect beforehand to see a large number of other people. In general people have different concepts of a natural experience and thus have a different social carrying capacity threshold. The visitors to a coniferous forest however probably have a different threshold, than those to an interpretive center. The trip to undeveloped areas may be to enjoy the peace and tranquillity and not the developed aspects. The values associated with such an experience include aesthetic value, diversity value and simple tranquillity value. Whereas an area like Oak Hammock may be enjoyed for its express recreational value, forested areas may be enjoyed for other values or reasons. The differences in social carrying capacity lend recreational areas in Manitoba well to the concept of recreational opportunity spectrum (ROS). This concept entails the offering of a wide array of recreational opportunities for the public. Factors to evaluate the ROS include access, non-recreational resource base, onsite management and social interaction (Dustin and McAvoy, 1981). The systems plan to management, including ROS offers a wide-array of opportunities and the informed user can choose the desired experience from the educational material mentioned earlier.

Evaluation of recreation resource potential, including ecological carrying capacity, is a necessary first step in the process of creating recreational opportunities.

The real problems for environmental management arise from the actual use of the recreation resource base. In the final analysis concern is often for the quality of the recreational experience, not the resource itself. The degree to which that experience contributes to the physical and mental well-being of participants may be more important than resource protection in some areas. This degradation must be balanced with resource preservation through the systems approach to management (Levy, 1979).

Problems arise when use of an area is not anticipated and methods of control or mitigation have not yet been established, when there is an unforseen level of use, or when the nature of use is unrecognized. The ironic fact is that most of the environmental impacts resulting from recreation-related activity will be caused unintentionally by individuals who appreciate the natural beauty, but who, by their increasing numbers, are threatening its integrity in many areas. It is the people who are the strongest supporters of wild areas, the people who walk, canoe or ski, who can often exceed an areas carrying capacity (Wall, 1989).

Ideally, recreation forest management objectives should reflect user preferences if they are to receive support at the implementation stage. Now that recreation has moved into the forest environment, it has collided with the established uses of forest land and caused serious conflicts including the need for areas to view wildlife that are only associated with old-growth forests. Established and necessary uses of forested land are being attacked by people who are looking for recreational areas. Some different types of recreation are incompatible when attempted in the same area. The conflict between skiers and wilderness enthusiasts in Southern Ontario is an example of this. Recreation

of some types is also incompatible with preservation, such as riding all terrain vehicles through a fragile forest. Recreation planning will help to make these collisions less inflammatory by pointing at potential conflicts in the uses of the land prior to their occurrence and by suggesting ways of mitigating the impacts (Douglass, 1975).

Albert Rutledge (1971), referred to recreation site planning and design. He suggested a set of 'umbrella considerations' or principles of design which include:

1. Design with purpose - so that the appropriate relationships are established between the various parts of the recreation complex. These include natural elements, use areas, people, animals and forces of nature.
2. Design for people - rather than to meet some rigid standards.
3. Design for both function and aesthetics - striking a balance of dollar values and human values with the achievement of efficiency interwoven with the generation of satisfying sensory experience."

   (from Rutledge, 1971)

2.31 SUMMARY

There are a number of uses for forested recreational areas, and the demand for areas to accommodate these uses has been growing. In summer, hiking, group nature walks, interpretation and wildlife viewing are all activities which may occur within close proximity to each other in the same forested area or even on the same trails. Conflict resolution is common in recreation, and when summer turns to fall recreational hunting becomes prevalent in many such areas. Hunting obviously can obviously not occur in the same area at the same time as wildlife viewing so the two activities must be separated

either in time or in space. There are also conflicts when planning winter recreation. The classic example of the confrontation between cross country skiing and snowmobiling in the same area is applicable in many parts of Manitoba's provincial forests. Sharpe (1983) suggests that a comprehensive trail management plan can reduce conflict and partially appease all groups involved. Alberta Parks (1989) presents guidelines for recreational trail design which can aid in the planning of a program to manage recreational uses and partition them in space to reduce conflict.

Recreational planning requires a wide knowledge base and interdisciplinary skills, if competently done however, it may be possible to allow for many forms of recreation to occur in one recreational area.

2.4 PLANNING CONSIDERATIONS FOR A PROTECTED AREA

There are three levels of planning respecting protected areas; systems planning, management planning and site planning.

2.41 Systems Planning

The fundamental principle behind the creation of national parks was to protect an outstanding representative sample of each of Canada's landscapes and natural phenomena (Environment Canada, 1990, p.4). In order to develop the system, the systems plan divided Canada into 39 distinct National Park Natural Regions based on physiography and vegetation.

Similar goals appear in a Systems Plan for Manitoba's Provincial Parks. The goals of this system plan include to protect representations of the natural and cultural heritage

of Manitoba.

The Endangered Spaces Campaign (ESC) also approaches the protection of land from a systems planning approach. The ESC has a measurable goal, to help conserve Canada's biological diversity by protecting a representative sample of the country's terrestrial natural regions by the year 2000. It is explicitly stated by the World Wildlife Fund (WWF) that "representation, not percentage is the ESC goal and progress reporting by the WWF will reflect this" (WWF, 1992).

The western Sandilands Provincial Forest lies in region 14, the Manitoba Lowlands, which is not represented at the national park level. " The Manitoba Lowlands Region which reaches through much of south-central Manitoba, includes both a national and provincial natural region, with no representative area yet protected by either government that is free from development"(WWF, 1992, p.23). This quote reflects the need for the preservation of land in this natural region.

2.42 Management Planning

Management planning of an area is concerned with issues such as policies and practices to give decision makers information to make proactive decisions. Park management plans are basically for the direction of park managers. They can also be commitments by the provincial government regarding the use and protection of terrestrial areas. Such plans contain statements of management objectives of sufficient detail to indicate how a protected area will be preserved and how it will represent the natural aspects of the region which it is in. Parks Canada (1979) suggest in keeping with these objectives, plans will: specify the type and degree of resource protection and management

needed to assure the ecological integrity of the Park and the management of its other resources; define the type , character and locale of visitor facilities, activities and services; and identify target groups.

The 1988 amendments to the National Parks Act state that the maintenance of ecological integrity must be the first consideration in management planning. Public involvement in this consideration is very important to receive support in the final policies regarding the management plan (Environment Canada, 1993, p.31).

In the preparation of a management plan, the maintenance of ecological integrity through the protection of natural resources will be the first priority when considering zoning and visitor use. The management plan provides the framework for site planning including resource management, interpretation, visitor services and public safety.

Zoning is one of the most important tools for the planning, development and management of protected areas. A zoning system should use a resource based approach by which land and water areas are classified according to natural resource protection requirements and their capability to accommodate visitors.

By defining areas and uses in the context of resource preservation, the zoning system is instrumental in maintaining the majority of the area in a wildland state. While zoning can result in dispersing visitor activities such as hiking, it can also contribute to concentrate support services and facilities (Environment Canada, 1993).

2.43 Site Planning

Site planning is the level of planning and management which is most obvious to visitors of a protected area. Site planning is concerned with things such as visitor

activities, information and interpretation, visitor services and facilities, access and trail design.

Protected areas can offer a variety of outdoor recreation opportunities for diverse interests, ages physical capabilities and skills so they can experience nature while being consistent with protecting the area's ecological integrity.

Interpretation has a number of objectives as part of the site management plan. Sharpe (1983, p.271) suggests that interpretation has three main objectives. The primary objective is to assist the visitor in developing a keener awareness, appreciation and understanding of the area he or she is visiting. Interpretation should help to make the visit a rich and enjoyable experience. The second objective is to accomplish management goals, and this can be done in two ways. First, interpretation can encourage thoughtful use of the recreation resource on the part of the visitor helping reinforce the idea that protected areas are special places requiring special behaviour. Second interpretation can be used to minimize human impact on the resource through informed use.

The third objective of interpretation is to promote an agency's goals and objectives. Well done interpretation promotes the agency that supplies it. If the message is overdone however, it will be labelled propaganda.

Visitor services and facilities include such things as parking areas, picnic areas, wildlife viewing towers and other such things to make the experience more enjoyable. These services are contained within the management plan and are grouped together as much as possible to respect ecological integrity.

Of all outdoor recreation facilities, a trail can be one of the most rewarding and one

of the most versatile. A trails unlike other facilities, can be enjoyed by everyone - senior citizens, families, handicapped persons and fitness buffs. Trail design is important in the recreational planning of a protected area, and guidelines for recreation trails can be found in Recreation trails by Alberta and Parks (1989).

2.5 SUMMARY

The values held by Canadians for forests include recreation, aesthetic and life support. The policies and programs of government reflect these values and there is a trend to preserve the remaining wildlands in Canada. Preservation by itself is not enough however, management planning for less consumptive uses such as recreation must be done to minimize impacts on the remaining natural areas in the country.

The first step then in wildland management is to inventory the species seemingly dependent on that particular area (Koonz, 1979). The next step is to choose a particular classification for the protected area based on the resources present in the area. Finally, the methodology should provide enough information to specify a management plan based on the results of the resource inventory.

CHAPTER THREE

METHODOLOGY

3.0 INTRODUCTION

There were three main methodologies used in the course of this study including literature search, interviews and ecological data methods. The literature search methodology consisted of searching the recent literature on the specific topic and condensing the information into a form suitable for this practicum. The literature which was used was either from government publications, books in the library or in the case of history of the area from early settlers surveys.

Interviews were performed in a non-scheduled manner. Non - scheduled interviews are designed so that a person of expertise is questioned regarding a specific topic. No specific question set is used and the responses are generally related to that person's position and opinion.

Ecological methodologies used are standard methods which are primarily found in the current literature and are used in standard format in most resource inventories of parks and protected areas.

3.1 History of the Area

The history was researched to identify the cultural significance of the Spur Woods. The history of the area was researched solely through a literature search and was complemented by input from the members of the Spur Woods Heritage Reserve Association.

3.2 Landforms

The Geology of the area was derived from the government of Manitoba's Department of Energy and Mines which has maps and other publications which give an overview of the underlying geology and provincial soils maps.

The study provided data on the physical resources of the Spur Woods. The geology may be important because some soil types cannot tolerate extensive use and others such as sandy soils may have erosion problems associated with them.

A topographic map was used to assess the topography of the area. Topography is an important area of study because it can provide for a variety of observation viewpoints and can facilitate trail locating in planned areas. Topography combined with soil type is also important for trails location to address things such as erosion.

3.3 Current and Future Uses

To evaluate the current area uses members of the Spur Woods Heritage Reserve Organization were interviewed using a non-scheduled form of interview. Many of the group members formerly hunted, trapped or held logging permits in this area so were well-versed in its former and current uses. Other participants in decision making positions regarding forested land were interviewed for current and potential use areas in the Spur Woods. A similar non-scheduled form of interview was used. Individuals interviewed included a member from each of the forestry branch, the parks branch, a local logging organization the wildlife branch and a legislative specialist of DNR. These current and future uses played an important role in the final land designation suggested

by this study.

3.4 Forest Inventory Mapping

The Province of Manitoba has compiled a Provincial Forest Inventory on forest inventory maps for the forested parts of the province. Such maps are compiled from vertical aerial photographs at a scale of 1:15840. Each map covers a township generally containing thirty-six sections (36 square miles).

For each forest stand, a number is given corresponding to a specific designation. Each stand classified by the Forestry Branch as productive, is given a number between 1 and 699. Non-productive forested land is numbered 700-799 and non-forested land is numbered 800-899 (Forestry Branch, 1991).

The Spur Woods tree stands were identified from forest inventory maps provided by the province, percentage cover was established, as was the area in hectares and the species composition. The forest inventory maps were used to establish study sites and identify sensitive areas, plantation and trails location and a vegetative variability index as described below.

3.5 Vegetation Survey

The study emphasis in the first field season was to complete a number of vegetation samples within the Spur Woods to establish existing ecological conditions. A complete species list of the area was attempted. However, due to the lack of reproductive structures and the seasonal advance affecting ground cover values, many plants were not

identified. Latin names follow Scoggan (1957), and appear in appendix B. The vegetation survey began with an examination of forest inventory maps to determine cover types within the Spur Woods. The preliminary map analysis identified 34 tree stands within the Spur Woods.

From these 34 stands of trees, there are 5 identifiable groups (or stand classes). These are mainly characterized by the dominant species and include:

1. Jack pine.
2. Eastern Cedar and Black Spruce.
3. Trembling Aspen and White Birch.
4. Red Pine forestry plantation.
5. Wetland along a stream dominated by willows.

After characterizing these five classes of stands, sites were randomly chosen from each stand subset within a particular class to acheive a representative sample. Therefore, one site representing each stand class was studied. In addition to these five study sites, one site was completed in a meadow which was discovered on site and may be a remnant of a Tall-grass prairie, a beaver pond after sucession or a recently burned area.

Each vegetation plot was designed as a standard 100 m^2 (10m x 10m) orientated in a north-south, east-west direction (after Knapton, 1979). Each plot was temporarily delineated with rope and the corners flagged with biodegradable marking tape for future use during the study period. Vegetation plots were established randomly within each of the study sites. All habitats could not be represented due to financial, time and season limitations.

In each vegetation plot, two sets of five 0.25 m^2 (.5m x .5m) quadrats were randomly placed. A ground cover value was recorded and presence/absence noted for

each species according the following scale of values.

1. 0 - 5 % of area covered.
2. 5 - 25 % of area covered.
3. 25 - 50 % of area covered.
4. 50 - 75 % of area covered.
5. 75 - 100 % of area covered.
   (after Knapton, 1979)

To obtain an approximation of the density and composition of the understorey, shrub stems intersected at waist height (1.0m) were recorded by species. In each vegetation plot two $20m^2$ (2m x 10m) transects were run in an east-west direction.

Each tree within the $100m^2$ plot was counted and recorded as to species and diameter at breast height (dbh) size class category (after James and Shuggart, 1970). Trees with a diameter of less than 7cm are placed in the shrub category and counted if they fell within the $20m^2$ transect.

A data spread sheet of tree data was derived using the following formulas:

Area of hectare = $10{,}000\ m^2$

$$\text{Density} = \frac{\text{number of individuals sampled}}{\text{area sampled}} \times 100$$

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

$$\text{Relative Density by size class category} = \frac{\text{density for a size-class category}}{\text{tot. density for all size classes}} \times 100$$

$$\text{Shrubs/hectare} = \frac{\text{\# shrubs per } 20m^2 \text{ x area of hectare}}{20m^2}$$

Shrubs/hectare = number of shrubs counted X 500

$$\text{Trees/hectare} = \frac{\text{\# of trees per } 100m^2 \text{ x area of hectare}}{100m^2}$$

Trees/hectare = number of trees counted x 100

A Haga altimeter was used to determine the height of the largest trees in each vegetation plot. A Swedish bore was used to obtain core samples of larger trees in each site and a dissecting microscope was then used to count the rings of each core to estimate age. The distribution and identification of aquatic vegetation within Cedar Creek was not be attempted due to season and budget constraints. The vegetation survey was used to identify sensitive areas, locate endangered of threatened species, and identify areas for potential trail development. The vegetation survey also provided information for the plant species list.

3.6 Small Mammal Trapping

The purpose was to determine species presence in each vegetation plot (Soper,1961). Small mammal trapping was completed in six of the seven study sites. Traps were set out for 900 trap hours per site. This consisted of 15 traps for 60 hours or 30 traps for 30 hours. Each trap line passed through the centre of the vegetation plots. Sherman live traps were used with a mixture of peanut butter and oats for bait. Inter-species abundance cannot be estimated as different species are usually not equally attracted to baits (Bill Koonz - personal communication). The only dependent data from the small mammal trapping survey was the identification of species seemingly dependent on each stand (habitat) type. This survey also indicates the ecological and species diversity in each sie and indicates potential viewing opportunities.

3.7 Bird Survey

A detailed bird survey was attempted in September however most migratory species would have started their Southern migration. The bird survey was done in a purely coincidental manner with all species observed being identified and recorded (coincidental bird census after Robbins et al., 1983), these species appear in appendix D.

The bird species present provided information to be used for a number of purposes including:

(1) identification of endangered or threatened species,

(2) providing locations for viewing opportunities,

(3) inventorying species dependent in each stand (habitat) and

(4) constructing a species list.

3.8 Large Mammal Survey

Most large mammal observations were coincidental and many mammals will identified by their tracks or other signs (Tande, 1977). The area has been used by local trappers for over 80 years. A non-scheduled interview with two trappers identified most furbearing mammals that were, or are present in the Spur Woods.

A random census of large mammals was done at dusk during the study period. The method was to use a 200,000 candle-power spotlight to sweep across the Spur Woods trails at night. All observations were coincidental. The purpose was to identify nocturnal mammals.

The large mammal survey provided information for species lists, identify viewing

opportunities and possibly hunting information.

3.9 Fire and Plantation History

The Manitoba Department of Natural Resources - Forestry Branch, keeps detailed records on the provincial fire history. A review of forest fire maps from 1920-1991 was completed. The fire history for the Spur Woods was then mapped.

The Forestry Branch keeps records of silviculture plantations in Manitoba. These records were consulted for plantation sizes, location and planting date.

The fire and plantation history provide information on the history of the area for cultural or interpretation information or for outdoor education.

3.10 Existing Trails

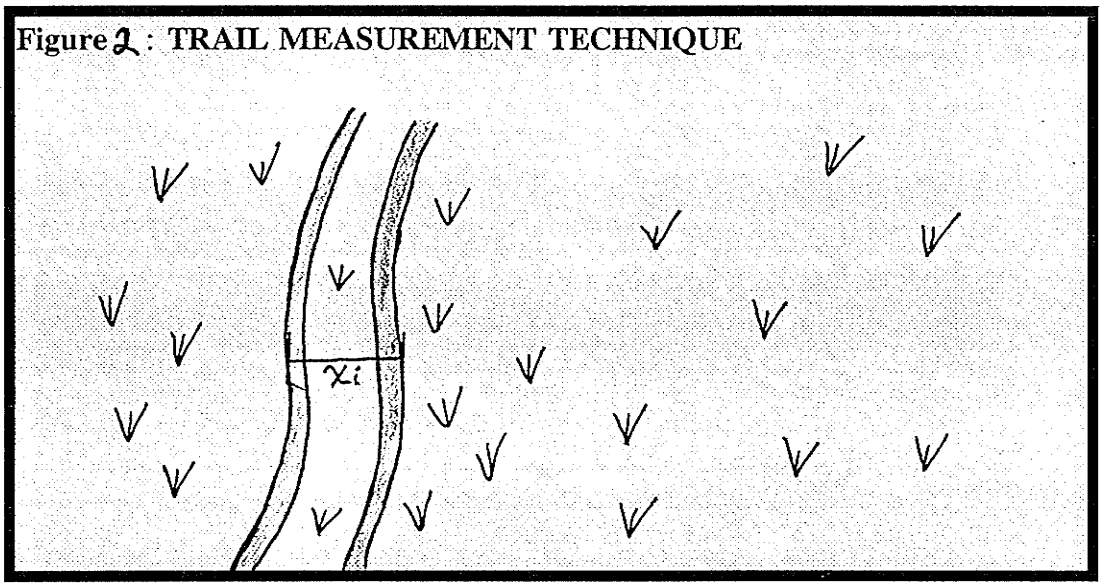
To establish the current status Spur Woods trails a ground surveillance was carried out. Aerial Photographs and Maps were also consulted to identify the number and specific geographical location of existing trails. Maps detailing topography, forest cover data, and existing trail locations were interpreted and produced by a geography sub-contractor.

Once trail locations were established, each trail was measured for two variables, length and average trail width. The method was to measure the length using a wheel with a 1 meter circumference and count the number wheel revolutions. This information

can be applied using Alberta parks (1989) Recreation Trails Booklet in which there are trail design specifications which include average tread width, and length recommendations for specific types of trails.

To calculate average trail width, each existing trail was measured every 100 m from the outside edges of the present trail tread as outlined in the following illustrations.

Figure 2 : TRAIL MEASUREMENT TECHNIQUE



V - VEGETATION	Xi - WIDTH

From the aforementioned measurements, the average trail width (X), the variance (s^2), the standard deviation (s), and the 95% confidence intervals for each trail was calculated using the following formulas (TABLE 3.1):

$$\overline{X} = \frac{1}{n}\sum_{i'=0'}^{N} X_{i'}$$

$$s^2 = \frac{1}{n-1}\sum_{i'=0}^{N} (\overline{X} - X_i)^2$$

$$s = \sqrt{s^2}$$

$$\overline{X} \pm t_{/2,n-1} \frac{s}{\sqrt{n}}$$

(equations after Huntsberger and Billingsley {1987})

A metodology was developed to quantify the vegetation diversity (changes in communities) of a trail. A simple way of measuring this vegetation variation was used to measure this aspect of a trails viewing potential. A vegetation variability index (VVI) was used on the trails in the Spur Woods. This provided a quantitative measurement by which all trails in an area can be compared for diversity purposes. This number is based on the number of types of vegetative cover which are encountered on any trail. These vegetative changes can be characterized by changes in forest stands, ecosystems, biomes or simply by obvious changes in the dominant tree species and provided a framework by

which initial surveys in the Spur Woods could be made and trails compared quantitatively. The VVI also served in the planning process because in many situations it can be calculated directly off forest inventory maps, if ground surveillance is not possible. For example, if a trail passes though a number of stands (Jack pine / Cedar / Deciduous / Jack pine) in one kilometer, it would have an VVI of 3 and could be quantitatively compared to other trails in the forest. In general the more interesting trail for a viewer would have a higher VVI.

Overgrown and deteriorated trails were also identified. After the quantitative evaluation of all trails, the trails were classified as to characteristics and appropriate uses, criteria is based on Parks Canada's Trail Manual, as this was the most comprehensive reference found in the literature search. The existing trail information is also be used to :

1. list prime viewing trails and there VVI,
2. provide information for the trail management plan,
3. indicate appropriate trails for interpretation, outdoor education, nature walking, snowmobiling and other uses and
4. provide information for future development options.

3.11 Trail Design

The trail design respects the ecological integrity of sensitive areas. This means that ecologically sensitive areas will not be developed, and in essence will be protected. Also areas where nesting, calving or intensive animal use occurs were strictly protected as a

priority over developmental considerations. Trail design follows Alberta Parks (1987).

3.12 Land Designation

The first step in the analysis of appropriate land designation was to list all Manitoba land designations for special areas. This was done in two parts. First, agencies involved in land preservation were contacted and interviewed using a non-scheduled form of interview. The interviees provided lists of publications and other potential agencies to interview. A literature review was completed in consultation with the Department of Natural Resources and a comprehensive list of designations was established.

The comprehensive list contains some designations that did not apply to the Spur Woods (a National Park) for example. To assist in the final designation process, a decision matrix matching activities allowed in special areas, to the perceived needs of the local population, and the specific designation was carried out. For this analysis the players seemingly involved in the process were interviewed and included:

1. A legislative specialist (Bud McIvor), who provided information on the implications of each designation.

2. The director of forestry for the province (Dave Rannard), who provided forestry insights into the area and how it is valued for logging.

3. The chief of parks planning for the province (Roger Schoedder), who provided insights into which designation may fit the Spur Woods.

4. Members of the Wildlife Branch (Glenn Suggett and Bill Koonz), who provided information on resource inventories and the Watchable Wildlife program.

5. A local loggers association representative (Abe Penner), who provided information on how industry values the Spur Woods and

6. A member of an N.G.O (Bob Jones), who provided information on special conservation areas, wildlife management areas and protected areas in Manitoba.

Once the short list was established by the matrix, each possible reasonable option was given a more thorough investigation. This investigation included a literature review of each designation including the implications for each as set out in legislation and a potential problem analysis.

The implications of each designation is important to a number of interest groups. Interest groups can indicate the positive or negative implications of each designation from their viewpoint. A non-scheduled interview concerning short-listed designations was held with people who administrate each of these designations. From these interviews, the implications of each designation was derived and proposed uses for the Spur Woods by the interest groups (especially forestry) were identified.

The completion of the above process lead to the set of recommendations on designation to the DNR.

CHAPTER FOUR

FLORAL AND FAUNAL RESOURCE INVENTORY

4.1 VEGETATION SURVEY

Overview

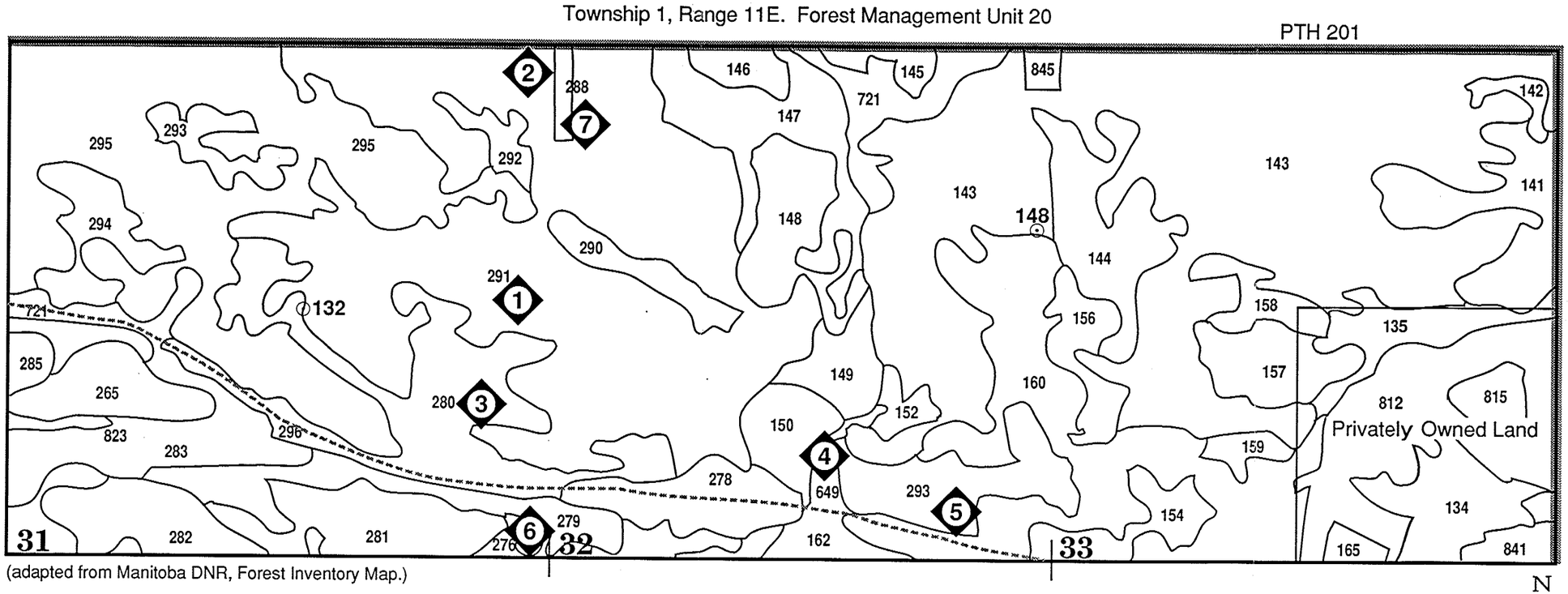
The vegetation survey below provides information on the varied communities within the Spur Woods. The data contained in this section will provide a data base to be used in zoning, management and designation decisions.

4.11 Discussion of the Study Sites

The purpose of the seven study sites was to identify valuable sites as defined in the literature review, sensitive areas, areas for different forms of recreation, areas that have been disturbed, areas for facilities and also to simply inventory the flora and fauna of the Spur Woods (site location appears in Figure 3). From these purposes flows the uses of the resource inventory which will facilitate zoning within the Spur Woods. Zoning can lead to a land designation and a trail management plan, based on maintaining ecological integrity with the resource inventory serving as the data base. This data base, however should contain enough ecological and physical information for effective decision making.

The forest inventory map identified the representative forest stands within the Spur Woods, however there is much more to a forest than the trees. The study sites identify the other floral and faunal attributes of the stands. These other attributes include the herbal layer on the forest floor, the intermediate shrub layer, and confirm the results obtained from the forest inventory map regarding tree species.

Figure 3:
Location of the Study Sites



(adapted from Manitoba DNR, Forest Inventory Map.)

Dominant species within each study site are summarized in Table 4.1. Results of the floral inventory on each study site where also used in constructing the Plant Species list found in Appendix B. Other random sightings of plants within the Spur Woods were added to the species list.

Results of the Floral and Faunal Inventory appear in Appendix A. This appendix lists the following for each study site:

(a) Summary of $0.25m^2$ quadrats, plots 1 and 2,

(b) Density of understorey species (Shrubs) in $20m^2$ transect, plots 1 and 2,

(c) Density of trees in $100m^2$ plot,

(d) Representative tree heights and ages and

(e) Mammal trap data.

TABLE 4.1 - DOMINANT PLANT SPECIES IN THE SPUR WOODS

TREES \ SITE	1	2	3	4	5	6	7
Jackpine	*	*					
White poplar					*		
Balsam poplar				*	*		
White Birch					*	*	
Balsam Fir						*	
White Cedar						*	
Black Spruce						*	
White Spruce	*	*					
Red Pine	*						*
SHRUBS							
Beaked Hazelnut	*				*		
Saskatoon	*				*		
Chokecherry	*	*	*				
Wild Rose			*	*	*		
Pincherry			*				
Willows				*			
Mountain Maple						*	
HERBAL LAYER							
Sedge	*	*				*	
Bearberry	*	*	*				
May lily	*						
Ferns	*				*		
Mosses	*	*				*	
Blueberry		*			*		
Big Bluestem			*				

* indicates presence in that study site.

SITE 1 - Description

Site 1 is a mature stand of Jack pine (Pinus banksiana) with a damp mossy floor located in stand 280 on the forest inventory map. Jack pine is the dominant area tree. There is a low shrub density under the canopy including Beaked Hazelnut (Corylus cornuta) and Saskatoon (Amalanchier alnifolia). Sedges, grasses and Bearberry cover the forest floor, as observed in PHOTO 1 - Small Mammal Trap in Site 1. The largest trees in this stand have a height close to 23.5 meters.

This area provides excellent habitat for deer mice, redbacked voles and chipmunks. Red squirrels are quite abundant and can be observed frequently in this area, however none were caught.

PHOTO 1 - SMALL MAMMAL TRAP IN SITE 1.

Large mammals also have excellent habitat available to them in this stand. Black Bears can find a large number of bearberry (Arctostaphylos uva-ursi) and blueberry at certain times of the year and are common here in fall. Many deer and moose tracks were also observed in this site.

The openness under the canopy provides good viewing distances to see the features of this stand. There is abundant wildlife and a main trail running along the periphery of the stand which provides good viewing opportunities of the area's floral and fauna . This stand is valuable and in need of protection for a number of reasons. It's viewing and access give it recreational value, and the vastness of its untouched interior give it both life-support and diversity value.

SITE 2 - Description

Site 2 is a mature Jack pine (Pinus banksiana) forest bordering a small Red pine plantation in stand 291 of the forest inventory map. This area's canopy is dominated by Jack pine, which made up 100 % of the tree cover. A large number of Jack pine saplings were observed on this site, but due to random sampling, they did not appear in the shrub data. There were a small number of Chokecherry (Prunus virginiana) shrubs intermixed with the Jack pine saplings. Bearberry was by far the most dominant herb. The largest Jack pine trees in this area had a height of 23 meters, while the average canopy height was 20.0 meters.

This area provides marginal habitat for small mammals. This might be due to the fact that it borders a red-pine plantation with no undergrowth. The area does provide

a large amount of browse for Black bears, but little for ungulates. No deer or moose tracks were observed in this area. This area also borders PTH 201, which might also contribute to the lack of wildlife.

This area represents a large mature Jack pine stand within the Spur Woods. There are no trails running through this stand and it has marginal potential for recreation. This site provides habitat associated with old-growth Jack pine forest which is one stage in the successional advance of such an area. This area is worthy of protection because of its species diversity in its interior and its present ecological integrity. There are no trails in this area and it borders the western Red pine plantation, where the need for protection ends.

SITE 3 - Description

Site 3 is a small meadow surrounded by a mature Jack pine forest located in stand 280. The areas species are similar to that found in the remaining tall-grass prairie of Southern Manitoba. It is dominated by of an array of grasses, most notable Big Bluestem (Andropogon gerardi). Wild Rose (Rosa woodsi) is also prevalent on the ecotone edges. The eastern edge of the meadow is dominated by Pincherry(Prunus pennsylvanica). Very little encroachment has taken place in this meadow, there are only three trees present within it, two Jack pine (Pinus banksiana) and one Scots Pine (Pinus sylvestris). This illustrates how Jack pine requires fire and a seed base to invade an area as it does not asexually reproduce like Aspen does. It is hypothesized that the Scots pine was either planted here or was transported from a plantation 1/2 kilometer away.

This was the only site within the Spur Woods where meadow voles were trapped. These species may have value as it can provide food for foraging owls which have been seen in the area. The Great Grey Owl (Manitoba's provincial bird) forages specifically for meadow voles, and thus may use such an area for foraging (Jim Duncan-personal communication).

Wildlife viewing in this area would mainly focus on White-tailed deer and the Great grey owl. There is a second small human made clearing (meadow) east of this study site which is the location of a geodetic site. The developed characteristics of this site make it useful for support of recreation. There is potential to develop a wildlife viewing tower at the second site as its ecological integrity would not be unduly affected by development. These sites have diversity value as they contained species of plants and animals that do not occur elsewhere in the Spur Woods, such as a Meadow vole. This area also possesses aesthetic value as it overlooks the Sundown Bog south of the Spur Woods.

Site 4 - Description

Cedar Creek is a small creek originating from springs in the northern portion of the Spur Woods. At its origin it is surrounded by large Cedar (Thuja occidentalis). The creek flows southward passing under an old railway right-of-way . Just north of the right-of-way in stand 648 is a small clearing which is flooded by the creek in the spring. The creekbed is surrounded by four types of willows including Pussy willow (Salix discolor), Basket willow (Salix petiolaris), Beaked willow (Salix bebbiana) and a red-

barked willow (Salix cr. serissima). The ground cover is dominated by composites, mainly Asters (Aster spp.), Sedges (Carex spp.) and Goldenrods (Solidago spp.).

Redbacked voles were the most frequent catch. Surprisingly, a flying squirrel was also caught here. This area provides excellent browse and resting cover for large ungulates such as moose and deer. Many game trails were noted and tracks of both species were observed here. Many Red-osier dogwood (Cornus stolonifera) shrubs in the study site had been browsed. This area is also important for deer to bed at least in the fall. One beaver dam was observed up the creek from the study site, and a muskrat was observed swimming in the creek. This site offers deer and moose viewing at dawn and dusk. This area is in need of protection because of the diversity of plants in the riparian areas. It also provides habitat for species associated with wildlife viewing including white-tailed deer, beaver and muskrat. The beaver has particular value because it is our national symbol and many visitors are interested in viewing them. This area then, has life support, recreational and aesthetic values for the reasons above.

Site 5: Description

Site 5 is centered in a stand of deciduous tress. Tree species included White poplar (Populus tremuloides), Balsam poplar (Populus balsamifera) and Birch (Betula papyifera). The canopy has a height of approximately 20.0 meters. There is an extremely dense undergrowth of ferns and shrubs in this area. Beaked hazelnut (Corylus cornuta) and Saskatoon (Amalanchier alnifolia) make up the dominate shrub cover. Braken fern (Pteridium aquilinum) and Ostrich fern (Pteretis pennsylvanica) form an extremely dense

mat 50-60 cm. over the forest floor, where cover approaches 100 percent.

This area was not sampled for small mammals due to time constraints and a lack of equipment. White-tailed deer are known to frequent deciduous forests, and the density of deer in this area was classified as high in 1987 (Penner, 1987). This deciduous stand is classified as excellent deer habitat and is valuable for the aesthetics associated with wildlife viewing.

There are 3 trails running through this stand and the frequency of viewing White-tailed deer during the field study was close to 100%. Trails 3, 4 and 5 start in mature Jack pine forest and then all enter this deciduous stand offering a wide range of viewing opportunities on one trail.

This site has a soft and wet soil type that is compacted quickly and gets soft when it rains. This results in potholes on the trail and ultimately leads to trail widening. The sensitivity of the trails may make them inappropriate for vehicle traffic in this stand.

Site 6 - Description

This site has the most impressive array of flora in the Spur Woods. Extremely large White cedar (Thuja occidentalis) dominate this area, stand 279 on the forest inventory map. Many area cedar trees have a dbh exceeding 65 cm and circumferences exceeding 200 cm, which is to large to put your arms around (see Photo 2). Two of the trees in the sample site had heights exceeding 23 meters (75 feet). There are also Balsam fir (Abies balsamea) and a few White birch (Betula papyifera) in the area. Ash (Fraxinus pennsylvanica) and Mountain maple (Acer spicatum) are the most frequently observed

shrubs. The forest floor is almost totally covered in mosses.

This site provides excellent habitat for deer,moose, black bear and coyotes in the winter, because of the number of denning sites and the protection from the elements. Many moose and deer tracks were observed during a winter habitat assessment in Febuary 1992. One Great Grey Owl was observed in this site. Lynx tracks were also observed during the winter. Few small mammals were trapped, but redbacked voles and deer mice were most prevalent.

This area is sensitive because the moist forest floor is covered in mosses and lichens. The upper reaches of cedar creek originate in this area making it an important part of the watershed. The large number of small creeks and moist soil make it sensitive to many types of disturbance. This area has value associated with untouched areas, including life-support value, diversity value and aesthetic value.

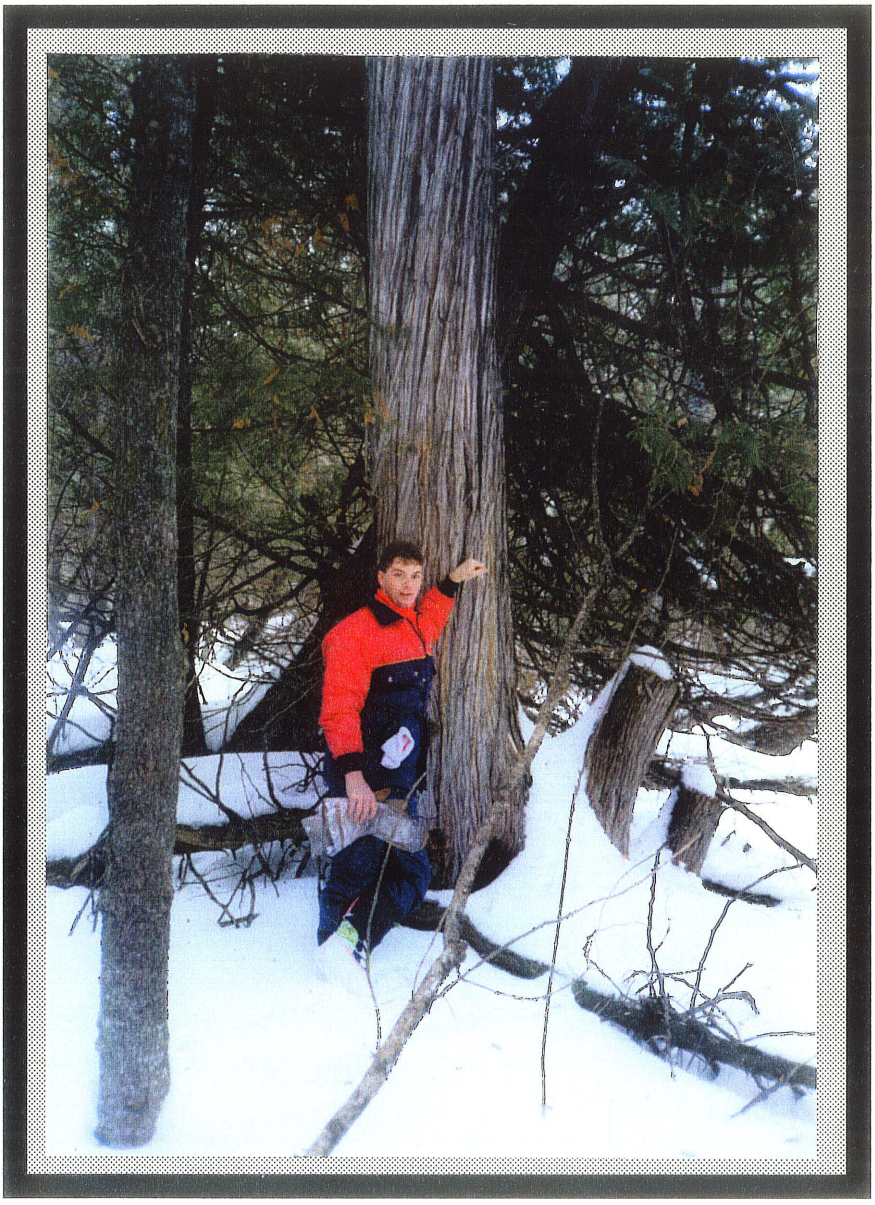


PHOTO 2 - AUTHOR LEANING ON CEDAR TREE IN SITE 6.

SITE 7 - Description

Site 7 was chosen to represent the plantation areas within the Spur Woods. This particular plantation is located at the north-east corner of section 31, along PTH # 201, stand 286. This particular plantation consists solely of Red (also called Norway) pine (Pinus resinosa), as shown in the photograph below. Other plantations also have Scots Pine (Pinus sylvestris) in them.

The canopy height for this plantation was approximately 14.0 meters. There was no shrub or herb growth on the forest floor and there were limited patches of moss. There is no forage for animals in this area, even the porcupines avoid it, and no small mammals were trapped in the inventory.

PHOTO 3 - RED PINE PLANTATION

This area is worthy of partial protection for its recreational value. The lack of undergrowth makes this area appropriate for area support services including a picnic site and a small parking lot.

4.2 WILDLIFE OF THE SPUR WOODS

Small Mammals

The small mammal survey yielded seven species of small mammals within the Spur Woods (trapping results appear in Table 4.2). Small mammals have are important in the functioning and ecological integrity of a community. Small mammals posses both diversity and support value just because they exist in an area. They also posses recreational value indirectly as they are forage for other species, and again have life-support value. The areas in which each species was trapped is summarized in the following table:

TABLE 4.2 : SMALL MAMMAL TRAPPING SUMMARY

SPECIES/SITE	1	2	3	4	6	7	T	%
DEER MOUSE	12	4				3	19	29.7
R-BACKED VOLE	10	9	1	9	2		31	48.4
CHIPMUNK	1		2				3	4.7
MEADOW VOLE			9				9	14.0
13-LN.G. SQUIRREL			1				1	1.6
FLYING SQUIRREL				1			1	1.6
TOTAL(T)	23	13	13	10	5	0	64	100
% OF TOTAL	36	20.3	20.3	15.6	7.8	0	--	100

Large Mammals

Seventeen species of large mammals were identified in the Spur Woods. The most observable species were the Porcupine (see Photo 4), White-tailed deer, Red squirrel and Red fox.

Hunting of White-tailed deer, Black bear and Moose occurs regularly in the Spur Woods. This may cause a potential danger that must be addressed in the planning of a recreation area.

PHOTO 4 - A PORCUPINE IN A JACK PINE TREE IN THE SPUR WOODS.

Birds

Most birds were identified during 18 hikes down the Spur Woods trails. This coincidental bird survey identified 29 species. The list includes species that are associated with old-growth forest, including the Pileated woodpecker, the Great grey owl and the Gray jay. This may make the Spur Woods both aesthetic and culturally valuable simply because this bird inhabits the forest. The non-consumptive resource potential for bird viewing is rising in Canada (Wall,1989) and this viewing market is being tapped in the planning of the Watchable Wildlife program for the province. Birds which have been viewed in the Spur Woods appear in Appendix D.

Reptiles / Amphibians

No specific attempt was made to inventory reptiles or amphibians. The only reptile which was observed in the study area was a red-sided garter snake (Thamnophis sirtalis). There were two amphibian species noted in the study area ; the leopard frog (Rana pipiens) and the wood frog (Rana sylvanica).

4.3 SUMMARY

The Floral and Faunal resource inventory identified the species present in the Spur Woods. The large number of plants and animals in the area indicate that the area possesses ecological diversity. There are many species which are widespread in the province and in the Spur Woods such as Jack pine, White-tailed deer and Porcupine. There are however other species which are not as common or which have national or provincial significance. Such species would include our national mammal, the Beaver and our provincial bird, the Great-Grey Owl. The Spur Woods also contains one Endangered Species, the Showy lady's slipper which is also of provincial interest.

The results obtained in this chapter can be used for a number of things, such as zoning in protected areas, trail management plans and the choice of an appropriate designation.

CHAPTER FIVE

HISTORICAL AND EXISTING CONDITIONS AT THE SPUR WOODS

This chapter provides information obtained from a literature search on the Spur Woods. The second part of this chapter focuses on information obtained from the trail survey.

5.1 HISTORY OF THE AREA

Pre-settlement

When R.S. Pelly, federal government surveyor, travelled throughout what later became the Sandilands Forest Reserve in 1873, he wrote in his reports that much of the area had been burned over, some areas were untouched, and in others there was new growth of Jack pine, and obviously it had dominated the area over a long period of time. Another huge fire occurred just before the settlers arrived in 1897. This fire was likely the same one that originated in Minnesota's Beltraini Forest, which burned across most of Rosseau County and swept into southeastern Manitoba in the autumn of 1897.

In 1990 archaeologists located an ancient Indian camp site near the Spur Woods. Due to the fact that arrowheads have been found on the property of Fred Spearst, SE 1/4 section 33, township 1 range 11E, it is quite possible that the Spur Woods was an Indian hunting ground. Early settlers reported and used numerous Indian trails on the higher ridges. Settlers believed that Indians camped in the Spur Woods area on their way to trade furs at the Hudson Bay Post of Fort Lac du Roseaux situated near the present village of Ross.

Settlement

In 1900, the area was surveyed by C. Carroll of the Canadian Government. It was reported that this portion of land lies within the meridians of 96 and 98 degrees longitude, therefore it was a part of the original " postage stamp province". Older maps seem to reveal that the east side of the Spur Woods was very close to the eastern border of the province at that time. In 1906 the Great Northern Railway constructed a track through the area. The track bed remains today, close to the southern borders of sections 31, 32 and 33, township 1, range 11E.

In 1908, John Stephenson paid five hundred dollars to the Great Northern Railway for the creation of a spur off the main railway track. This is where the current name of "Spur Woods" originated. His reason for building the spur was to establish a logging operation in the Sundown Bog south of the Spur Woods, thus establishing the early importance of the Spur Woods to the logging industry of Manitoba. Local loggers used the spur to load railcars with wood, and Mr. Stephanson charged them for the use of his spur. A large number of individuals used the spur to load wood from 1910 until the early 1940s. Most logging in the area was done in winter when the bogs were most accessible. This selective logging has had little effect on the present day fauna of the area, and there are few signs in the area of this activity, other than the trails.

In 1912, a geodetic survey tower was erected in the Spur Woods. The triangulation site exists today but there is no evidence of a tower. Markers throughout the area have dated the site. The old-ridge road that is mentioned in the surveyors report still exists today. This and other roads served to link the Spur Woods with the towns of Piney and Menisino, and are said to have followed early Indian trails. The last recorded survey

made at the geodetic site was in 1924.

Between 1924 and 1955, the most prevalent activity in the Spur Woods was selective logging of Jack pine for lumber, Poplar for fuel and Cedar for fenceposts. Permits were issued for small areas of selective cutting until 1955.

The original preservation effort regarding the area began in 1962. In 1962 a coalition of the Piney Chamber of Commerce and the Farmers Union initiated a preservation effort with limited results, as the effort met political opposition. During the 1970's loggers attempted to cut in the area. A local resident and conservative MLA, Abe Kovnats, put a stop to the cutting and again started the preservation movement. The interest in preserving the Spur Woods was carried by many people in the local community and in 1989 Albert Thorvaldson was elected to organize the Spur Woods Heritage Reserve Association (SWHRA), of which he was president until his passing in 1992. This group has been rallying local people, petitioning government, initiating position papers since 1989. The area's protection group became more active in response to renewed forestry interest in the area. The local members of the SWHRA feel that this is a valuable recreation area and should be used for recreation only. They note the following varied uses:

- nature hikes and educating school children on natural history,
- big game and upland bird hunting,
- snowmobiling,
- berry picking,
- inspiration and relaxation,

- enjoyment of the plants and animals and
- the heritage value of the area.

Cooperation between this group and the provincial governement has sparked the commisioning of this report to study whether to preserve this area and prevent it from being logged or otherwise developed, or to leave management up to the forestry branch as a provincial forest.

5.2 EXISTING TRAILS

There are 6 existing trails in the Spur Woods not including the railway-right-of-way. Data on the trails appears in table 5.1. The length of each trail is given in meters and the average width for each trail in centimeters. The varience (s^2) and standard deviation (s) for each trails' width are also presented in the table below. The 95% confidence interval is given in centimeters and presents to the reader that with 95% statistical confidence the trails width is within the two numbers given. The Vegetation Variability Index (VVI) gives the number of changes in vegetative cover (trees) over the length of the trail per kilometer. Trail locations are depicted in Figure 4.

TABLE 5.1 - EXISTING TRAIL DATA

DATA/TRAIL	1	1a	2	3	4	5
LENGTH (M)	3000	802	709	1021	1086	1681
AVG.WIDTH (CM)	255.86	275.88	249.57	274.85	268.36	257.91
S^2	299.83	2083.2	1898.23	4226.6	803.91	2042.01
S	17.31	52.95	43.57	65.01	28.35	45.18
95% C.I.	249.40 262.32	200.60 298.54	236.95 314.83	229.05 320.65	259.39 277.33	233.96 281.86
VVI	2.33	3.75	1.43	3.00	4.55	5.29

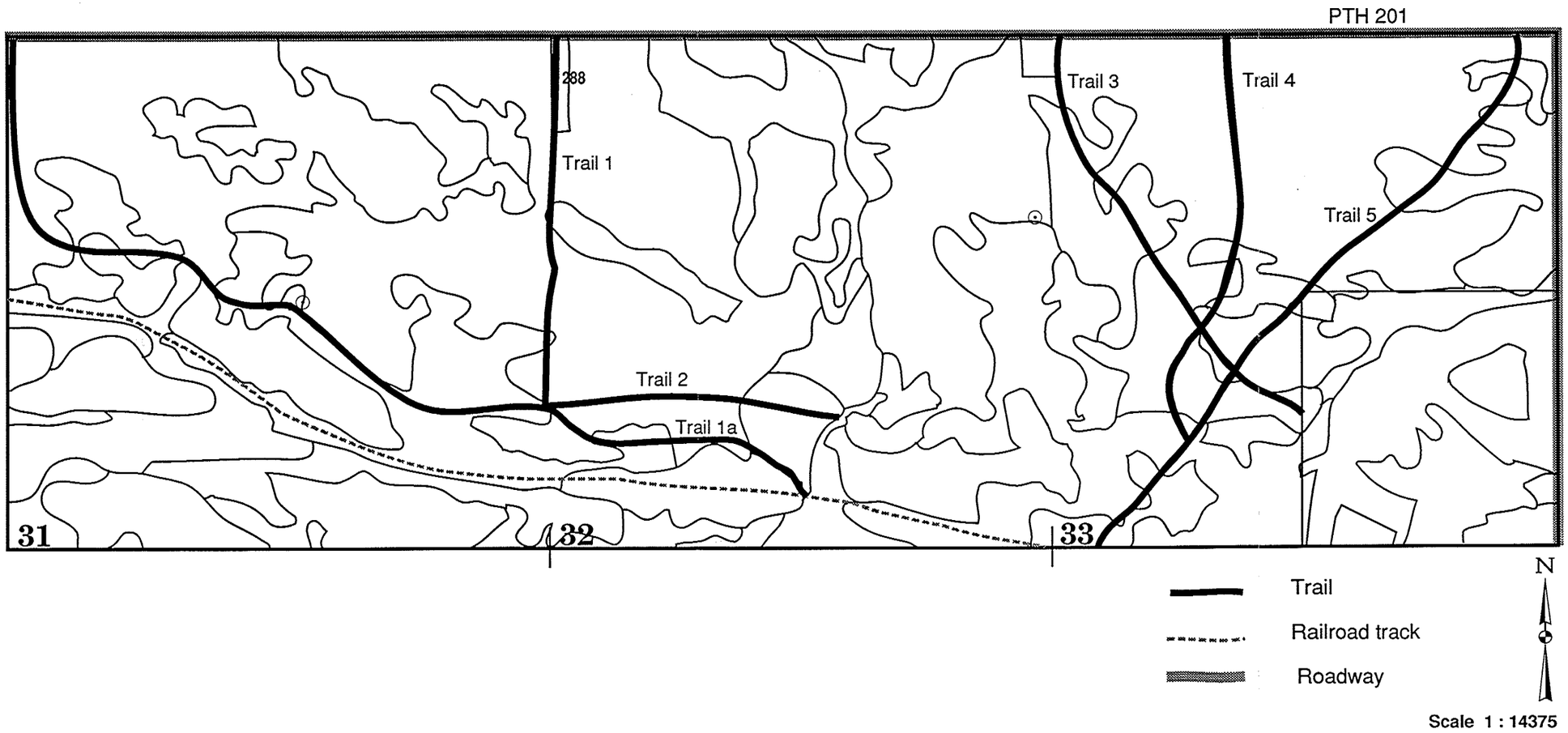
TRAIL 1. This trail forms the border between sections 31 and 32 from study site 1 (a plantation numbered stand 286 on the forest inventory map) until it swings west at the geodetic site. This trail borders study sites 1 and 3 and passes by all four Spur Woods plantations. Trail 1 has a low vegetation variability index of 2.33, however it passes through primarily old-growth pine forest and offers interesting contrasts between natural and planted vegetation and associated ecological differences. This trail also offers an opportunity to view old and tall Jack pine and Red Pine trees (see photo 1). Some valuable watchable wildlife on this trail include the pileated woodpecker, cedar waxwing and pine siskin. The photo below was taken from the highest point in the Spur Woods on trail 1 and appeared in the tourism publication Manitoba : An Adventure in Nature.

PHOTO 5 - VIEW OVER THE SUNDOWN BOG

This particular area offers fantastic viewing of the Sundown bog below. The top of the ridge has an elevation of 361 m (1175 feet) and the Cedar bog has an elevation of 338 m (1100 feet). There has been interest by the Watchable Wildlife program to place a viewing tower at this site which will be maintained by the Wildlife Branch (Glen Suggett - personal communication- Jan. 1993).

PHOTO 6 - GROUSE CROSSING TRAIL 1.

Figure 4:
Preliminary Trail Location



TRAIL 1A. This trail passes through an old-growth Jack pine forest with White spruce as the second most dominant tree species. This trail is valuable for interpretation as it demonstrates succession as White spruce is a late successional species. This trail passes by relatively resistant stands and can thus can handle a high level of use including activities such as hiking and nature viewing as well as crosscountry skiing or snowmobiling in winter. This is a wide trail (255 cm average width) and offers great opportunities for groups to travel two-abreast in a Jack pine old-growth forest setting.

TRAIL 2. This trail lies east-west from trail 1 were trail 1 splits to form trail 1 and 1a. Trail 2 ends at Cedar Creek, at the site of PHOTO 8 which was represented by study site 4 - creekbed surrounded by willows. This trail, however is on sandy soil and has an undulating topography and erosion is a problem. The area at the end of the trail (cedar creek) is an ecologically sensitive area and is in need of preservation due to the large number of ground cover species. This trail offers exceptional old- growth forest viewing and the lack of shrub undergrowth offers long viewing distances. The berries on the forest floor make this prime habitat for Black bear, grouse and songbirds, which are frequently viewed here.

TRAIL 3. Trail 3 begins at the borrow pit along PTH 201 and swings south-east where it continues until it enters private property on the S.E. quarter of section 33, township 1 range 11E. This trail begins in an even aged (approximately 70 year old) stand of Jack pine, proceeds into a deciduous stand, and then reenters a stand of old-growth Jack pine and White spruce. It is fringed by Braken fern which forms a dense understorey approximately 1m off the forest floor. This trail offers a good opportunity to view the

flora and fauna of distinct coniferous and deciduous communities. Trail 3 passes through stands 143, 144 and 158 which are represented by study site 1 and 4. This area is not sensitive ecologically and has both recreational and aesthetic value. The soft soil makes it susceptible to high intensity use. Therefore there is little potential for interpretation or large groups to use the trail in summer.

PHOTO 7 - WILD COLUMBINE BESIDE TRAIL 3, NOTE THE TREE FALLEN OVER THE TRAIL IN THE BACKGROUND.

TRAIL 4. Trail 4 originates on PTH 201 via a trail through the ditch. This trail enters into an old-growth Jack pine stand (143) crosses into a deciduous stand (158) and reenters stand 143. Trail 4 is very similar to trail 3 in its characteristics of surrounding vegetation. The communities surrounding are represented by sites 1 and 4. The characteristics of this trail offer prime viewing of deer, porcupine and songbirds. This trail, however also lies on a soft soil and a wood chip tread is needed to prevent further trail deterioration. There is little opportunity for interpretation on this trail as it is surrounded by thick vegetation and the community surrounding the trail is susceptible to disturbance.

TRAIL 5. Trail 5 begins 200m west of the eastern edge of the Spur Woods, along PTH 201. It offers the most diverse vegetation array of any trail in the Spur Woods (5.29). This trail passes through alternating stands of coniferous and deciduous trees offering a great diversity of viewing habitats. The watchable wildlife include songbirds such as the cedar waxwing and flycatcher.

5.3 Current and Future Uses

Current Uses

As noted in the history section, the local inhabitants of the area identified the current uses of the area. It has also been identified that the protection status of the area should allow for future public access.

The potential future uses of the area as identified through interviews with players as indicated in sections 3.4 and 3.13 include:

- forestry cutting

- use in the watchable wildlife program
- outdoor education and interpretation
- cross country skiing and hiking
- snowmobiling in connection with a large trail which traverses the southeastern corner of the province
- and all of the activities listed under current uses

Forestry Use (logging)

The Spur Woods covers 704 hectares in the Sandilands Provincial Forest, Forestry Management Unit 20. Removal of this particular area from the land base contributing to the annual allowable cut in the Sandilands Provincial Forest will have a negligible effect on the annual allowable cut in the area. There is a concern, however, about the cumulative effects of removing this and other areas from the annual allowable cut calculations. In the Sandilands Provincial Forest management unit there is pressure to remove other areas from the annual allowable cut. Such pressures include a cottage development at Woodridge and the removal of land for roads, hydro lines and other public services (Dave Rannard - personal communication - Jan. 1993).

The Spur Woods contains the following volumes of merchantable wood: 35,056.4 m^3 of softwoods and 8,630.2 m^3 of hardwoods on 651.9 hectares of productive forested land. The Spur Woods contains largely mature and overmature trees and 63% of the area is mature enough to be harvested. The value of the wood in the Spur Woods as provincial revenue is $132,202.61, the value to the provincial economy is many fold after

harvest (Jim Atkinson, personal communication, March 1993).

As for the effect of the removal of the Spur Woods from the annual allowable cut, the Spur Woods represents approximately 1/1000th of the productive forest of forestry management unit 20 and thus by itself will have little effect on a per annum basis. The effect will be a 174 m^3 reduction in the annual allowable cut which will have to be passed on to quota holders.

The plantations in the Spur Woods represent 4,643.1 m^2 of wood and represent 184.2 hectares or 13% of the area of the Spur Woods. Vegetation management in the Spur Woods will be explored by the responsible agency after a designation is chosen for it. Succession will continue as it does in all natural areas and eventually the trees will die. Jim Atkinson, the assistant regional forester explains " as time passes the proportion of damaged, dying, and dead stems increases and in a natural ecosystem a wildfire would sanitize the stand and initiate the establishment of a new stand. Interruption of this cycle by excluding the disturbance phase will eventually result in stand conversion to shade tolerant species and/or perpetuation of an uneven-aged jack pine stand regenerating in pockets of growing space vacated by dead jack pine" (personal communication, March 1993). A vegetation management plan will obviously be needed for this protected area, however such a task is outside the objectives of this study.

Watchable Wildlife Program

The Watchable Wildlife Program is a joint venture between the Departments of Industry, Trade and Tourism, and Natural Resources; Wildlife Branch. This program

is attempting to develop eco-tourism in Manitoba through wildlife viewing tourism. There are currently approximately 200 sites throughout the province which have been identified as worthy of development. The Spur Woods is one of these sites and is included in Concept 3 of the program. Concept 3 provides for linkages in southeastern Manitoba between viewing sites.

Interpretation and Outdoor Education

One aspect of the watchable wildlife program is the establishment of an interpretation program. This program currently does not have any funding, so trained interpreters are not feasible, however non-personal interpretation including signs and brochures at this site may be feasible with cooperation of DNR and SWHRA.

The Watchable Wildlife program can also accommodate groups in areas which are not sensitive to disturbance. This program with interpretation can also offer opportunities for outdoor education in the Spur Woods.

Snomobiling Activity in the Spur Woods

There is a proposal for a snowmobile trail in the Spur Wood, which connects with to the Can-Am trail. This plan is from the Piney community center which proposes to use the railway right-of-way. There has been communication between the SWHRA and the community center and it seems that the proponents will respect zoning within the Spur Woods. The community center may also contribute funds for signs and markers respecting snowmobiling in the area. These signs may include open and closed areas as well as trail marker signs. The proposal for this activity is addressed in the zoning of protected areas (6.1) and the trail management plan (7.1).

5.4 LANDFORMS

The underlying rocks in this region are Pre-Cambrian formations. The exposed rock area is so small it has no effect on the district soils. The effect of glaciation, however is great and the parent material for the soils is directly or indirectly glacial in origin. Some ridges in the Spur Woods were beaches on glacial Lake Agassiz or formed by moraine from movement of the glacier.

The soil in the area is classified by the Manitoba Department of Agriculture (1990) as E1-A1:1b. This represents:

(i) A Luvisolic Grey and Brunisolic Eutric soil

(ii) Textural phase : coarse

(iii) Topographic Phase : rolling to hilly

Most of the soil in the area has a high sand component, making the soil susceptible to erosion once the vegetative cover is removed. This erosion potential may have implications for trail management plans.

Most of the soil surface in the study area was formed by a combination of glaciation followed by the sedimentation of glacial Lake Agassiz. The high sand ridges of the Sandilands (also known as the Bedford Hills) are a crescent shaped recessional moraine formed by the Keewatin Ice Sheet. The western slope of the highlands forms an escarpment rising 75 meters in a 5 km vicinity of the Marchand lookout tower. The elevation above sea level of these ridges is 1,300 feet (400m) near Marchand, 1,125 feet (347m) east of Piney and 1,117 feet (344m) near Menisino. Topography of the Spur Woods and Surrounding area is given in Figure 5.

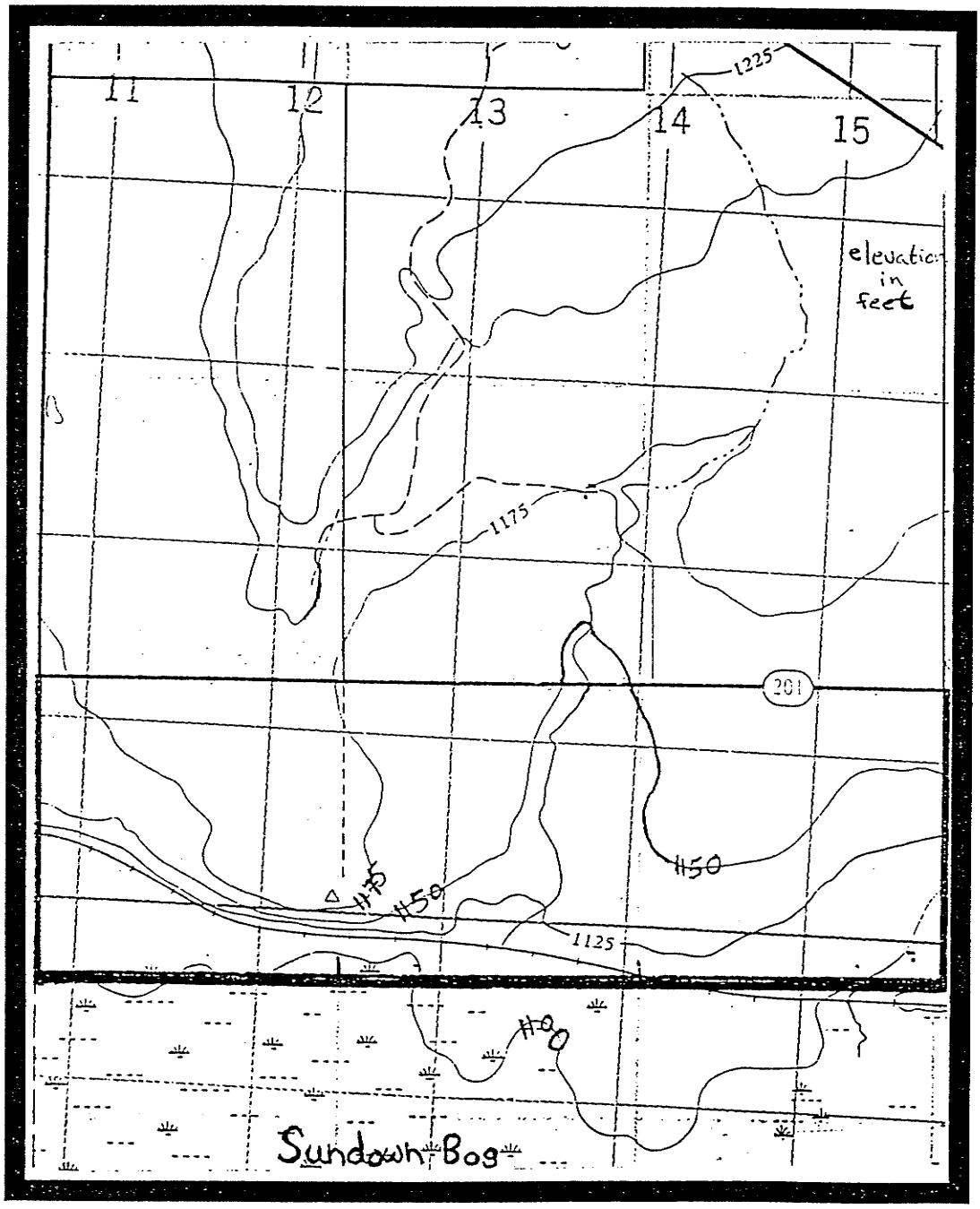


FIGURE 5 : TOPOGRAPHY OF THE AREA.

There is an undulating topography within the Spur Woods. The highest point in the Spur Woods has an elevation of 1175 feet which slopes down to 1100 feet in the cedar bog into which the ridge overlooks. This highest point is the best site to place a viewing tower as it looks over the bog which stretches far into Minnesota. The Spur Woods is generally rolling with an elevation between 1125 (347m) and 1150 feet.

5.5 DISCUSSION OF THE FOREST INVENTORY MAP

The Spur Woods is the most southerly forested area in township 1 range 11E. This represents the southern border of the sandilands forest reserve and the jack pine stands can be observed on the forest cover map, see figure 6.

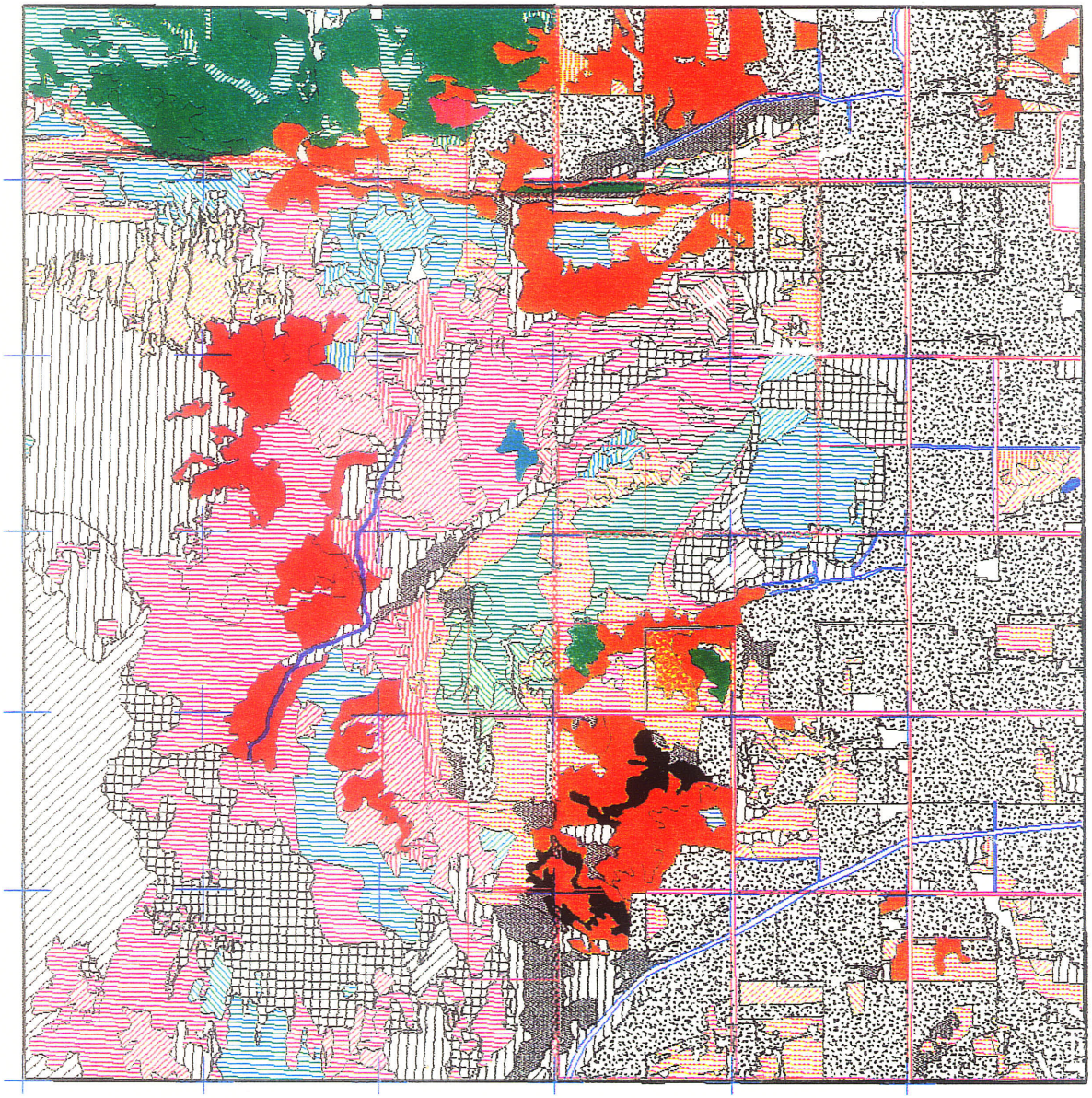
There are six different classes of stands within the Spur Woods. These can be summarized using the following labels and descriptions (scientific names appear in appendix B).

1. Jack pine 60% +. These stands have Jack pine as the dominant tree species with a cover of 60% or greater. The other tree species making up the remaining percentage of the cover include Trembling aspen, White birch and White spruce. There are 15 such stands in the Spur Woods.

2. Deciduous. These stands are made up of primarily deciduous trees. These deciduous trees include Trembling aspen, Balsam poplar, Ash, and White birch, which generally make up more than 60% of the crown cover. There are some White Spruce within these stands as observed on ground surveillance hikes, however they make up a small percentage of the cover value. There are 12 such stands in the Spur Woods.

t01r11epm

cover-type map by cutting class



legend

subtype class	working group	cutting class 0	1	2	3	4	5
01-09,41-49	PINE						
10-22,50-62	SF SPRUCE						
30-32,70,72	TL						
36-37,76-77	EC						
90-91,99,80-84	TH						
88,98	BA						
85,86,87,92	WB						
93,94,95,96,97 9A,98,9C,90,9E OTHER HARD WOOD							

700-704 TREED MUSKEG.....

720-725 WILLOW ALDER.....

731-734 PROTECTION FOREST.....

811-816 FIELDS agriculture .....

820-824 MEADOW.....

830-839 MARSH -MUSKEG.....

710-713,840-859..... TREED ROCK,UNCLASSIFIED

900-999 WATER.....

- MANAGEMENT UNIT
- FOREST TYPE
- STATUS LINE
- OWNERSHIP LINE
- RAIL ROADS
- PRIMARY & SECONDARY ROADS
- TRANSMISSION LINES
- DRAINAGE DITCHES
- STREAMS LINES
- FIRES LINES

scale: 1 inch to a mile

publication date : January 05, 1993

3. Cedar/ Tamarack/ Balsam Fir. These stands are in the low-lying boggy areas in the southern reaches of the Spur Woods. The Cedar and Balsam fir groves are usually distinct from the Tamarack and Cedar groves. There are 7 such stands in the Spur Woods.

4. Black spruce. Black spruce are common in low-lying areas throughout the Spur Woods. These trees are primarily found along streams running South to North in the old-growth forest. Black spruce are also found in isolated stands in the southern bog in the Spur Woods. There are 7 such stands in the study area.

5. Willow. These stands are classified as non-productive for forestry purposes but play an important role in the biological productivity of the Spur Woods. These areas provide forage for Deer and Moose and are frequented by both species. There are four species of willows in these stands: Pussy willow, Basket willow, Beaked willow and Red-barked willow. There are 3 stands of this nature in the study area, two reside along cedar creek and the third is on the western side of the Spur Woods along the old train track.

6. Plantation. The four plantations in the Spur Woods were a result of previous forestry activity in the area. The northern plantations are made up strictly of Red Pine, while the two southern plantations contain Red pine, Jack pine and Scot's pine.

From the classes of stands listed above, a representative sample was taken of each class of stand within the Spur Woods with the exception of Black Spruce. These sample plots are analyzed in the flora inventory section. The study sites were established and named. The site number and title were:

1. Mature Jack pine forest

2. Jack pine forest bordering plantation

3. Meadow

4. Creekbed surrounded by Willow

5. Deciduous stand

6. Cedar and Balsam Fir Stand

7. Northern Red Pine plantation

After the study sites were established, data was obtained on the composition of the different numbered stands which appear in Appendix F and the coloured map (Figure 7) details the forest inventory map of the Spur Woods.

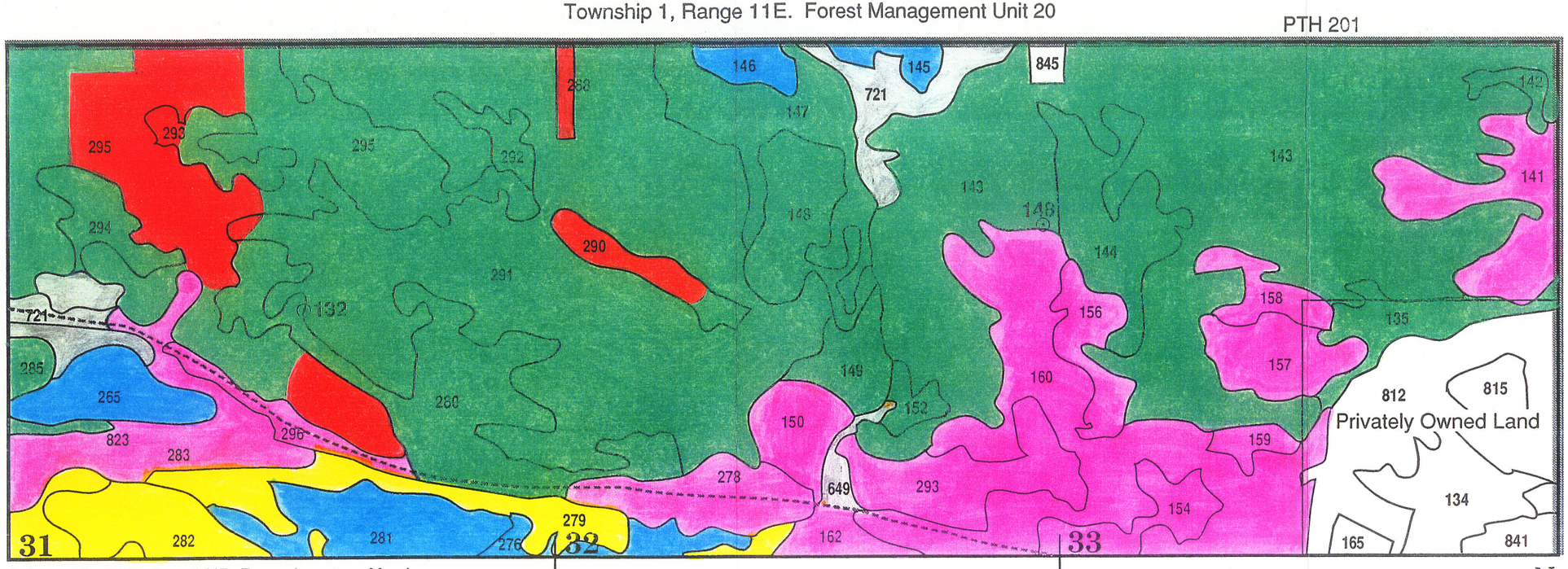
The forest inventory map shows that there is a diversity of forest stands in the Spur Woods. This is important as this diversity offers a wide range of activities which may be accompanied by such an area. The cover types for the township also demonstrate that the Spur Woods is the most southerly stand of Jack pine and Deciduous trees in the township, making it even more valuable as a recreational area.

5.6 SUMMARY

The literature review results of this chapter detail the historical and existing conditions of the Spur Woods. When combined with the resource inventory this chapter provides a data base for management decisions. The results of the previous two chapters will be used to formulate the zoning and trail management plan for the area.

Figure 6:
Forest Cover Stands of the Spurwoods

Township 1, Range 11E. Forest Management Unit 20



(adapted from Manitoba DNR, Forest Inventory Map.)

Jack pine
Plantation
Cedar
Willow
Spruce
Deciduous

Railroad track
Roadway

N

Scale 1 : 14375

CHAPTER SIX

RECOMMENDED ZONING

6.0 THE SPUR WOODS AS A SPECIAL NATURAL AREA

The results obtained and discussion of chapters 4 and 5 provide background for the value of the Spur Woods. The values listed in section 2.1 are all relevant to the Spur Woods. The trails possess recreational value, the plantations contrast the wild area and thus provide scientific value, the scenery and flora provide aesthetic value, and the wildlife provides a combination of all these values. The Spur Woods is a valuable wildland of local and provincial importance, and the whole area is worthy of protection and is in need of management. The zoning presented in this chapter will provide a framework for recreational management in the Spur Woods.

6.1 DISCUSSION OF ZONING

The resource inventory, as presented in chapter 4, indicates the ecological and physical conditions present in the Spur Woods including the trails present in the area as discussed in section (4.2). The two aforementioned discussions along with the information in the literature review provide the background for zoning within the Spur Woods. This zoning concentrates on trail management, but may also be used in future management plans by the branch(es) responsible for the administration of the area. As stated in the methodology, other uses of the above data include identification of sensitive areas, location of endangered or threatened species that are in need of protection and to identify areas for potential trail development. All of the uses, objectives and purposes listed above can be accommodated by a zoning plan for the Spur Woods.

The first zone is areas which are not in need of protection (see Figure 8) . The most

obvious of these is study site seven which represents the plantations. This area provides no habitat for animals, the trees are planted in strait rows with no undergrowth and therefore the area does not have any particular natural or aesthetic value. This area does have recreational value however. In the Watchable Wildlife Program Plan the possibility of constructing a day use picnic site in the Spur Woods was mentioned. This type of development would include picnic tables, restrooms and garbage containers. A parking lot has also been a development consideration (Frank Boychuk - personal communication). Study site 7 provides the perfect site for all of these developments. It is large enough to accommodate a parking lot along PTH 201 and, if trees are thinned, it could be a great place for a picnic under even-aged Red pine trees. This area also offers a good opportunity for interpretation in respect to forestry plantations. This, along with the 3 other plantations in the Spur Woods and the borrow pit along the highway, provide services ancillary to the recreational use of area trails. These areas form Zone V - Area Services zones which are defined in section 6.2.

The second zone relates to the zoning requirments for intense area recreational use. This zone is well defined as it represents trails only, not the area surrounding them. This type of zone focuses on an area that has been developed in the past, and includes the railine and trails 1a and the north-south section of trail 1 (see figure 4). This zone does not infringe on sensitive areas, although it does travel along the two identified ecologically sensitive areas. Following the above discussion, it is recognizable that this zone does possess recreational value as a snowmobile route in winter. It borders sensitive areas for birds but most birds migrate south for the winter and the sensitive

areas provide little forage for mammals, so recreational use (and the associated noise) is negligible in the winter months. For future management of this activity it is important that the snowmobiling trail be explicitly marked and ecologically sensitive areas be delineated and reasons for closure appear on the signs. This zone, for express recreational use is Zone IV - the motorized recreation zone, and it's recommended definition appears in section 6.2.

The next zone delineated regards the future management of Spur Woods. The trails that already exist there are not conducive to interpretation or hiking because they do not start in one area and end in the same area, hence the are one-way trails. Trials that are circular are usually recommended for hiking, walking or interpretation programs (Alberta Parks, 1987). It is therefore noted and that some new trails will be established in the Spur Woods. To design trails for interpretation, hiking and wildlife viewing, the existing trails will make-up the bulk of the total length and ancillary trails will be designed and constructed in conjunction with the landscape architect who works on the Watchable Wildlife program. The stands which have potential for future trails given that they are not physically or ecologically sensitive occur in this area. There is a need in the deciduous stands to place some sort of tread material on the trials as the soil is prone to erosion and becomes soft when wet. The recommended tread is either wood chips or sandy gravel as they are the most natural treads available. The emphasis of this zone is on trail use and therefore this zone is to experience the out-of-doors and thus Zone III is named the Natural Experience Zone.

There was an emphasis in the literature review and throughout the practicum to

focuss on the values carried by preserved land. Some non-anthropocentric values of wildlands include natural value, intrinsic value, genetic-diversity value and life support value (after Rolston, 1988). It follows that some parts of the Spur Woods should remain virtually untouched by recreational development. In the context of trail management this means that no new trails should be established in such a zone if it exists. There is one such zone in the Spur Woods. The ecological integrity present in old-growth, undeveloped forested areas is rare in Southern Manitoba. There are some uses however which may have little impact on such an old-growth area. An example of a low-impact activity would include low density berry picking. The zone to accommodate these apparent non-consumptive uses of the forested wildland can logically be called a Wildland zone, which is defined in section 6.1.

It was stated in Section 1.1, "how to protect ecologically sensitive areas from being disturbed using zoning and land designation" was one of the main purposes of this investigation. The literature section supported the values involved with such strict preservation, and the natural, cultural, life support and intrinsic values all can be included for such ecologically sensitive areas. There are areas within the Spur Woods which have been identified as ecologically sensitive. These include study sites 4 and 6 and the areas that they represent.

Site 4 is a wetland along a stream dominated by willows. This site is sensitive for both ecological and physical reasons. The wetland is partially flooded in the spring and the soil remains soft and damp into early summer (see photo 8). This particular soil is susceptible to deterioration as it is easily displaced when walked upon. This feature

makes potential for recreation minimal. The area does however provide habitat for sensitive floral species and provides a bedding area for deer and moose. The species that require a moist microclimate and wet soils include the Yellow lady's slipper and blue flag. This area also harbors a Manitoba endangered species, the Showy lady's slipper, so the protection of this area is required under the Endangered Species Act. It is for these physical and ecological reasons that site 4 is worthy of special protection.

PHOTO 8 - CEDAR CREEK AT THE END OF TRAIL 2.

The second Spur Woods sensitive site is study site 6. This study site is representative of Cedar and Balsam fir stands south of the railine. These sites are also worthy of special attention in the Spur Woods trail management plan. The forest floor is moist, moss covered and forms the uppermost reaches of the Cedar Creek watershed. The large number of creek tributaries and soft soil make this area sensitive to disturbance. The area is also habitat for a large number of species which are sensitive to human disturbance. These floral species include the Mountain maple, Feather moss and Twinflower. The fauna of this area is also sensitive to disturbance. Lynx and great grey owl live here. The sites which are represented by study sites 4 and 6 are in need of the strictest protection available in the Spur Woods trails management plan. The sensitive and fragile areas form Zone I - Special Preservation Zone.

6.2 RECOMMENDED ZONING OF PROTECTED AREAS

The third objective of this study was to " delineate boundaries for areas within the Spur Woods which may be worthy of protection for physical or ecological reasons". The resource inventory provided enough data to show that the Spur Woods is indeed a special and diverse place and the whole area is worthy of protection. To delineate the extent of protection which is required in each part of the Spur Woods, a set of area classification descriptions has been recommended which is similar to that used in national parks (after Environment Canada, 1991).

The recommended zoning in the Spur Woods is depicted in Figure 8 and will follow this classification system:

Zone I - Special Preservation Zone - a zone where public use is controlled to protect especially important or fragile resources.

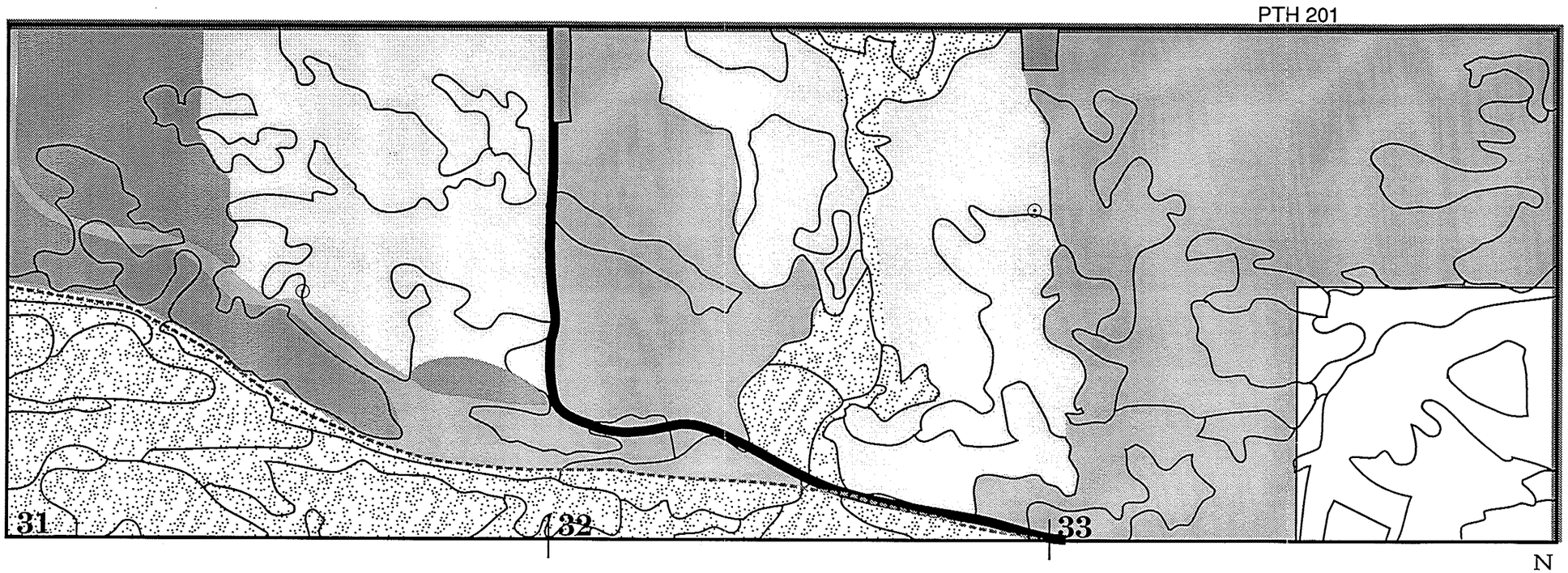
Zone II - Wildland Zone - a zone where public use for low impact activities such as berry or cherry picking is permitted, however no trails or other recreational activities are allowed.

Zone III - Natural Experience Zone - a zone that is maintained in its natural state (as existed in 1992). Vegetation management may be necessary in this zone to maintain its attractiveness for recreational trails. Zone III allows for new trails and for non-motorized recreational use.

Zone IV - Motorized Recreation Zone - a zone which accommodates a broad range of recreation opportunities including motorized recreational vehicle use. This is a zone where development has taken place in the past which complements recreational activities such as snowmobiling.

Zone V - Area Services Zone - a zone for recreational services including parking lots, structures for recreation, interpretation and wildlife viewing towers. These structures will preferably be located in areas which have previously been disturbed, such as borrow pits, plantations and survey sites.

Figure 8:
Zones



CHAPTER SEVEN

TRAIL MANAGEMENT PLAN

7.1 TRAIL MANAGEMENT PLAN

All six trails and the railine in the Spur Woods have some recreational potential but due to physical and ecological differences between trails, they differ in the activities that are recommended for each. The following is a summary of the activities recommended for each trail and, in a broader sense, each zone (see Figure 9 for details).

Trails 1 and 1a - The interest in snowmobiling as a form of outdoor recreation has put pressure on the resources of areas surrounding the Spur Woods. The railway right-of-way is a popular thoroughfare for this activity. For the Spur Woods trail management plan, it is recommended that the railine connecting to trail 1a, and the north-south portion of trail 1 is the only trial suitable for snow-machine traffic {Zone IV}. The Piney community center will provide funding for the trial markers and closure signs and it is expected that the snowmobilers in the area will respect these signs (Frank Boychuk - personal communication - Jan.1993). This activity will be allowed solely in Zone IV of the Spur Woods. The primary use for the western branch of trial one and the recommended extension loop will be for interpretation (see Figure 9). The remainder of trail 1 occurs in Zone 4 and will form the snowmobile route in winter.

Trail 2 - This trail which ended at Cedar Creek was formally used as a hunting trial. The trail suffers severe trail degradation and is barely passable with a four-wheel drive vehicle. It is severely eroded and has numerous "potholes" along it. Trail widening is inevitable as "potholes" are avoided by driving around them. This trail ends at Cedar Creek which is the most fragile area ecologically within the Spur Woods. Cedar Creek provides habitat for Showy lady's slippers and Blue flag plants. This trail passes through

Zones II and III. The ecological and physical conditions of this trail dictate that it should end before Cedar Creek and an extension loop will be placed to return back to the parking and picnic area. This trail will be fitted with signs and other aids and will the primary interpretation trail in the Spur Woods.

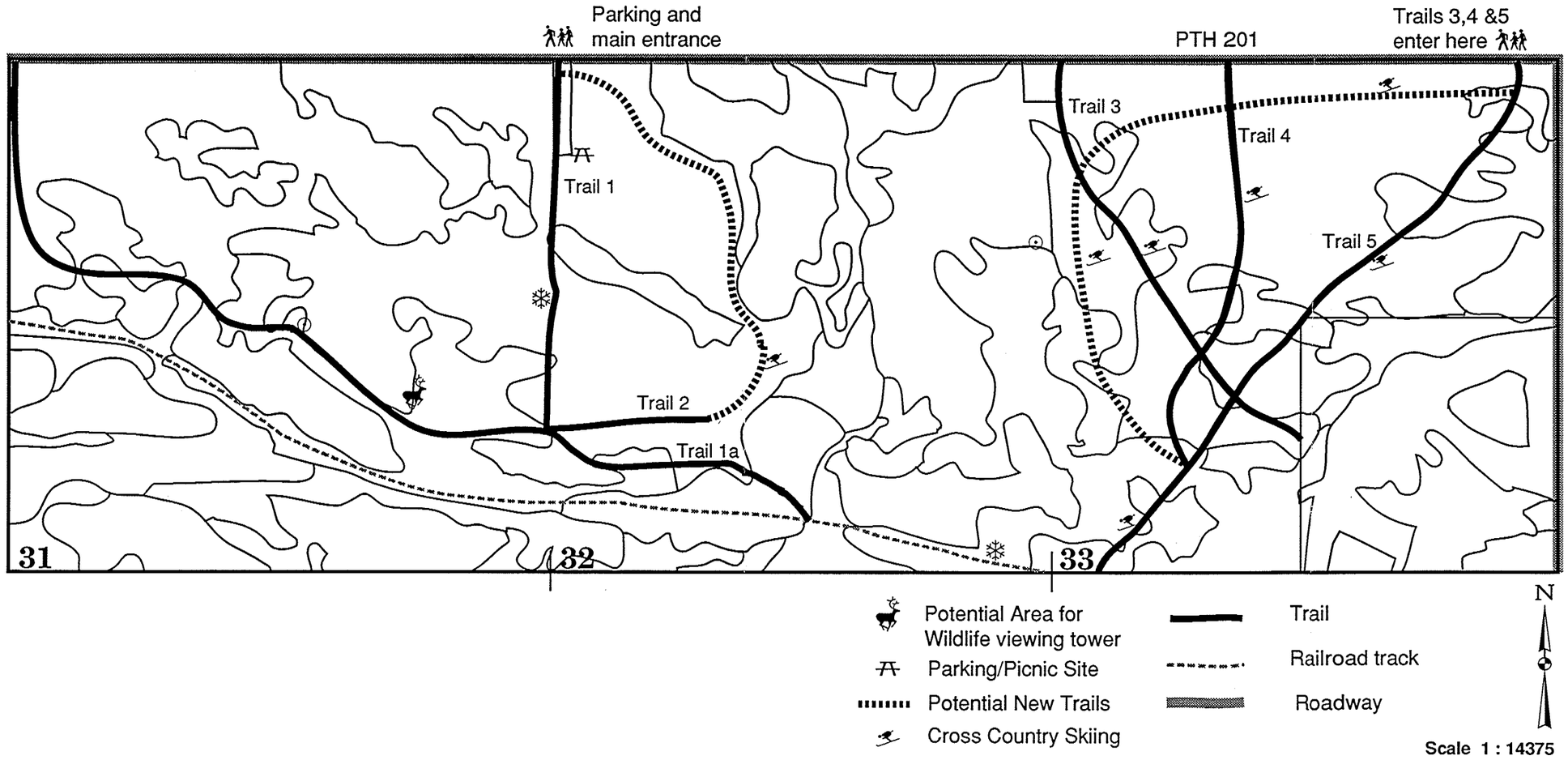
Trail 3 - This is a short trail beginning at the borrow pit along PTH 201. Currently it is primarily used by hunters who drive it to spot deer. Many fresh deer carcasses were observed there in June and July 1992, thus poaching seems to be a specific problem on this trail. The use of this trail by vehicles has also led to its deterioration. "Mudholes" are evident in a number of places. This trail offers prime white-tailed deer viewing. This trail passes through Zone III of the Spur Woods.

The vegetation variability index (VVI) of this trail is 3.0, so it has a moderate diversity of vegetation along it. It is best suited for cross country skiing in winter and nature walks in summer. It should be closed to vehicle traffic because it is physically vulnerable to degradation.

Trail 4 - This trail is very similar to trail 3 in its physical attributes. Its primary use is for hunting. Trail deterioration is also a problem and many "mudholes" have been observed there. It is therefore recommended that this trail be closed to vehicle traffic. It offers good viewing opportunities of porcupine and white-tailed deer. This trail has the second highest VVI (4.55) of the Spur Woods and thus offers a diversity in change of vegetation over its length. It passes through Zone III of the Spur Woods. The primary uses will be for hiking and cross-country skiing.

Trial 5 - With a length of 1681 m, this is longest and most diverse trail in the

Figure 9:
Potential Trail and Facility Design



eastern section of the Spur Woods. The damp, soft soil and diversity of vegetation (VVI=5.29) make this an especially interesting trail. The fragile soil and plants make this trail susceptible to human disturbance. Although the trail is currently quite wide (X = 257.91 cm) it is not suitable for large group travel. It is therefore recommended that it be used primarily hiking in summer and cross country skiing in winter. As part of the management plan this trail has potential to be added to form a ski loop. The loop will be approximately 2.5 km long and access from PTH 201 is possible. Parking to use this trail is feasible on the shoulder of the highway. Since, in general, the trail cannot be driven on in winter because of deep snow. The trail will be easily recognized once trail markers are put in place.

Railway right-of-way - This is the most built up trail in the Spur Woods. This former train track forms the southern border of the Spur Woods for two sections. The eastern access to the Spur Woods is blocked by a washed out area where it appears there had been a bridge. This washout currently makes car or truck passage impossible, however, ATV traffic occurs in summer and this is used primarily as a snowmobile trail in winter. This area has been disturbed in the past, however ATV noise in summer frightens away wildlife which might otherwise nest or feed in the Spur Woods near the railine. If wildlife viewing is to be a major attraction of the Spur Woods, this ATV traffic must come to a halt. It is therefore recommended that ATV's not be allowed on the railway-right-of-way, or for that matter in any other part of the Spur Woods. This ban is supported by a number of local residents, however many members of school age are opposed. The ban on ATV's should be for spring and summer which are the

breeding, nesting and rearing seasons for most forms of wildlife. ATV and snowmobile traffic on designated routes in winter do not interfere with breeding, nesting or rearing and thus those uses should be allowed to continue at that time of year. It is recommended that the designated routes for these two activities be on the railway-right of-way and on trails 1a and 1 only {Zone IV}.

In addition to the trail management plan and recommended uses for each trail, there are other considerations relating to trail management in the Spur Woods.

One concern of the SWHRA was that if the area's trails are further developed, there is potential for people to get lost in the Spur Woods. To alleviate this concern, a set of trail head markers will be placed at the start of trails, at places where trails meet and where the trails cross each other. A combination of symbols and colours is recommended for the Spur Woods trails. The recommended combination is:

Trail	**Code**
1	green - pine tree
2	brown - porcupine
3	blue - fern
4	black - moose
5	yellow - cedar waxwing

The trail marker keys will be published in a trail guide for the Spur Woods which the SWHRA is interested in publishing. Trail markers for snowmobiling will also be erected in the Spur Woods with cooperation from the SWHRA and the Piney community center. They will delineate Zone IV as the snowmobile route.

Protected areas (Zone 1) will also be delineated with signs explaining the ecological sensitivity of each area, and the SWHRA in association with DNR is willing to perform

all of the work involved if materials are supplied.

Another major area of sign erection is Spur Woods' Watchable Wildlife at the head of trail 1. It has been suggested by the SHWRA that a sign depicting the flora and fauna of the Spur Woods should be erected similar to the one at Rushing River (see photo 9). A local artist has been contacted by the SWHRA to paint the relevant species on the sign when needed. The recommended species are:

Plants	Mammals	Birds
Showy lady's slipper	Porcupine	Pileated woodpecker
Blue flag	Moose	Cedar waxwing
Bunchberry	Redbacked vole	Great grey owl
Lily of the valley	Beaver	Northern goshawk
Red pine	Red squirrel	Black-capped chickadee
Ostrich fern	White-tailed deer	Ruffed grouse

PHOTO 9 - RECOMMENDED WATCHABLE WILDLIFE SIGN DESIGN

In conjunction with the Watchable Wildlife program and outdoor education potential of the Spur Woods, it is recommended that non-personal (signed) interpretation be used on Trial 1 within the Spur Woods. The potential interpretation themes could include:

(A) Natural old-growth forests

(B) The subject of biodiversity

(C) Habitat requirements of old-growth associated species

(D) How noise of all-terrain vehicles affects wildlife

(E) The ecology of a bog, and how it differs from jackpine forest

It is also recommended that Trails 3, 4 and 5 receive a tread material. It might be possible to have the SWHRA perform the work and the City of Winnipeg may supply the woodchips from their " Let's Chip In" program. It may also be possible for the SWHRA to have a volunteer day to remove trees that have fallen over trails. It is ecologically sound to use these trees as trail head posts and closure posts across trailheads.

7.2 FUTURE MANAGEMENT CONSIDERATIONS

Protection and management in the Spur Woods is based on the ecological integrity of the area. This approach regards resource preservation as dominant over other considerations. The main uses and purposes of the Spur Woods if it is given a protected status are expected to be:

1. For the Watchable Wildlife Program

2. For other forms of outdoor recreation

3. For use in science as a demonstation area by the forestry branch

There are current Spur Woods uses which are not compatible with the future expected uses, these include:

(i) recreational hunting

(ii) commercial trapping

(iii) riding all-terrain vehicles

It was identified by Glenn Suggett of the Wildlife Branch that there is a potential problem in allowing recreational hunting in a wildlife viewing area. The problem lies in the inherent danger of walking through the forest during big-game hunting seasons.

There may be other uses that are incompatible, but have yet to be identified. It is therefore recommended that the uses listed as (ii) and (iii) above no longer be allowed in the Spur Woods except as noted elsewhere in this practicum (ATV riding will be allowed in winter). Provisions for this should be included in the regulation establishing the Spur Woods. All other management recommendations by DNR regarding the Spur Woods should be carried out in consultation with the Spur Woods Heritage Reserve Association to establish grass roots involvement in such decision-making processes.

CHAPTER EIGHT

APPROPRIATE DESIGNATION

In order to achieve an effective zoning and trail management plan for the Spur Woods, a land designation is needed which will protect the area from logging while continuing to allow recreation to occur. A designation through provincial legislation will ensure that both of these purposes are fulfilled.

8.1 PROTECTED AREA LAND DESIGNATION IN MANITOBA

Land class designation is a land use management tool by which uses can be prescribed for land within the province. For example wildlife conservation areas provide habitat for endangered wildlife. For forest recreation areas in Manitoba, there are a number of agencies involved in land use decisions. All but one of these agencies is under the jurisdiction of the Department of Natural Resources. The potential branches of DNR involved include parks, wildlife, lands and forestry. The one designation that is not the responsibility of the DNR is the transfer of ownership to a non-governmental organization.

"The earliest exclusions of lands from agriculture, apart from Indian Reserves were the Dominion Timber Reserves, which included the Sandilands. Although principally dedicated to guaranteeing a supply of fenceposts and fuelwood for settlers, the determination to prevent homesteading on unsuitable lands was also explicit" (Manitoba DNR, 1989). The statutory purpose of these reserves, now called Provincial Forests is " to reserve certain areas in the province for a perpetual growth of timber, and to preserve the forest cover thereon, and to provide for a reasonable use of all the resources that the forest lands contain" (Manitoba Forest Act).

The following is a summary of the branches of government involved in the protection of land, each title that can be used for preservation and the statutory purpose of designation:

Provincial Parks and Natural Areas Branch

Provincial Parks are created under the Provincial Parks Lands Act. Under section 2(2) of the Act,"Provincial park lands are dedicated to the people of Manitoba and visitors to Manitoba, and may be used by them for healthy enjoyment, and for cultural, educational and social benefits that may be derived therefrom". So, in essence, parks are created for people not wildlife or wild plants. Later in the Act, in Section 13(1) the Lieutenant Governor in Council may make regulations:

(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 so is to be;

(b) describing various types of provincial park lands, including

(iii) provincial recreation parks,

(iv) provincial recreation trailways,

(v) provincial parkways,

(vii) provincial heritage parks,

(viii) wayside parks.

A provincial Parkland Act is being developed to replace the Provincial Parks Lands Act and many of the designations mentioned here may not appear in the new Act. These parks currently are regulated and included in A Systems Plan For Manitoba's Provincial

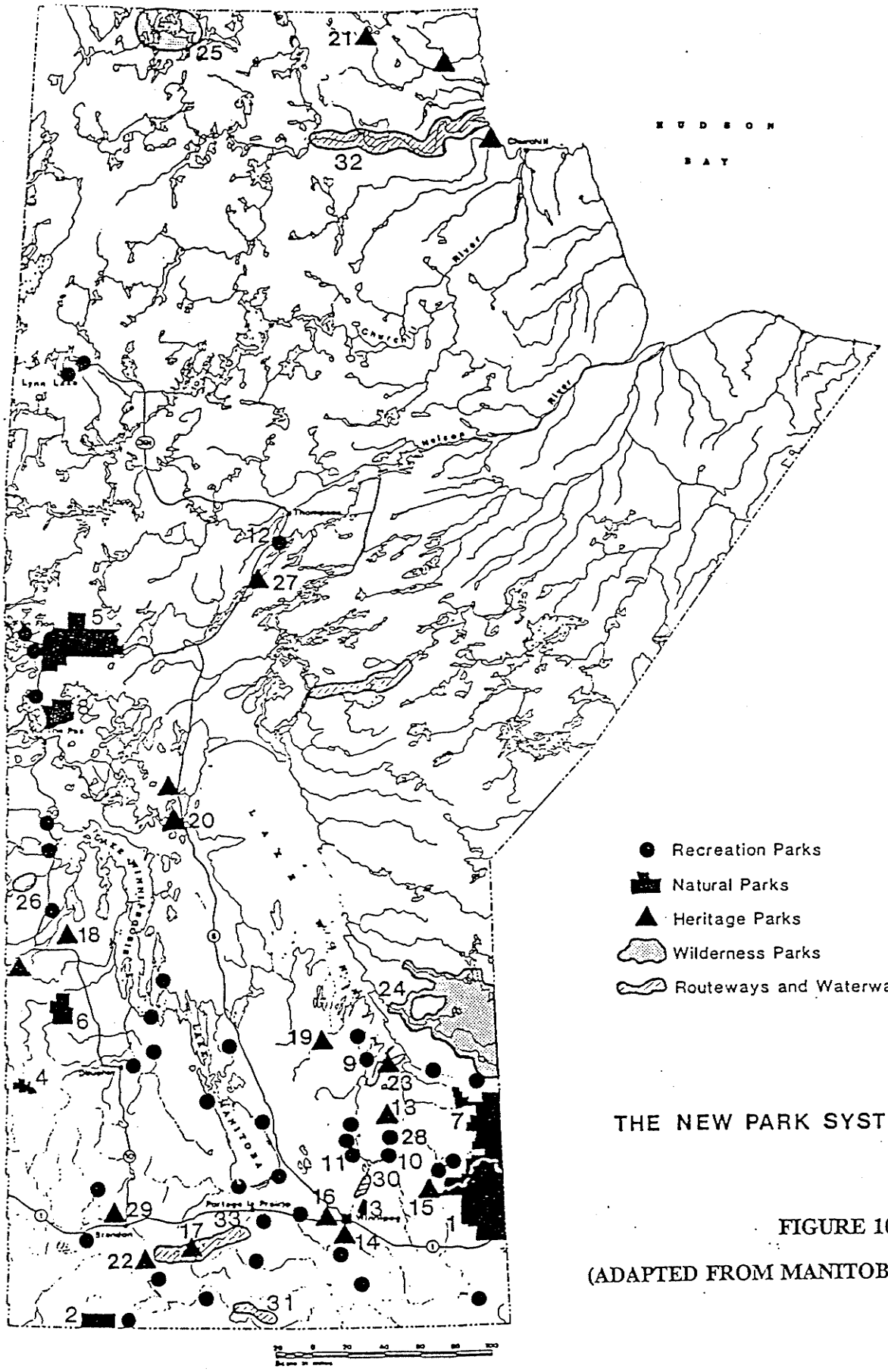
Parks (park location depicted in Figure 10) Each of the aforementioned parks is defined and described in the systems plan:

1. **Provincial Recreation Parks** are described as "spacious areas close to concentrations of people, the natural attributes of which make it possible to serve large numbers of recreational users without degradation of the basic natural resources of the area." There are currently 45 such parks in Manitoba totalling 50,600 hectares. In the systems plan, future action may include new recreation parks at La Salle River and Rosseau River.

2. **Provincial Recreation Trailways** are described as "non-motorized trailways that link attractive landscapes or that run along linear features such as valleys. They provided encounters with wildlife in a natural setting. In Phase II of the systems plan, one provincial trailway is to be established in the Pembina Valley.

3. **Provincial Recreation Parkways** are "especially attractive motorized-use recreation corridors designed for winter or summer use". They link historical or natural features and may also contain waysides, overlooks, or jump-off points for side trips. The systems plan proposes one recreation parkway to be located on Red River Road.

4. **Provincial Heritage Parks** "represent landscapes or sites that are one-of-a-kind in Manitoba. They preserve and interpret key elements of Manitoba's natural and cultural history". Heritage Parks provide a range of outdoor recreational opportunities and experiences that emphasize appreciation of heritage values. Major commercial resource extraction/harvest activities are not permitted. There are 4 Heritage Parks currently covering 26,500 hectares. In the systems plan 4 new parks will be reclassified



THE NEW PARK SYSTEM

FIGURE 10

(ADAPTED FROM MANITOBA DNR, 1985)

and 13 new Heritage Parks will be designated.

5. **Wayside and Special Use Parks** are ".. small land areas developed for express recreational purposes, including Waysides, Provincial Campgrounds, Marine Parks, Access Sites and Information Centers". There are 89 Waysides totalling 486 hectares, 5 Special Use parks totalling 50 hectares and 18 undesignated sites totalling 38 hectares.

Wildlife Branch

The designation of special use areas for wildlife is contained in the Wildlife Act. Section 2 reads " for the better management, conservation and enhancement of the wildlife resource of the province, the Lieutenant Governor in council may by regulation designate areas of the province and prescribe a use or uses to which each area so designated shall be devoted". Newly designated Crown Land is discussed in Section 5(1) of the Act which reads " where an area proposed to be designated under section 2 consists of Crown Land, it may be designated as

(d) a Wildlife Management Area; or

(e) such other type of area as the Lieutenant Governor in Council may specify in the regulation designating the area.

Therefore, under this act, the wildlife branch is responsible for two types of "conservation areas", those being Wildlife Management Areas and Special Conservation Areas and both may be used to protect special areas in Manitoba.

6. **Wildlife Management Areas** are "designated for the better management, conservation, and enhancement of the wildlife resource of the province. These areas can,

and are, used for agriculture, as well as for forestry, recreation, mineral extraction and other resource uses" (Manitoba DNR, 1989). The first Wildlife Management Area was established in 1961, and additions have been made in most years since. As of 1989, there were a total of 69 WMA's on 3,035,200 hectares. Most (89%) of this area is north of the 53rd parallel, in the four largest WMA's.

7. **Special Conservation Areas** are designated under the Wildlife Act in Regulation 76/91. These areas provide protection generally for one species of wildlife (Bob Jones - personal communication). There are 3 Special Conservation Areas in the Province. Under Section 1(2) of the regulation "the purpose of designating the Clandeboye Bay Special Conservation Area is to conserve and protect the migratory bird species piping plover (*Chadrius melodus*)". Similar purposes for the Walter Cook SCA (piping plover) and the Churchill SCA (ross' gull) are also contained in the regulation.

Forestry Branch

The involvement of the forestry branch in land management traces its roots into the 19th century. The earliest exclusions of lands for settlement apart from Indian reserves were the Dominion Timber Reserves declared on Riding, Turtle, Duck and Porcupine Mountains and in Spruce Woods and the Sandilands. Although principally dedicated to guaranteeing a supply of fenceposts and fuelwood for settlers, the determination to prevent homesteading on unsuitable land was also explicit.

After the control of natural resources was transferred the provincial governments in 1930, the forest reserves became the responsibility of the Provincial Forestry Service of

the Department of Mines and Natural Resources. The forest service took over all the administration and other duties associated with the newly named provincial forests. Forest management policies established prior to 1930 remained in practise. Basic principles guiding the management of the forest reserves included: fire protection, development and utilization of forest resources, development for recreational use and wildlife conservation (Goldrup, 1992).

The forestry branch held this four fold purpose until the establishment of the Provincial Parks Act in 1960. This Act provided for the formal establishment of a system of parks and associated recreation areas for the enjoyment of the public.

The first Wildlife Management Area, Watson P. Davidson, was established in 1961 west of the Sandilands Provincial Forest. The establishment of areas for wildlife and recreational parks thus made the forestry branch responsible for only two of its original principles: fire protection and the utilization of forest resources.

8. **The Forest Act**. R.S.M. 1987,c.F150, under Section 41(1) the Lieutenant Governor in Council may make regulations and orders in Section (k) "respecting the conservation, protection, and management of crown forests and the control and management of the flora and fauna is such areas, and the occupancy of the lands in provincial forests". This may provide the legislative framework for a regulation by which forested areas can be protected under the Forest Act, under the direction of the Forestry Branch, and may protect both the flora and fauna of such "conservation areas". The area may continue to be included in a provincial forest and also may preclude cutting from within designated areas (Bud McIvor - personal communication).

Ecological Reserves Committee (Parks and Natural Areas Branch)

9. **Ecological Reserves.** The ecological reserves program began in 1973 and is legislated under the Ecological Reserves Act of 1981. This program involves the selection of areas to preserve ecosystems and landscapes. There are 13 ecological reserves protecting a total of 57,400 hectares in the province.

Transfer of land ownership to a non-governmental organization (NGO).

10. The transfer of the title to land in Manitoba has been used to preserve land in Manitoba in the past. This transfer was for the preservation of land and provides for the management of the land by a non-governmental organization or its delegates. Organizations who are involved in this procedure include the Manitoba Habitat Heritage Corporation, the Nature Conservancy and possibly local environmental groups within the province.

8.2 DISCUSSION OF APPROPRIATE LAND DESIGNATION

The literature review of Section 7.1 revealed ten possible land designations applicable to the Spur Woods. A brief analytical discussion of each follows:

Recreation Park

The Spur Woods is a relatively small area which has ecologically fragile zones and has an undulating sandy soil that is prone to erosion. It is not possible for this area "to

serve large numbers of recreational users without degradation of the basic natural resources as set out in the systems plan" (Parks, 1986). The Spur Woods is not close to a concentration of people, with the closest large town being Steinbach, 50 minutes away. It is for these reasons that this designation is not appropriate for the Spur Woods.

Provincial Recreation Parkway

This designation provides for motorized use corridors designed for year round use. The Spur Woods does have some trails which can be driven on, however they are not major corridors. Ploughing roads in the Spur Woods would not be feasible either in cost or the damage that might be done to the sandy soil on the trails in the Spur Woods. Therefore this designation would not fulfil the objectives of this study.

Both of the following designations, Recreation Trailway and Heritage Park have been debated lately around the province at the Natural Lands and Special Places strategy meetings. In these meetings there have been recommendations on changing the Park Lands Act, which creates both recreation trailways and heritage parks. A summary of the potential problem analysis for each designation follows.

Recreation Trailway

The designation as a recreation trailway does not seem feasible in the case of the Spur Woods, or for any future area in Manitoba. This is because there is a recommendation of the executive committee suggesting changes to the Park Lands Act which would remove the designation. This removal presents an obvious problem, since

the designation may no longer exist (Roger Schoeder - personal communication, Jan. 1993).

Heritage Park

The recommendations regarding Heritage Park by the executive committee are similar to those for recreation trailway. This designation will not appear in the revised Act. The new designation which will replace it will be as a heritage site. These will be small areas that focus on the cultural value of a specific area. There will not be an emphasis on scenic or natural values in these sites. It was suggested that many larger Heritage Parks will be redesignated as Natural Parks. The Spur Woods however is quite small and it may not be feasible to designate it as a natural park under the revised Park Lands Act (Roger Schoeder - personal communication, Jan. 1993).

Provincial Wayside Park

Wayside Parks "are developed for express recreational purposes". The designation of the Spur Woods is to protect an old-growth forest, not for express recreational purposes. Although this designation may fit because of the protection it provides, it would not fulfil the ecological objectives of this investigation.

Special Conservation Area

A Special Conservation Area protects primarily one species of wildlife as defined by the Wildlife Act. The Spur Woods does not harbour any one species of wildlife that

requires protection according to the act. The whole community in the area, however is in need of protection. Thus, this designation would not fulfil the objectives of this study.

Ecological Reserve

As mentioned explicitly in Section 1.1 of this practicum, the Ecological Reserve Designation was not approved by the citizens of the area when they were consulted by the Department of Natural Resources staff. This designation, then was precluded from this area before the formal start of this investigation.

Transfer of Ownership to a Non-Government Organization

This alternative is acceptable publicly, however it is leaves a number of questions from a government and public interest group viewpoint. As demonstrated in Table 8.1, the internal policy of a NGO effects 6 of the 8 activities which form the criteria for selection. The transfer of ownership to a government associated NGO such as the Manitoba Habitat Heritage Corporation, does not seem feasible as the emphasis is not for the protection of wildlife habitat but for the protection of floral habitat (Bob Jones - personal communication). Many NGO's are offloading land that they owned because of the tough economic times they are facing.

Forest Conservation Area

The establishment of such an area would be the first in Manitoba and could contribute to the preservation of the Manitoba Lowlands natural region of the province.

The establishment of such an area could be achieved under the Forest Act. This designation would also focus on one objective of this study; to protect wild plants. This designation can offer the most flexible management options while protecting the area.

The first potential problem with this designation is that it would require a new regulation under the Forest Act to date. No Forest Conservation Areas currently exist and their creation may require new infrastructure within the Forestry Branch. There currently is no experience in managing a FCA designation which would also be a problem.

Wildlife Management Area

This designation would be the easiest to establish and incorporate into existing programs, policy and systems plan of the DNR. A Wildlife Management Area(WMA) designation can offer flexible alternatives for management of the area. There is currently an infrastructure in place within the Wildlife Branch to manage such areas. Regulations and policy exist regarding a WMA designation and the branch has experience establishing a WMA. There is support within the Wildlife Branch for the Spur Woods to be incorporated into the Watchable Wildlife Program. This may make it easy for the Wildlife Branch to incorporate this program if they are responsible for the area.

A WMA is designated to protect wildlife and their habitat. This designation of habitat in a regulation to designate the Spur Woods as a WMA should be suitable broadened so as to include the wild plants that exist in the area. As the Wildlife Act does not specifically include wild plants, special care in drafting the regulation will be

required. Similarly, the regulation will have to be drafted in a manner so as to prohibit logging from occurring in the Spur Woods (other than for management purposes as discussed elsewhere in this practicum). Without the specific reference to logging prohibition the department could issue a permit for logging in the area. Such logging activity would not be support by the SWHRA and also would not fulfil the objectives of this study.

8.3 SUMMARY

Table 8.1 provides further information for the basis of elimination of many of the aforementioned designations. The criteria as stated in the objectives and purpose was to:

(a) have the area protected from logging,

(b) allow many of the traditional recreational pursuits to continue in the Area,

(c) have agreement between the DNR and SWHRA as to the final designation for the area.

Some of the designations this table have been precluded from the short list as per the discussion in the previous section. This table, however appears in the Manitoba State of the Environment Report (1991) and can be used to assist in the selection of the designations to be analyses in the short list and potential problem analysis.

In relation to criteria (a) the following comments can be made:

Recreation parks may allow logging within their borders and therefore would not fulfil criteria (a) and the SWHRA feel that this is not a good designation and neither does the Parks Branch and therefore criteria (c) would not be fulfilled either.

In relation to criteria (b) the following comments can be made from the matrix. A Special Conservation Area precludes recreation as it protects the area for the breeding time of the year and when combined with the purpose of the regulation as previously discussed it to can also be removed from the short list. The transfer of ownership to a non-governmental organization leaves too many questions as to the effect of internal policies of the potential land owner. It is also not fully accepted by the Spur Woods Heritage Reserve Association. The recreational use and right of access may also create management problems in the future in regard to this option. Criteria (c) is also not met with this option as the government is critical of such transfers of land and thus this designation can be removed from the short list. The ecological reserve designation does not fulfil criteria (c) as before the start of the formal investigation there was resistance by the SWHRA to such a restrictive designation.

The choices as denoted by * on the matrix are the only two which may be viable alternatives for the management of the Spur Woods. This leaves policy makers with the option of using a Forest Conservation Area or Wildlife Management Area designation to protect the area. If the logging concerns of the local people can be addressed in the regulations establishing the Spur Woods Wildlife Management Area, this designation would be the best fit in terms of current programs.

TABLE 8.1 : ACTIVITIES ALLOWED IN SPECIAL AREAS MATRIX

ACTIVITY / DESIGNATION	RESEARCH	RECREATION	LIC. HUNTING	TRAPPING	HAYING	LOGGING	MINING	CANDIDATES
RECREATION PARKS	a	a	a	a	s	s	s	
RECREATION TRAILWAYS	a	a	a	n	n	n	n	
RECREATION PARKWAYS	a	a	n	n	n	n	n	
HERITAGE PARKS	a	a	s	s	s	p	s	
WAYSIDE PARKS	a	a	a	a	s	p	p	
WILDLIFE MANAGEMENT A.	s	a	s	s	s	s	s	*
SPECIAL CONSERVATION A.	a	s	a	a	p	p	p	
FOREST CONSERVATION A.	a	a	s	p	p	p	p	*
N.G.O	a	a	?	?	?	?	?	
ECOLOGICAL RESERVE	s	s	p	p	p	p	p	

a - allowed
p - prohibited
s - allowed in some or by permit
n - no decision yet
? - depends on N.G.O's internal policy
* - Candidate designations for the Spur Woods

Note: A Forest Conservation Area has not yet been established yet and allowing or not-allowing activities may be incorporated into the regulation establishing the area.

CHAPTER NINE

CONCLUSIONS AND RECOMMENDATIONS

9.1 OVERVIEW

This Plan For Protection and Management of the Spur Woods describes the natural and historical features, and present uses of the area. It provides guidelines for future development and management of the Spur Woods through the identification of land use zones, trail management and development proposals and by recommending that the site be designated as a protected area under provincial legislation.

A primary focus of the study was a field inventory of the natural resources of the Spur Woods. Field studies and observations were supplemented by literature and information gleaned from local area residents in interviews and correspondence.

Interviews and conversations involving local people and governmental staff were important in determining present and future proposed uses of the area. This information in combination with the resource inventory was used to determine zones and develop a variety of trails to meet local and broader interests.

The Department of Natural Resources will continue to manage the Spur Woods in the future, however concerns for protection of the area and development for recreation are part of the rationale for giving the area a new designated status. An important part of this project involved consideration as to the most appropriate designation. Analysis of various provincial land categories was completed in order to identify the best fit for the Spur Woods.

9.2 CONCLUSIONS

The following conclusions can be made from this study of the Spur Woods.

The resource inventory was considered to be comprehensive with the exception of the bird inventory. The inventory provided a solid information base for management planning of the area. The inventory results revealed seven distinct plant communities in the area. There are three primary communities dominated by Jack pine, Aspen and Cedar trees. Jack pine, the most extensive vegetation community, is old-aged and is most susceptible to change from natural factors including fire, wind throw and disease.

This largely intact "natural" island of habitat in the southeastern agricultural area of the province provides habitat for a variety of wildlife and wild plants, including some rare and endangered species, such as the Showy lady's slipper. This study does not provide a picture of the larger ecosystem of the surrounding area, but opportunities to link planning and management with potentially important natural areas to the south of the Spur Woods should not be overlooked.

Activities such as poaching and indiscriminate tree cutting provide evidence that this area is currently a "common property resource" with little enforcement. Also there is currently no organization or management of development of the present recreational uses. Some trails or parts of trails have been developed in sensitive areas, and therefore, warrant removal from access in the future. Unless there is attention to unorganized uses of the woods its recreational values and ecological integrity will suffer.

The Spur Woods Heritage Reserve Association (SWHRA) desires a planned approach for expanded use of trails and management of the area. Moreover, the Department of

Natural Resources has expressed interest in expanded use of the area for wildlife viewing. With planning and management it is believed that the area can sustain increased recreational use.

Preliminary interviews for this study indicate that there is good potential for the establishment of a partnership between the local community and governmental staff. For example, if DNR supplies the signs, the SWHRA is willing to erect them. This partnership could lead to development and maintenance of the area recreational potential. As noted above interest in wildlife viewing has led to the Spur Woods being included in the Watchable Wildlife Program. There is potential for this program and this would fit into the partnership for management of the area. However, expanded recreational uses could lead to conflicts with activities such as hunting. It will be important for the responsible agency to address this as a safety concern in future development.

The Spur Woods has a number of distinctive use areas. Ecologically sensitive sites and areas capable of supporting recreational activities were identified and categorized into different zones. Zoning is an accepted land management practice that can be applied here to help protect sensitive areas and direct planning and development of recreational activities.

Public consultation was an important though somewhat limited aspect of this study. There has been effective consultation with the local groups concerned with protection, management and recreational use of the area. It was determined that, these groups uphold and support this *Plan for Protection and Management*. Consultation with government agencies also indicated support and concern for the area by different

branches within the Department of Natural Resources (DNR). Different interests on preferred ultimate uses exist. In particular, the Forestry Branch is concerned about the removal of the area from the annual allowable cut. However, the Wildlife Branch sees the potential to develop the area for recreation and tourism. The input from the local people involved in the forest industry however, has been limited. The preliminary contacts made indicate that local loggers oppose any plan for protection of the Spur Woods.

This study identified 10 potential designations which may be used for a protected area in Manitoba. Analysis of these options lead to identification of 2 designations which fulfilled the objectives and criteria of this study, those being a Wildlife Management Area and Forest Conservation Area.

9.3 RECOMMENDATIONS

The following recommendations address means to enhance and implement the findings of this study:

1. To strengthen the resource inventory, a more complete bird survey needs to be done in the Spur Woods.

It may be possible to have this inventory done by local bird watching clubs.

2. Future management strive to maintain the natural diversity of the areas vegetation communities.

The Spur Woods can generally be regarded as an intact area which possess ecological integrity. Attention should be given to the options of allowing natural

succession to continue or "limited intervention" in regards to future vegetation management.

3. The responsible agency implement the trail management plan as stated elsewhere in this practicum.

The regulation should include allocation to specific uses, ranging from walking to motorized trails. There should also be closure of the eastern half of Trail 2 which leads to an ecologically sensitive area which harbours an endangered species. Development of new trails to form circular routes for recreation are also recommended. Tread is required on Trails 3, 4 and 5 to facilitate recreation and prevent trail deterioration. Signing, picnic areas and a parking lot should all be included in the final site plan.

4. The responsible agency should monitor the area to determine if conflicts arise in the Spur Woods.

They should undertake steps to prevent or eliminate recreational conflict in the area. The greatest potential for conflict may arise from hunting in a wildlife viewing area. These activities are mutually exclusive as safety is a concern if hunting and hiking occur in the same area.

5. Given strong local interest in the area, the DNR and the community establish a more formal relationship to achieve cooperative management of the *plan*. The watchable wildlife program will be a part of this relationship and may provide funding for development of interpretive signs, picnic tables and a wildlife viewing tower.

Section 6.2 identified that 5 zones be established in the Spur Woods, including: special preservation, wildland, natural experience, motorized recreation and area

services.

6. The 5 land use zones should be identified in the management plan used after the Spur Woods is designated either a Forest Conservation Area or Wildlife Management Area.

The branches of DNR involved in land management have been consulted for input in their relative areas or expertise.

7. DNR address and determine their position on *The Plan for Protection and Management*.

It is also recommended that a more broad-based public consultation be carried out by DNR. This consultation will confirm the levels of support or opposition to the *plan*. One particular target group should be the local loggers' association.

8. The final recommendation flowing from this study is that the Spur Woods be designated a Forest Conservation Area or Wildlife Management Area as soon as possible. The Forest Conservation Area designation offers the best protection for Wild Plants, however the Wildlife Management Area is the easiest to implement.

REFERENCES

Alberta Recreation and Parks. 1987. Recreation Trials. Community Recreation Branch. Edmonton.

Canadian Wildlife Service. 1989. The Benefits of Wildlife. Environment Canada. Ottawa.

Canadian Wildlife Service. 1990 . A Wildlife Policy for Canada. Minister of Supply and Services. Ottawa.

Dame, Vernon D. 1985. The Role and Responsibility of Interpretation as a function in a Total Park Operation. Interpretation 22(4):2-21.

Barlowe, R. 1978. Land resource economics: the economics of real estate. 3rd. ed. Englewood cliffs. Prentice Hall.

Dearden, P. 1980. Towards protection of scenic resources. Environmental conservation, 7(2):152-158.

Donaldson, J.W. and M.D. Swan. 1979. Administration of ECO-education. Council on Outdoor Education. Wash. D.C.

Doozan, C.J. and William J. Kimball. 1982. Citizen Attitudes about environmental Issues in Guiding Land Use Decisions. London.

Douglass, R.W. 1975. Forest Recreation. Pergamon. Toronto.

Duhamal, Roger. 1964. Wild plants of the Canadian Prairies. Canada Dept. of Agriculture. Ottawa.

Edington, J. and M.A. Edington. 1986. Ecology, Recreation and Tourism. Cambridge University Press. London. pp:1-77.

Edwards, Yorke. 1984. The Land Speaks: Organizing and Running an Interpretation System. The National and Provincial Parks Association Of Canada. Toronto.

Environment Canada: Parks Service. 1991. Canadian Parks Service Proposed Policy. Canada's Green Plan. Ottawa

Environment Canada: Parks Service. 1991. National Parks System Plan 1990. Minister of Supply and Services Canada. Ottawa

Environmental Advisory Council. 1991. A Protected Areas Vision For Canada.

Minister of Supply and Services Canada. Ottawa.

Filion, F.L. et al. 1983. The importance of Wildlife to Canadians: Highlights of the 1981 National Survey. Canadian Wildlife Service. Ottawa.

Fiolion, F.L.Jacquemot, A. and R. Reid. 1985. The importance of Wildlife to Canadians: An executive overview of the recreational economic significance of wildlife. Canadian Wildlife Service. Ottawa.

Forest Act. R.S.M. 1987, c.F150. Manitoba Legislature. Winnipeg.

Forestry Canada. 1991. Sustaining a Balence in Forestry Management. Minister of Supply and Services Canada. Ottawa. pp:1-15.

Ford, P.M. 1981. Principles and Practices of Outdoor/ Environmental Education. John Wiley and Sons. Toronto.

Huntsberger, D.V. and P.P. Billingsley. 1987. Elements of Statistical Inference. Allyn and Bacon Inc. Toronto.

James, F.C. and H.H. Shuggart. 1970. A quantatative method of Habitat Description. Aud. Field Notes. 24(6):727-736

Jubenville, A. 1978. Outdoor Recreation Management. Saunders. Philadelphia. pp: 10ff.

Knapton, R. 1979. Flora and Fauna Studies. Whiteshell Study: 1978. Manitoba Dept. of Mines, Natural Resources and Environment. Parks Division. Winnipeg.

Knetsch, J. 1972. Interpreting demands for Outdoor Recreation. Economic Record. 48:429-432.

Koonz, B. 1979. A Brief Floral and Faunal Inventory with an Assessment of Management Alternatives for Nopiming Provincial Park. MNRM Practicum. University of Manitoba. Winnipeg.

LeDuc, George and Robert Goodland. 1988. Wildlands : Their Protection and Management in Economic Development. The World Bank. Washington, D.C.

Leopold. A. 1966. A Sand County Almanac. Oxford University Press. New York.

Lime, D.W. and C.T. Cushwa. 1969. Wildlife aesthetics and Auto-campers in the Superior National Forest. U.S. Dept. of Agriculture, Forest Service. Research Paper NC-22. Minnesota.

Lucas, R.C. 1982. Recreation Regulations - When Are They Needed? Journal of Forestry. 80(3):148-152.

Manitoba Department of Agriculture. 1990. Manitoba Soils and Their Management. Winnipeg.

Manitoba Department of Environment. 1990. State of the Environment Report: Section on Special Places. Winnipeg

Manitoba Department of Natural Resources. 1989. An overview of Land Acquistion programs, Crown Land Sales, Establishment of Provincial Forests, Parks, Wildlife Management Areas and Community Pastures; Agricultural Crown Land allocation in Manitoba nad Interlake: 1960 - 1989. Department of Natural Resources. Manitoba.

Manitoba Department of Natural Resources: Forestry Branch. Forest Fire Maps 1920-1990. Winnipeg.

Manitoba Department of Natural Resources: Parks Branch. 1985. A Systems Plan For Manitoba's Provincial Parks. Manitoba Parks Branch : Planning Section. Winnipeg.

Matrix Management. 1991.

McEvoy, J. 1972. The American Concern with the Environment. In Social Behaviour, Natural Resources and Environment. Harper. New York.

McInnis, N. and D. Albrecht. 1975. What makes Education Environmental? Data Courier. Kentucky.

Knudson, D.M. 1980. Outdoor Recreation. MacMillian. New York.

Nash, R. 1980. Widerness and the American Mind. 3rd. ed. Yale University Press. London.

Nye, R.B. 1976. This almost chosen people, essays in the History of American Ideas. Michigan State University Press.

O'Riorden, T. 1971. Outdoor recreation. in H. Foster and D. Sewell, eds. Resources, Recreation and Research. B.C. Occasional Papers in Geography. Vancouver.

Parks Canada. 1978. Trail Manual. Minister of Supply and Services Canada. Ottawa.

Parks Canada. 1985. Trail Manual. Minister of Supply and Services Canada.

Ottawa.

Parks Canada. 1986. Trail and Backcountry Facility Designs. Western Regional Office, Calgary.

Penner, Jack (Minster of Natural Resources). 1987. Five-year Report to the Legislature On Wildlife. Queen's Printer. Manitoba.

Pigram, J. 1983. Outdoor Recreation and Resource Management. St. Martines Press. New York. pp.1-58

Provincial Parks Lands Act. R.S.M. 1987,c.P20. Manitoba Legislature.

Province of Manitoba. 1991. Guide for use of Forest Inventory Maps. Forestry Branch. Winnipeg.

Province of Manitoba. 1991. Special Conservation Areas Regulation. regulation 76/91. Manitoba gazette. Vol. 120 No. 16.

Province of Manitoba. 1988. Forest Use and Management Regulation. regulation 227/88R. Manitoba gazette Vol 117 No. 27.

Readers Digest. 1982. North American Wildlife : An illustrated Guide. Montreal.

Robbins, C.S., B. Brunn and H.S. Zim. 1983. Birds of North America: A Field Guide. Golden. New York.

Robinson, D.L., J. Wager and A Traill. 1976. Landscape Evaluation. University of Manchestor Press.

Rolston, Holmes III. 1988. Environmental Ethics: Duties and Values in the Natural World. Temple University Press. Philadelphia.

Rutledge, A. 1971. Anatomy of a Park. McGraw-Hill. New York.

Saunders, Kurt G. 1991. The Steeprock River Vally : An Evaluation of Its potential as a Manitoba Provincial Wilderness Park. MNRM Practicum. University of Manitoba.

Sax, J. 1980. Mountains with Handrails. University of Michigan Press. Ann Arbor.

Schoenfeld, C.A. and F.C. Hendee. 1978. Wildlife Management in Wilderness. Wildlife Management Institute. Washington. D.C.

Scoggan, H.J. 1957. Flora of Manitoba. National Museum of Canada Bulletin No. 140. 619pp.

Sharpe, Grant W., C.H. Odegaarde and W.F. Sharpe. 1983. Park Management. John Wiley and Sons. Toronto.

Smith, Robert Leo. 1974. Ecology and Field Biology. Harper and Row. New York.

Soper, J.D. 1961. The Mammals Of Manitoba. Can. Field Nat. 75(4):171-219.

Sustainable Development Coordination Unit. 1991. Manitobas Round Table on Environment and Economy: Workbook on Natural Lands and Special Places. Winnipeg.

Wall, Geoffrey, editor. 1989. Outdoor recreation in Canada. John Wiley and Sons. Toronto. pp.43-280.

Wildlife Act. L.R.M. 1987, c.W130. Manitoba Legislature.

PERSONAL COMMUNICATION

Atkinson, Jim. 1993. Regional Forester, Forestry Branch, Manitoba Natural Resources. Steinbach.

Boychuk, Frank. 1993. Member - Piney community center executive. Piney.

Duncan, Dr. Jim. 1991. Term Biologist - Great Grey Owl project, Wildlife branch, Manitoba Natural Resources. Winnipeg.

Jones, Bob. 1992. Head Biologist. Manitoba Habitat Heritage Corporation. Winnipeg.

Koonz, Bill. 1992. Endangered Species Biologist, Wildlife Branch Manitoba Natural Resources. Winnipeg.

Penner, Abe. 1993. Owner/Operator - Southeast forest products. Blumenort.

Rannard, Dave. 1993. Director - Forestry Branch, Manitoba Natural Resources. Winnipeg.

Schoedder, Roger. 1992. Acting Director - Parks and Natural Areas Branch, Manitoba Natural Resources. Winnipeg.

Slivitsky, Mike. 1992. Forester and student. Natural Resources Institute. Winnipeg.

Suggett, Glen. 1993. Coordinator - Watchable Wildlife Program, Wildlife Branch, Manitoba Natural Resources. Winnipeg.

Zellermeyer, Alex. 1992. Cheif - Management Planning, Parks Canada, Western Region. Winnipeg

EXECUTIVE MEMBERS OF THE SPUR WOODS HERITAGE RESERVE ASSOCIATION

Albert Thorvaldson (Past president)
Enid Swaine
Ron Swaine
John Tkachuk
Frank Boychuk
Ewald Aarus

APPENDICES

APPENDIX A - GLOSSARY OF TERMS

Benefits - Anything contributing to human improvement. These can include tangible benefits such as economic or educational, but can also include less tangible benefits such as aesthetic or character building benefits.

Biological diversity(biodiversity) - As used here, the full range of genetic diversity (species, subspecies and distinct biological populations of plants and animals) as well as the full variety of ecosystems in which the plants and animals occur.

Carrying Capacity - The maximum number of organisms that can be supported indefinitely in a given environment (allowing for seasonal and random fluctuations) without any degradation of the environment that would diminish this maximum number in the future.

Conservation - The wise use and careful management of resources, so as to obtain the maximum possible social benefits from them for present and future generations.

Conversion - The significant ecological modification or the complete elimination of a wildland by human activity.

Ecosystem - A self-regulating natural community of plants and animals interacting with one-another and with their non-living environment, it is often bigger than one community.

Non-scheduled interview - An interview which a person of expertise is questioned regarding a specific topic. No specific question set is used and the responses are generally related to that persons position and opinion.

Preservation - The belief that large areas of public land should be protected and preserved from mining, lumbering and other forms of development by establishing parks, wilderness areas, and wildlife refuges which can be enjoyed by present generations and passed unspoiled to future generations.

Species - A group of interbreeding organisms that under natural conditions, seldom or never interbreed with individuals in other such groups.

Wildlands - Natural land and water areas that have been modified by human activities only slightly, or not at all. They include the full range of natural land-based ecosystems, such as forests , grasslands or wetlands.

Wildland Management - The direct maintenance, protection or enhancement of ecosystems and their characteristic plant and

animal species, thus a subset of the acts of conservation or preservation.

Quadrat - a measuring device used by botanists to designate where counts of species' cover values are made, usually on the forest floor. For this investigation, they were 50 cm * 50 cm square. This meant that each quadrat was covering 0.25 m^2.

ABBREVIATIONS USED

Ac - Acre.

CBH - Circumference and breast height.

DBH - Diameter at breast height.

DNR - Department of Natural Resources.

ha - Hectare - 10,000 square meters (100m * 100m).

km^2 - one square kilometer (1km * 1km).

m^2 - one square meter (1m * 1m).

mi^2 - 1 square mile (1mi * 1mi).

NGO - Non-government organization.

SWHRA - Spur Woods Heritage Reserve Association.

CONVERSION FACTORS

1 Kilometer = 0.621 mile

1 hectare = 2.471 acres

1 square kilometer = 0.386 square mile

APPENDIX B - FLORA AND FAUNA RESOURCE INVENTORY

Summary of plot 1 .25 m2 quadrats : Site 1

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
Rhamnus alnifolia	Alder-leaved Buchthorn	5-25	100
Carex spp.	Sedge	5-25	80
Amalanchier alnifolia	Saskatoon	5-25	60
Linnaea borealis	Twinflower	5-25	60
Maiathemum canadense	May lily	0-5	60
Arctostaphylos uva-ursi	Bearberry	25-50	40
Rosa spp.	Wild rose	5-25	20
Solidago canadensis	Goldenrod	0-5	20
Pteridium aquilinum	Braken Fern	0-5	20
?	Grass	5-25	20
Vaccinium myrtilloides	blueberry	0-5	20
?	mosses	0-5	20
--	bareground	0-5	20
--	deadwood	5-25	20

Summary of plot 2 .25 m2 quadrats : Site 1

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
--	Mosses	5-25	100
--	Grasses	5-25	80
Pteridium aquilinum	Braken fern	5-25	80
Vaccinum myrtilloides	Blueberry	0-5	60
--	Bareground	0-5	60
Dicranum ef. scoparium	Feather Moss	0-5	40
Arctostaphylos uva-ursi	Bearberry	5-25	40
Aster spp.	Aster	0-5	20
Maiathemun canadense	May lily	0-5	20
Lathyrus spp.	--	0-5	20
Rosa spp.	Wild Rose	0-5	20
Solidago spp.	Goldenrod	0-5	20
Amalanchier alnifolia	Saskatoon	0-5	20
Lycopodium complantum	Ground Cedar	0-5	20
Prunus pumila	Low-sand Cherry	0-5	20

b. Density of understroy species in 20 m2 transect.
plot 1 : Site 1

SPECIES	COMMON NAME	STEMS PER TRANSECT	STEMS PRE HECTARE
Corylus cornuta	Beaked Hazelnut	73	36,500
Amalanchier alnifolia	Saskatoon	8	4,000
Prunus pennsylvanica	Pincherry	2	1,000
Prunus virginiana	Chokecherry	3	1,500
Rosa spp.	Wild Rose	1	500
Total		87	43,500

Plot 2 : Site 1

SPECIES	COMMON NAME	STEMS PER TRANSECT	STEMS PER HECTARE
Corylus cornuta	Beaked Hazelnut	61	30,500
Amalanchier alnifolia	Saskatoon	2	1,000
Rosa spp.	Wild Rose	2	1,000
Total		65	32,500

c. Density of trees in 100 m2 plot : Site 1

Species	A	B	C	D	E	F	Total	Trees/ha	Relative Density
Jackpine	11	1		1		1	14	1400	100
Total	11	1		1		1	14	1400	
Trees/ha by size	1100	100		100		100	.1400		
Rel. Dens by size	78.58	7.14		7.14		7.14	100		

d. Representative Tree heights and ages : Site 1

	Height (m)	Age (years)
1.	23	48
2.	20	47
3.	20.5	47
4.	21	42
5.	22	48

e. Mammal Trap Data : Site 1

Number of Traps: 15
Duration: 60 hours
Trap Hours: 900

	Night	Day
day 1	3 deer mice 1 red backed vole	1 red backed vole 1 eastern chipmunk
day 2	5 deer mice 2 red backed voles	4 redbacked voles
day 3	4 deer mice 2 redbacked voles	0
Total:	12 deer mice 10 redbacked voles 1 eastern chipmunk	

a. Summary of plot 1 .25 m2 quadrats : Site 2

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
Arctostaphylos uva-ursi	Bearberry	25-50	100
Carex spp.	sedge	5-25	80
?	Foloise lichen	5-25	80
--	Mosses	5-25	80
Pinus banksiana	Jackpine	0-5	20
Amalanchier alnifolia	Saskatoon	0-5	20

Summary of plot 2 .25 m2 quadrats : Site 2

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
Arctostaphylos uva-ursi	Bearberry	5- 25	100
Vaccinium spp.	Blueberry	25-50	100
?	Grasses	0-5	100
--	Foliose lichen	5-25	60
--	Mosses	25-50	60
Maiathemum canadense	May Lily	0-5	20
--	Bareground	5-25	40

b. Density of Understroy Species in 20 m2 quadrats
Plot 1 : Site 2

SPECIES	COMMON NAME	STEMS PER TRANSECT	STEMS PER HECTARE
Prunus virginiana	Chokecherry	1	500
Total		1	500

Plot 2 : Site 2

SPECIES	COMMON NAME	STEMS PER TRANSECT	STEMS PER HECTARE
Prunus viginiana	Chokecherry	2	1000
Total		2	1000

c. Density of trees in the 100 m2 plot : Site 2.

Species	A	B	C	D	Total	Trees /ha	Rel. dens
Jackpine	1	3	7	1	12	1200	100
Totals	1	3	7	1	12	1200	100
Trees/ha	100	300	700	100	1200		
Relative density	.083	.25	.58	.083			

d. Representative Tree heights : Site 2

	Height(m)	Age(years)	
1.	23.0	51	Jackpine
2.	24.2	78	Jackpine
3.	24.6	87	Redpine
4.	25.2	88	Redpine

e. Mammal Trap Data

Number of Traps: 15
Duration of Trapping: 60 hours
Trap hours: 900

	Night	Day
day 1	2 deer mice	0
	1 redbacked vole	0
day 2	1 deer mouse	3 redbacked voles
	2 redbacked voles	
day 3	3 redbacked voles	0
	1 deer mouse	0

Total : 4 deer mice, 9 rebacked voles

a. Summary of plot 1 .25 m2 quadrats : Site 3

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
Rosa woodsi	Wild Rose	5-25	100
--	Grasses	5-25	100
Rhamnus alnifolia	Alder-leaved buckthorn	25-50	80
Andropogon gerardi	Big Bluestem	5-25	80
Symphoricarpos occidentalis	Snowberry	0-5	60
Galium boreale	N. Bedstraw	0-5	40
Mentha arvensis	Hisip mint	0-5	20
Apocynum androsaemif-dium	Spreading Dogbane	0-5	20
Prunus virginiana	Chokecherry	0-5	20
--	Crustose lichen	0-5	20
Prunus pennsylvanica	Pincherry	0-5	20

Summary of Plot 2 0.25 m2 quadrats : Site 3

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
Andropogon gerardi	Big Bluestem	5-25	100
Rosa woodsi	Wild rose	5-25	100
--	grasses	5-25	100
--	Bareground	5-25	60
Arctostaphylos uva-ursi	Bearberry	5-25	60
Symphocarpos occidentalis	Snowberry	0-5	40
Carex spp.	Sedge	0-5	40
Ribes americanum	Black Currant	0-5	20
Aster spp.	Aster	0-5	20
Solidago canadansis	Goldenrod	0-5	20
Galium boreale	N. Bedstraw	0-5	20

b. Density of understory species in 20 m2 transect : Site 3. Plot 1

SPECIES	COMMON NAME	STEMS PER TRANSECT	STEMS PER HECTARE
Prunus pennsylvanica	Pincherry	29	14,500
Total		29	14,500

Plot 2 : Site 3

SPECIES	COMMON NAME	STEMS PER TRANSECT	STEMS PER HECTARE
Prunus pennsylvanica	Pincherry	1	500
Prunus virginiana	Chokecherry	2	1000
Total		3	1,500

c,d. no trees in plot

e. Mammal trap data : Site 3
Number of Traps: 15
Duration: 60 hours
Number of Trap hours: 900

	Night	Day
day 1	3 meadow voles 1 redbacked vole	1 meadow vole 0
day 2	1 eastern chipmunk	1- 13-lined ground squirrel
	3 medow voles	1 eastern chipmunk
day 3	2 meadow voles	0

Total: 9 meadow voles
1 redbacked vole
2 eastern chipmunks
1 13-lined ground squirrel

a: Summary of plot 1 .25m2 quadrats : Site 4

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
Anemone canadensis	Canadian Anemone	5-25	100
Solidago spp.	Goldenrods	5-25	80
--	Grasses	0-5	60
Juncus spp.	Rush	5-25	60
Rubus strigosis	Raspberry	0-5	40
Eupatorium maculatum	Joe Pyeweed	0-5	40
Aster cordifolius	Aster	5-25	40
Plantago major	Plaintain	0-5	20
Lysmachia ciliata	Fringed Loosestrife	0-5	20
Sonchus asper	Sow Thistle	0-5	20
Circium flodmanii	Flodman's Thistle	0-5	20
Mentha arvensis	Mint	0-5	20
Rosa woodsi	Wild Rose	0-5	20

Summary of plot 2 .25 m2 quadrats : Site 4

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
Solidago spp.	Goldenrod	25-50	100
Aster cordifolius	Aster	5-25	80
Rubus strigosis	Raspberry	5-25	60
Circium flodmanii	Flodman's Thistle	0-5	60
Anemone canadensis	Canadian Anemone	0-5	60
Lysimachia ciliata	Fringed loosestrife	5-25	40
--	Grasses	0-5	40
Mentha arvensis	Mint	0-5	20
Cornus stolonifera	Red-osier dogwood	5-25	20

b. Density of under story species in 20m2 transect : Site 4. Plot 1

SPECIES	COMMON NAME	STEMS PER TR.	STEMS PER HA.
Salix serissima	Willow (red-barked)	17	8,500
Salix petiolaris	Basket Willow	15	7,500
Salix bebbiana	Beaked Willow	27	13,500
Salix discolor	Pussy Willow	2	1,000
Alnus rugosa	Alder	10	5,000
Total		71	35,500

Plot 2 : Site 4

SPECIES	COMMON NAME	STEMS PER TR.	STEMS PER HA.
Populus balsamifera	Balsam poplar	2	1,000
Alnus rugosa	Alder	4	2,000
Total		6	3,000

c,d. No trees present

e. Small Mammal Trap Data : Site 4
Number of Traps: 15
Duration : 60 hours
Number of Trap hours : 900

	Night	Day
day 1	3 redbacked voles	0
day 2	4 redbacked voles	0
day 3	2 redbacked voles 1 flying squirell	0

Total: 9 redbacked voles,1 flying squirell

a. Summary of plot 1 .25 m2 quadrats : Site 5

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
Pteridium aquilinum	Braken Fern	25-50	100
Diervilla lonicera	Bush Honeysuckle	25-50	100
Vaccinium spp.	Blueberry	5-25	100
Rubus strigosis	Raspberry	5-25	100
Maiathemum canadense	May Lily	0-5	60
--	Grasses	0-5	40
Aralia nudicaulis	Sarsparilla	0-5	20
--	Bareground	0-5	20
Corylus cornuta	Hazel	0-5	20

Summary of plot 2 0.25 m2 quadrats : Site 5

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
Vaccinium spp.	Blueberry	5-25	100
Diervilla lonicera	Bush Honeysuckle	5-25	100
Pteridium aquilinum	Braken Fern	25-50	80
Rosa spp.	Wild Rose	0-5	80
--	Bareground	25-50	60
Rubus strigosis	Raspberry	5-25	40
Salix spp.	Willow	0-5	20
Fragaria glauca	Wild Strawberry	0-5	20
--	Grasses	0-5	20

b. Density of understroy species in 20 m2 transect : Site 5 Plot 1

SPECIES	COMMON NAME	STEMS PRE TR.	STEMS PER HA.
Rosa spp.	Wild Rose	1	500
Corylus cornuta	Beaked Hazelnut	5	2,500
Amalanchier alnifolia	Saskatoon	5	2,500
Rubus strigosis	Raspberry	3	1,500
Total		14	7,000

Plot 2 : Site 5

SPECIES	COMMON NAME	STEMS PER TR.	STEMS PER HA.
Prunus virginiana	Chikecherry	15	7,500
Rosa spp.	Wild Rose	8	4,000
Populus tremuloides	Trembling Aspen	2	1,000
Total		25	12,500

c. Density of trees in 100 m2 plot.

Species	A	B	C	D	Total	Trees /ha	Rel. density
White Poplar		2	1	3	6	600	.75
Balsam Poplar		1		1	2	200	.25
Total		3	1	4	8	800	
Trees/ha by size		300	100	400	800		
Relative dens.by size		37.5	12.5	50	100%		

Representative tree heights

1. 20 m
2. 20.9 m

a. Summary of plot 1 0.25 m2 quadrats : Site 6

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
Carex spp.	Sedge	0-5	100
Lycopodium spp.	Mosses	25-50	100
Asarum canadense	--	0-5	80
Cornus canadensis	Bunchberry	5-25	80
Pteretis pennsylvanica	Ostrich fern	0-5	60
--	Bareground	25-50	40
Acer spicatum	Mountain Maple	0-5	40
Galium triflorum	Sweet-scented Bedstraw	0-5	20
Maiathemum canadense	May Lily	0-5	20
Abies balsamea	Balsam Fir	0-5	20
Juncus spp.	Rush	0-5	20
Circaea alpina	Enchanter's nightshade	0-5	20
Rubus pubescens	Dewberry	0-5	40

Summary of plot 2 .25m2 quadrats : Site 6

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
Cornus canadensis	Bunchberry	5-25	80
Lycopodium spp.	Feather Moss	5-25	80
Carex spp.	Sedge	0-5	80
Pteretis pennsylvanica	Ostrich Fern	5-25	80
--	Bareground	5-25	80
Abies balsamea	Balsam fir	0-5	60
Equisetum spp.	Horsetail	0-5	60
Thuja occidentalis	White Cedar	0-5	40
Fragaria vesca	Strawberry	0-5	40
--	Bareground	5-25	40
Galium spp.	Bedstraw	0-5	40
Trifolum spp.		0-5	40
Linnaea borealis	Twinflower	5-25	40
Rubes pubescens	Dewberry	0-5	40
Lonicera oblongifolia	Swamp-fly Honeysuckle	0-5	40
Mitella nuda	Bishop's cap	0-5	40
Circium spp.	Thistle	0-5	20
Coptis trifolia	Gold Thread	0-5	20

b. Density of understory species in 20 m2 transect : Site 6. plot 1

SPECIES	COMMON NAME	STEMS PER TR.	STEMS PER HA.
Alnus rugosa	Alder	2	1,000
Fraxinus pennsylvanica	Ash	9	4,500
Acer spicatum	Mountain Maple	1	500
Total		12	6,000

c. Density of trees in 100 m2 plot: Site 6.

Species	A	B	C	D	E	F+	Total	Trees	Rel. /Ha density
White Birch		2	1	1	1	1	6	600	37.5
White Cedar		1	1	1		2	5	500	31.25
Balsam Fir	1	1	3				5	600	31.25
Total	1	4	5	2	1	3	16	1600	100

Trees/ha by size 100 400 500 200 100 300 1600

Rel.Density 6.26 25 31.25 12.5 6.25 18.75 100

Representative tree heights and ages(White Cedar)

	Height(meters)	Age(years)	cbh(cm)	dbh(cm)
1.	20	86+	200	67
2.	23.7	127+	212	65
3.	18	64	158	50

Note: + trees suffered from heartrot, so they are probably significantly older than stated.

e. Small Mammal Trapping Data : Site 6.

Number of Traps : 30
Duration : 30 hours
Trap hours : 900

	day	night
day 1	0	2 redbacked voles 3 deer mice

Total: 2 redbacked voles, 3 deer mice

a. Summary of Plots 1 and 2 0.25 m2 quadrats : Site 7

SPECIES	COMMON NAME	% GROUND COVER	FREQUENCY
NO PLANTS WERE	ENCOUNTERED IN	EITHER PLOT 1	OR PLOT 2 **

b. Density of understory species in 20 m2 transect : Site 7

SPECIES	COMMON NAME	STEMS PER TR.	STEMS PER HA.
NONE OBSERVED		0	0

c.Density of trees in 100 m2 plot Site 7.

Species	A	B	C	Total	Trees /ha	Relative Density
Red Pine	3	15	5	23	2300	100
Total	3	15	5	23	2300	
Trees/ ha by size	300	1500	500	2300		
Relative dens. by size class	13.1	65.2	21.7	100		

Representative Tree heights

	Height(m)	Age (years)
1.	12.5	
2.	15.3	
3.	14.2	34
4.	13.7	

APPENDIX C. PLANT SPECIES LIST

A.	Species Name
Alsike Clover	Trifolium spp.
Alder (Speckled)	Alnus rugosa
Anemone (Canadian)	Anemone canadensis
Ash (Green)	Fraxinus pennsylvanica
Aster (Blue)	Aster cordifolius
Aster (Lindley's)	Aster ciliolatus
Aster (Smooth)	Aster laevis
Aster	Aster lateriflorus
Aster	Aster spp.
Avens	Geum spp.
--	Asarum canadense
B.	
Balsam Fir	Abis balsamea
Balsam Poplar	Populus balsamifera
Baneberry (Red)	Actaea rubra
Bearberry	Arctostaphylos uva-ursi
Bedstraw (Northern)	Galium boreale
Bedstraw (Sweet-scented)	Galium triflorum
Bilberry (Dwarf)	Vaccinium caespitosum
Bishop's Cap	Mitella nuda
Big Blue Stem	Andropogn gerardi
Black Currant	Ribes hudsonianum
Black Spruce	Piceae mariana
Bluebell	Campanula rotundifolia
Blueberry	Vaccinium myrtilloides
Blue-eyed Grass	Sisyrinchium montanum
Blue Flag	Iris versicolor
Blazingstar (Meadow)	Liatris ligulistylis
Braken Fern	Pteridium aquilinum
Buchthorn (Alder-leaved)	Rhamnus alnifolia
Buttercup (Heart-leaved)	Ranunculus cardiophyllus
Bunchberry	Cornus canadensis
C.	
Canada Thistle	Cirsium arvense
Cherry (Low-sand)	Prunus pumila
Chokecherry	Prunus viginiana
Cinquefoil	Potentilla fruticosa
Clover (White)	Trifolium repens
Columbine (Wild)	Aqaiegia canadensis
Cranberry (High-bush)	Viburnum trilobum
D.	

Dandelion	Taraxacum officinale
Dewberry	Rubus pubescens
Dogbane (Spreading)	Apocynum androsaemifolium
Dwarf Mistletoe on Jackpine	Arceuthobium americanum
Dwarf Mistletoe on Black Spruce	Arceuthobium pusillum
Dwarf Scouring Rush	Equisetum scirpoides
E.	
Eastern White Cedar	Thuja occidentalis
Elm (American)	Ulmus americanus
Enchanter's nightshade	Cicaea alpina
Equisetum	Equisetum spp.
F.	
Fern (Shield)	Dryopteris carthusiana (Vill.)
H.P. Fuchs	
Fleabane (Tufted)	Erigeron caepitosus
Flodman's Thistle	Circium flodmanii
Foliose lichen	--
Fringed loosestrife	Lysmachia ciliata
G.	
Goldenrod	Solidago canadensis
Goldenrod	Solidago spp.
Gold Thread	Coptis trifolia
Gooseberry	Ribes oxyacan thoides
Grasses	8 varieties
Ground Cedar	Lycopodium complantum
H.	
Hawthorn	Crataegus rotundifolia
Hazelnut (Beaked)	Corylus cornuta
Hoary Puccoon	Lithospermum canescens
Honeysuckle (Bush)	Diervilla lonicera
Horsetail	Equisetum sylvaticum
I.	
Iris	Iris spp.
J.	
Jackpine	Pinus banksiana
Joe-Pyeweed	Eupatorium maculatum
Juniper	Juniper communis

L.	
Labrador Tea	Ledum groenlandicum
Lettuce (Yellow)	Lactuca canadensis
Lettuce (White)	Lactuca spp.
Lily (Prairie)	Lilium philadelphicum
Lichen (Crustose)	--
M.	
May Lily	Maiathemum canadense
Marsh Marigold	Caltha palustris
Meadowrue	Thalactrum venalosum
Meadowsweet	Spirea alba
Mint	Mentha arvensis
Mountain Maple	Acer spicatum
Moss (Feather)	Dicranum ef. scoparium
Moss	Sphagnum spp.
N.	
Nannyberry	Viburnam lentago
O.	
Ostrich Fern	Pteretis pennsylvanica
P.	
Paintbrush	Catilleja spp.
Paper Birch	Betula papyifera
Pincherry	Prunus pennsylvanica
Plaintain (Common)	Plantago major
Poison Ivy	Rhus radicans
Prairie Crocus	Anemone patens
Prickly Rose	Rosa spp.
R.	
Raspberry	Rubus strigosis
Red Currant	Ribes triste
Dogwood (Red-osier)	Cornus stolonifera
Red Pine	Pinus resinosa
Rush	Juncus spp.
S.	
Sagebrush	Artemision cana
Sage (Prairie)	Artemisia ludoviciana
Sandcherry	Prunus pumila

Sarsaparilla	Aralia nudicaulis
Saskatoon	Amalachier alnifolia
Scot's Pine	Pinus sylvestris
Showy Lady Slipper	Cypripedium reginae
Silvery Groundsel	Senecio canus
Smooth Sumach	Rubus glabra
Snakeroot	Sanicula marilandica
Snowberry	Symphoricarpos occidentalis
Solomon's Seal	Maianthemum canadense
Solomon's Seal	Polygonotum canaliculatum
Sow Thistle	Sonchus asper
Spikenard	Smilacina spp.
Strawberry	Fragaria virginiana
Strawberry (American Wild)	Fragaria vesca
Strawberry	Fragaria glauca
Star-false Solomon's Seal	Smilacina stellata
Swamp Thistle	Cirsium muticum
Swamp-Fly Honeysuckle	Lonicera oblongifolia
Sweet clover	Melilotus spp.

T.

Tall Meadowrue	Thalictrum dasycorpum
Tamarack	Larix laricina
Twinflower	Linnaea borealis

V.

Vine-leaved Coltsfoot	Petasites vitifolius
Vetchling	Lathyrus spp.
Vetchling (Creme colored)	Lathyrus ochroleucus

W.

White Spruce	Piceae glauca
White Poplar	Populus tremuloides
Wild Peavine	Lathyrus venosus
Wild Vetch	Vicia americana
Willow (Basket)	Salix petiolaris
Willow (Beaked)	Salix bebbiana
Willow (Pussy)	Salix discolor
Willow (Red-barked)	Salix cr. serissima
Willow	Salix lucida
Wintergreen	Prrola spp.

Y.

Yarrow	Achillea millefolium
Yellow-lady's Slipper	Cypripedium calceolus

APPENDIX D. MAMMAL SPECIES LIST

Common Name	Species	Method
Black Bear	Ursus americanus	reported
Beaver	Castor Canadensis	observed
Chipmunk(eastern)	Tamias striatus	trapped 2
Chipmunk(least)	Eutamias minimus	trapped 2
Cougar	Felis concolor	reported*
Coyote	Canis latrans	observed
Deer Mouse	Peromyscus maniculatus	trapped 2
Deer (White-tailed)	Odocoileus virginicanus	observed
Elk	Cervus canadensis	reported**
Fisher	Martes pennanti	trapped 1
Lynx	Lynx lynx	observed tracks
Moose	Alces alces	observed tracks
Muskrat	Ondatra zibethicus	observed
Meadow vole	Microtus pennsylvanicus	trapped 2
Marten	Martes americana	trapped 1
Mink	Mustela vison	trapped 1
Northern-flying Squirrel	Glaucomys sabrinus	trapped 2
Porcupine	Erthizon dorsatum	observed
Red-backed vole	Clethrionomys gapperi	trapped 2
Raccon	Procyon lotor	observed
Red Squirrel	Tamiasciurus hudsonicus	trapped 1
Red Fox	Vulpes fulva	observed
Snowshoe hare	Lepus americanus	trapped 1

Stripped Skunk	Mephitus mephitus	smelled
Thirteen-lined ground squirrel	Citellus tridecemlineatus	trapped 2
Timber Wolf tracks	Canus lupus	observed

* Note : The cougar has been reported within a 4 km radius of the Spur Woods, however the report is unconfirmed.

** Note : Two male elk were observed crossing the highway 2 weeks bfore this investigation began.

Trapped 1 : Trapped by local trappers, appeared in Manitoba DNR trapping records for the area.

Trapped 2 : Trapped during the small mammal survey.

APPENDIX E. BIRD SPECIES LIST

Common Name	Species	Method
American Goldfinch	Carduelis tristis	observed
Black-Crowned Night Heron	Nycticorax nycticorax	observed
Blue Jay	Cyanocitta cristata	observed
Bald Eagle	Haliaeetus leucocephalus	reported
Boreal Owl	Aegolius funereus	reported
Boreal Chickadee	Parus hudsonicus	observed
Cedar Waxwing	Bombycilla garrulus	observed
Eastern Phoebe	Sayornis phoebe	observed
Flicker(Common)	Colaptes auratus	observed
Golden Eagle	Aquila chrysaetos	observed
Great Horned Owl	Bubo virginianus	observed
Great Grey Owl	Strix nebulosa	observed
Great Blue Heron	Ardea herodias	observed
Grey Jay	Perisoreus canadensis	observed
Killdeer	Charadrius vociferus	observed
Merlin	Falco columbarius	observed
Mallard	Anas platyrhynchos	observed
Mourning Dove	Zenaida macroura	observed
Northern Goshawk	Accipter gentilis	observed
Northern Shoveler	Anas clypeata	observed
Nighthawk (common)	Chordeiles minor	observed
Nuthatch (red-breasted)	Sitta canadensis	observed
Pileated Woodpecker	Dryocopus pileatus	observed

Pine Siskin	Carduelis pinus	observed
Raven	Corvus corax	observed
Ruffed Grouse	Bonasa umbellus	observed
Red-tailed hawk	Buteo jamaicensis	observed
Spruce Grouse	Dendragapus canadensis	observed
Yellow Bellied Sapsucker	Sphyrapicus varius	observed

APPENDIX F FOREST INVENTORY MAP DATA

STAND	COVER	HECTARES	SPECIES COMPOSITION
134	71%+	13.6	Trembling Aspen 70% White Birch 10% Jackpine 10%
135	71%+	8.4	Jackpine 60% Trembling Aspen 30% White Birch 10%
141	71%+	15.4	Trembling Aspen 40% White Birch 30% Jackpine 30%
142	** not restocked after fire or cutting		
143	71%+	141.8	Jackpine 90% Trembling Aspen 10%
144	71%+	15.2	Jackpine 90% Trembling Aspen 10%
145	71%+	1.8	Black Spruce 80% Eastern Cedar 10% Tamarack 10%
146	71%+	2.9	Jackpine 70% Black Spruce 20% Trembling Aspen 10%
147	71%+	19.1	Jackpine 70% Black Spruce 20% Trembling Aspen 10%
148	71%+	13.8	Jackpine 60% Trembling Aspen 40%
149	71%+	7.1	Jackpine 80% Black Spruce 10% White Birch 10%
150	51 - 70%	7.4	Trembling Aspen 40% Balsam Poplar 20% Jackpine 20% Ash 10%

			White birch	10%
152	71%+	2.6	Jackpine	60%
			Trembling Aspen	40%
156	51 - 70%	7.0	Trembling Aspen	50%
			Jackpine	30%
			White Birch	20%
157	71%+	7.3	White Birch	70%
			Jackpine	20%
			Trembling Aspen	10%
158	31 - 50%	4.2	Trembling Aspen	40%
			Jackpine	40%
			White Birch	20%
159		2.4	** not restocked after fire	
160	71%+	54.7	Trembling Aspen	80%
			White Birch	20%
161	71%+	14.8	Trembling Aspen	60%
			Balsam Poplar	20%
			White Birch	10%
			Black Spruce	10%
162	51 - 70%	25.0	Trembling Aspen	30%
			Balsam Poplar	30%
			Ash	20%
			Black Spruce	20%
164	51 - 70%	8.4	Trembling Aspen	70%
			White Birch	20%
			Balsam Poplar	10%
165	71%+	3.4	Trembling Aspen	80%
			Black Poplar	20%
174	71%+	15.3	Tamarack	60%
			Black Spruce	40%
274	71%+	8.4	Tamarack	60%
			Black Spruce	40%
278	71%+	7.0	Trembling Aspen	90%
			Balsam Poplar	10%
279	51 - 70%	15.7	Eastern Cedar	40%
			Black Spruce	30%
			Balsam Poplar	20%

			Tamarack	10%
280	31 - 50%	30.3	Jackpine	80%
			Trembling Aspen	20%
281	51 - 70%	28.2	Black Spruce	60%
			Eastern Cedar	20%
			Tamarack	20%
282	71%+	18.2	Eastern Cedar	50%
			Black Spruce	40%
			Tamarack	10%
283	71%+	2.0	Trembling Aspen	80%
			Black Spruce	20%
285	51 - 70%	9.0	Black Spruce	60%
			Eastern Cedar	40%
288	71%+	1.8	Jackpine	100%
290	71%+	5.9	Jackpine	80%
			Scotch Pine	20%
291	51 - 70%	128.9	Jackpine	90%
			Black Spruce	10%
292	** not restocked following fire or cutting			
293	51 - 70%	5.3	Jackpine	100%
294	51 - 70%	7.2	Jackpine	100%
295	71%+	76.5	Jackpine	90%
			Trembling Aspen	10%
296	51 - 70%	9.0	Trembling Aspen	80%
			Jackpine	20%
648			Wet Meadow	
721	71%+		Willow	
845			Borrow Pit	