

THE STEWARDSHIP PLAN  
FOR  
TRENT UNIVERSITY  
NATURE AREAS



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TRENT UNIVERSITY  
1600 West Bank Drive  
Peterborough, Ontario  
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Front cover photograph: Marsh marigolds (*Calthea palustris*) in a deciduous swamp  
in the Wildlife Sanctuary Natural Area, late May, 2002.

# THE STEWARDSHIP PLAN FOR TRENT UNIVERSITY NATURE AREAS

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The Nature Areas Committee, Trent University

[www.trentu.ca/biology/na](http://www.trentu.ca/biology/na)

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# FOREWORD

This Stewardship Plan was prepared at the request of former President Leonard Conolly to provide guidance to the University for the active stewardship of its Nature Areas. For decades there had been only occasional action, rather than ongoing management, to deal with issues relating to the stewardship of these lands. During these years many abandoned farm fields, were invaded by numerous Eastern white cedars, to the exclusion of other trees, shrubs and herbs, thus leading to a loss of habitat and biodiversity of these areas. Similarly, many areas were invaded by a large aggressive shrub, the European buckthorn, which has the ability to displace native species.

Without active stewardship, the heritage of Trent's Nature Areas will decline, so that the current biodiversity of habitats will be gradually lost for future academic study and research by generations of students and faculty at the University. Active stewardship is also necessary to maintain the many formal nature/walking trails, in a safe condition for use both by students in their academic and research pursuits and by visitors from the university and general public. Trent's Nature Areas are increasingly appreciated for their marvelous aesthetic and natural qualities, for the chance to view wildlife, and for their recreational qualities.

The Nature Areas are a magnificent natural asset to the University, particularly because they are quite accessible within the City of Peterborough boundary and thus are extremely suitable for environmental and nature interpretation by area schools. This attraction would be greatly enhanced by the conversion of the un-occupied house belonging to the University, located at the north-west corner of the Wildlife Sanctuary Nature Area and close to the campus core, to become an Environmental/Nature Interpretation Centre. Such a Centre, within the City, would favourably increase the exposure of the University locally and regionally and provide a significant community service for environmental and natural heritage education.

Responsible stewardship of Trent's Nature Areas will greatly benefit the public image of the University as an institution caring for the natural environment.



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Professor Thomas Hutchinson,  
Department of Environmental and Resource Studies



Professor Terry Matthews,  
Department of Biology



Professor John Jennings,  
Department of History



Professor John Marsh,  
Department of Geography



Professor Roger Jones,  
Department of Biology



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# EXECUTIVE SUMMARY

The purpose of this Stewardship Plan is to facilitate the implementation of sustained and responsible stewardship of the Nature Areas (TNAs) on the Symons Campus of Trent University in the near future and the longer term. There are 16 TNAs, representing over 50 per cent of the Symons Campus lands, that were identified by extensive study in 1989, and were recognized by the Board of Governors (BOG) and by the University Senate as areas significant for their natural heritage values and functions, for their educational, research and recreational purposes. Furthermore, these areas were to be protected from development. The Board and the Senate approved the formation of a Nature Areas Committee (NAC), of faculty, staff, administrators, undergraduate and graduate students to advise the Senate and BOG on the wise use and management (stewardship) of the TNAs. However, the NAC was not assigned a budget or personnel resources to gather information about the ecological status or use of the TNAs so that the Committee could fully carry out its mandate. The NAC also became frustrated because it was not clear if any action would be taken on advice given to the Senate and Board of Governors by the NAC and because the Department of Physical Resources consistently maintained that, due to under-funding and lack of personnel, it could only undertake very limited amounts of work in the TNAs, usually only to deal with urgent safety issues.

The 1994/95 NAC Annual Report (Jones 1995) to Senate described the many problems and deficiencies in the University stewardship of its TNAs and called for the preparation of a Stewardship Plan for these areas. As a direct result of this report, President Coady formed an ad hoc advisory committee to prepare a Stewardship Plan for the TNAs.

The objectives in preparing the Plan were:

- to determine if any of the 16 TNAs should be consolidated for ecological or other reasons, or if any of the TNAs should be increased in size and if there were any other lands on the Symons Campus which should be designated as TNAs
- to identify and map the plant communities in each TNA
- to detail the past and current conditions of TNAs
- to identify preferred uses for individual TNAs
- to identify user safety issues in TNAs
- to make recommendations for the protection, use and management of the TNAs
- to identify responsibilities, priorities and funding needs as well as a strategy for policy enforcement and responsible stewardship
- to produce a list of key recommendations for the long term maintenance and viability of the TNAs

The Stewardship Plan consists of the following:

#### **A. MISSION STATEMENT FOR TNAs**

This states that:

"Trent University espouses, in its aspiration to be Canada's outstanding small university, responsible stewardship of its TNAs in order to provide unique opportunities for undergraduate and graduate student education, for teaching and research, and for aesthetics and recreation. The University will be vigilant in its stewardship of its TNAs to ensure their natural and cultural heritage values will be protected so that future generations will have the benefit of a campus providing the kind and degree of biodiversity and habitat diversity that students, faculty and staff were fortunate to experience during the first four decades of the institution's existence."

"Trent University further recognizes the importance of its TNAs in the community and that the TNAs are an essential part of the City of Peterborough Major Open Space, Parks and Natural Areas system".

#### **B. GOALS FOR TNAs**

The goals for TNAs developed in the Stewardship Plan are:

- to enhance the reputation of Trent University, as an institution of higher learning and as an institution caring for the environment, by the commitment to competent and responsible stewardship of its TNAs;
- to promote appreciation and understanding of nature and the environment along with environmental responsibility;
- to ensure long term quality of TNAs for education, research and enjoyment by students, faculty, staff and the public;
- to protect and promote biodiversity in TNAs;
- to maintain a safe user environment for teaching, research and recreational activities in TNAs;
- to maintain a biophysical and cultural database for TNAs;
- to encourage the creation of a 'Nature/Environmental Interpretation Centre' for use by the university, schools and public;
- to promote designated TNAs for appropriate recreational use by the University community and public.

#### **C. RESULTS OF THE FIELD STUDIES**

For the purposes of the Stewardship Plan, the vegetation in the various TNAs was classified according to the general appearance, character and form of the vegetation into the following major types: agricultural, forest with tree cover greater than 60%, forest with tree cover less than 60%, marsh, old field, plantation, swamp, woodland with tree cover greater than 60% and woodland

with tree cover less than 60%. Within the major vegetation types, vegetation communities were identified and mapped.

For ecological and environmental reasons some adjacent TNAs were combined and others have been increased in size. The result is that instead of 16 TNAs approved by the BOC and Senate in 1989, there are now 12 on the Symons Campus (Figure ES.1). Some characteristics of the 12 TNAs are presented in Table 1.

A brief description of the topography and soils, hydrology, vegetation and wildlife, historical features, significant features, land use including research and teaching, recreation, agriculture, and adjacent landuse for each Nature Area is included in Appendix D in the Stewardship Plan. Each account is accompanied by a map to show the topography (contours) and another one to show the vegetation types occurring in the particular Nature Area. Formally approved nature trails are shown in separate maps for TNAs in which they occur. Management issues, such as safety of users, ecological integrity, teaching and research, and recreational activities are identified for each Nature Area in the Plan.

#### **D. GENERAL POLICIES**

A set of general policies for achieving the goals developed for the stewardship of the TNAs are presented and cover issues such as natural and cultural heritage protection, safety, education and interpretation, research, recreation, the enforcement of By-laws and Regulations, and public involvement with the TNAs.

#### **E. CLASSIFICATION AND ZONING OF TNAs**

Each Nature Area is classified in Table 1 as either a Class A or Class B Nature Area.

Class A TNAs contain an abundance of one or more biophysical resources that are either (a) provincially or regionally significant; (b) or are unique to the Symons Campus; (c) or are the best example of a biological or physical feature of interest within the TNAs. The major management objective for a Class A Nature Area is to maintain or enhance the quality of its biophysical resources within the context of natural processes that occur in this type of ecosystem.

Class B TNAs are those containing biophysical resources that are representative of the natural areas in the region surrounding Peterborough and are of general interest to the Trent community. The major management objective for a Class B Nature Area is to maintain or enhance the quality of its most significant biophysical resources.

Additionally, lands within TNAs were zoned to be managed with the same set of policies. The designated zones are: Nature Reserve, Natural Environment, Cultural Environment, Recreation, Research, Facility, Transition and Special Management Zone.

#### **F. MANAGEMENT AND OPERATIONAL GUIDELINES FOR TNAs**

A series of management and operational guidelines have been set for TNAs to deal with issues such as the preservation of ecological character, safety, vegetation and faunal management, use for teaching, research and recreation. Management priorities are boundary clarification and demarcation, ensuring the safety of users, increasing habitat and biodiversity threatened by invasive species, maintenance of formal nature trails and garbage collection, and addressing the disturbance of wildlife and users caused by dogs.

Table 1. Summary of Some Characteristics of the 12 Nature Areas on the Spicers Campus, Trent University, Peterborough, Ontario.

| Nature Area (NA) name and names of Nature Areas consolidated by the Plan                           | Area (ha) | Classification         |                        | Habitats                                              |
|----------------------------------------------------------------------------------------------------|-----------|------------------------|------------------------|-------------------------------------------------------|
|                                                                                                    |           | Class A<br>Nature Area | Class B<br>Nature Area |                                                       |
| Wildlife Sanctuary NA<br>1989: Wildlife Sanctuary NA and Wildlife Sanctuary East                   | 164       |                        | X                      | Old field, woodland, forest, plantation, marsh, swamp |
| Carol NA<br>1989: Snow and Biological Research NA                                                  | 27        |                        | X                      | Old field, woodland, swamp, (shoreline)               |
| South Drumlin NA                                                                                   | 14        |                        | X                      | Old field, woodland, forest, (shoreline)              |
| Lady Eaton Drumlin NA<br>1989: Lady Eaton Drumlin NA, Highway 28 Wetland NA, and Lowland Forest NA | 53        |                        | X                      | Old field, woodland, forest, swamp                    |
| Highway 28 Woods NA                                                                                | 4         | X                      |                        | Woodland, forest                                      |
| Total Lass Farm NA                                                                                 | 10        | X                      |                        | Old field, woodland, forest, plantation, marsh, swamp |
| Lock 22 NA<br>1989: Lock 22 Maple-Beech Woods NA and Horsetail-Fern Meadow Wetland NA              | 23        |                        | X                      | Woodland, forest, marsh, swamp                        |
| Ninth Line NA<br>1989: Ninth Line Maple-Beech NA and Ninth Line Pond NA                            | 8         |                        | X                      | Agricultural, woodland, marsh                         |
| Premier Rock NA                                                                                    | 6         | X                      |                        | Old field, forest, swamp                              |
| Wetland Complex NA                                                                                 | 11        | X                      |                        | Old field, woodland, marsh, swamp                     |
| Archaeology Centre Wetland NA                                                                      | 5         | X                      |                        | Woodland, marsh, forest                               |
| Chenabaw College Wetland NA                                                                        | 6         | X                      |                        | Old field, marsh, swamp                               |

## G. POTENTIAL AND CONTINUING INITIATIVES

Several potential and continuing initiatives to promote educational, research and recreational use of TNAs by the University community, area schools and the public are presented. These include an undergraduate course on nature and environmental interpretation for students enrolled in the Concurrent Education Program, a Nature/Environmental Interpretation Centre, an arboretum, use of TNAs by area schools for nature and environmental education, a cedar-hedge maze for environmental education, research initiatives, a Friends of Trent University Organization and partnerships with non-University organizations. Very successful partnerships, for example, began in 1998 between the NAC and the Federation of Ontario Naturalists and the British Trust for Conservation Volunteers for conservation and maintenance initiatives in TNAs.

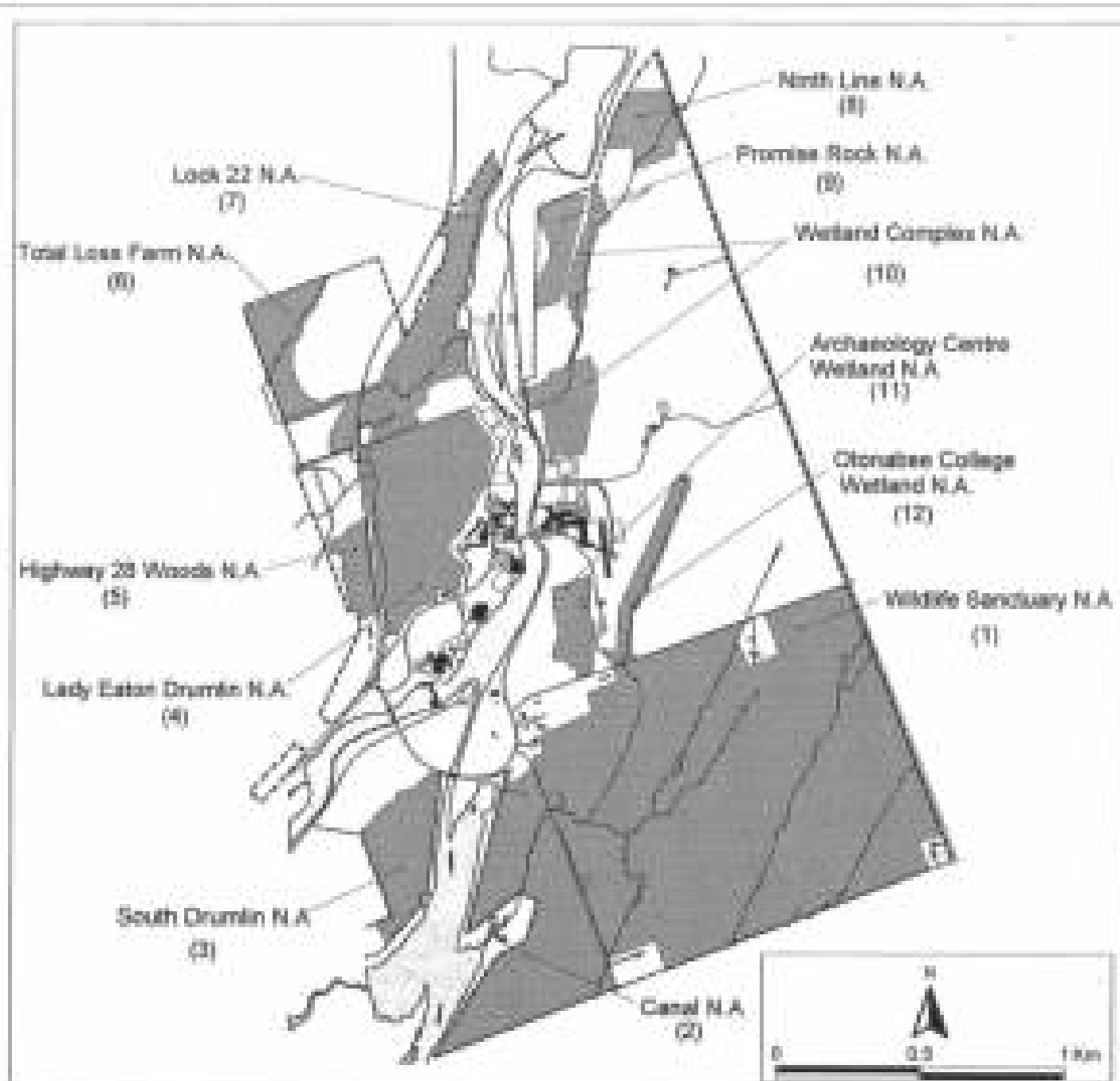
## H. FINANCING OF TNAs

The Plan requires, for responsible and sustained stewardship of the TNAs, that the University allocate funds from its operating budget. The past pattern of funding must change by which practically all funds for management and maintenance of TNAs have resulted from the efforts of the NAC or members of the Committee and have been delivered, on a sporadic basis, from government summer employment programs for student assistance. Since 1998, funds donated as a levy by the Trent student body (Appendix I) and, beginning in 2001, funds from corporate donations have been used for management and maintenance purposes. In 2002, for the first time, some funds were allocated from the University budget for summer work in TNAs.

The operating budget that is recommended is Operating Budget 1 which is for \$117,000 per year. (Two alternative less effective, although lower budgets are presented below). This is the budget that will provide for the active, sustainable stewardship of this valuable University asset. A major part of this budget are funds to hire a qualified professional University Naturalist/Nature Areas Manager required, in the opinion of the authors of this Plan and also by the NAC, to implement the Stewardship Plan and manage the TNAs. It is almost impossible to envision that the Stewardship Plan can be effectively implemented and sustained without a qualified professional Nature Areas Manager. The Naturalist/Manager would also teach an undergraduate course in Nature and Environmental Interpretation, raise funds and institute an outdoor educational program in selected TNAs for area schools. Also included in this budget are funds for an assistant to the Naturalist/Manager whose duties would be to assist with fundraising and with the interpretation programs. Under this budget plan the involvement of the Department of Physical Resources in the management of the TNAs would remain as at present.

Operating Budget 2, for \$91,000 per year, calls for a qualified professional Naturalist/Manager, as in Operating Budget 1, but does not include funds for an assistant to aid with fundraising and interpretation programs.

Operating Budget 3, for \$31,000 per year, will merely address ongoing user safety issues and maintenance issues identified in the Stewardship Plan. This budget is unlikely to lead to effective and continuing implementation of the Stewardship Plan. If a qualified professional Nature Areas Manager is not hired to implement the Stewardship Plan, then the Department of Physical Resources will have to assume greatly increased responsibility for the management and maintenance of the TNAs. This is because the current ad hoc approach to management and maintenance of TNAs has to change, not least because of safety and liability concerns and the increasing loss of habitat and biodiversity in some TNAs, such as in the Wildlife Sanctuary and Canal TNAs. Also, additional funds, in addition to the \$31,000 budget, will be needed to monitor the ecological conditions and uses made of TNAs.



C./Trent/Issuing 4/02

Figure ES.1. Nature Areas on the Symons Campus, Trent University, Peterborough, Ontario.





A variety of suggestions are made in the plan for financing the stewardship and management of the TNAs. Suggestions include, among others, matching by the University each year the funds from the student levy (approximately \$7,500 per year), sponsorships of trails, fields, trees in an arboretum, sponsoring of interpretive signs, the sale of goods, such as t-shirts and hats, in an Interpretation Centre and on campus, assistance from a Friends organization, and an alumni fundraising campaign. The success of the "Beyond our Walls" campaign in raising \$75,000 from the Canadian Pacific Foundation and Home Depot Canada indicates that there is significant corporate interest in the stewardship of TNAs and community use of these areas. Funds also could be sought from foundations promoting environmental education and conservation. A program for outdoor educational and recreational use for area schools could also generate income.

## **1. CONCLUSIONS AND KEY RECOMMENDATIONS FOR THE ACTIVE STEWARDSHIP OF TNAs**

Conclusions with key recommendations for the active stewardship of Trent University Nature Areas (TNAs) are detailed below.

1. Trent University was blessed with a spectacular site of 900 ha (1450 acres) encompassing a superb array of landscapes and habitats, ranging from dry uplands and wetlands to a variety of woodlots, abandoned farm fields and working farms when the first undergraduate class was admitted in 1964. In 1989, the Board of Governors (BOG) and the Senate determined that 16 areas of the Nassau Campus, since renamed the Symons Campus, should be preserved as TNAs because of their natural heritage characteristics and functions and that these TNAs should be protected from development. As a result of the fieldwork undertaken for this Plan, some adjacent TNAs, for ecological reasons, have been combined and some have been increased in size by the addition of significant adjacent areas. The 16 TNAs designated in 1989 thus have been consolidated into 12 TNAs for this Stewardship Plan.

### **Recommendation 1.**

That the University, Board of Governors (BOG) and the Senate reaffirm their commitment to the lands on the Symons Campus designated as TNAs for their natural heritage values and functions and because of their importance for long-term educational and research purposes and that these lands be protected from development. Furthermore, that the University, the BOG and the Senate adopt the 12 TNAs identified in this Stewardship Plan, as shown in Figure 1, and confirm their boundaries, with appropriately wide buffer zones. Also, that the width of the respective buffer zone for each Nature Area will be carefully re-evaluated, if there is any change of use, or threat by development on, land adjacent to that particular Nature Area.

2. In the absence of a long-term management and use plan the default approach to management of TNAs has been to take ad hoc action when management issues involving the safety of users have become too serious to ignore. This ad hoc approach must be abandoned by immediately implementing the Stewardship Plan in order to ensure the protection and sustainable use of Trent's TNAs for the long-term teaching, research and safe recreational purposes of the University and the community.

Implementing the Stewardship Plan for the Symons Campus will be an exciting and worthy challenge for a University that extols its concern for the environment and promotes all aspects of environmental studies.

### **Recommendation 2.**

That the University immediately implements the Stewardship Plan to protect the natural heritage values and functions of its TNAs for teaching, research and for recreation uses by the current and future generations of students, faculty, staff and the public.

3. a). Effective and successful implementation of the Stewardship Plan, in all of its aspects, will require the services of a qualified professional coordinating and supervisory person. The current situation without clear responsibility for the undertaking of actions to ensure the safe use of, or management of TNAs must change. Furthermore, the continued ad hoc practice by the University for dealing with its TNAs will exacerbate the declining of access to many TNAs and continued loss of habitat diversity and biodiversity.

### **Recommendation 3a.**

That the University hires a qualified person as the University Naturalist/Nature Areas Manager with responsibility for implementing the Stewardship Plan and for managing and monitoring of TNAs. This will entail adopting Operating Budget 1, or at the very least, Operating Budget 2.

3. b). If Recommendation 3.a is rejected, then the Department of Physical Resources should expand significantly its current role in the stewardship of TNAs by committing significant personnel time and funds to all of the operational aspects of TNAs management identified in the Stewardship Plan, particularly issues of safety affecting University and public users. University users are primarily undergraduate students in the academic program and involves, in particular, students in Biology, Geography and ERS undergraduate courses (750 to 1000 course enrollees annually) that use TNAs for practical class work and training. Furthermore, based on some visitor surveys of both University and community recreational users, there are 10,000 – 15,000 day users per year of the Wildlife Sanctuary NA, alone.

The Department of Physical Resources will also need to control the unabated spread of European buckthorn and the excessive spread of Eastern white cedars, both of which are threatening habitat diversity and biodiversity in TNAs and reducing recreational appeal by encroaching into nature trails. Also the Department of Physical Resources, with advice from the NAC (or replacement Committee) will need to arrange for monitoring of the ecological conditions in the TNAs, so that any detrimental impacts of changes in biodiversity and habitat diversity in TNAs can be addressed. An example of detrimental change, due to the lack of monitoring, is the loss of open field habitats to stands of Eastern white cedar and the spread, all over the Symons campus, of European buckthorn.

### **Recommendation 3b.**

That if the University does not hire a University Naturalist/NA Manager then the operational management issues identified in the Stewardship Plan should be addressed by the Department of Physical Resources, under policy direction by the NAC or its replacement, the Nature Areas Stewardship Advisory Committee (NASAC). The University also will need to provide the Department of Physical Resources with funds for the contract monitoring of the ecological conditions of its TNAs so that the NAC, or its replacement committee, will be able to fulfil the advisory role assigned to it.

4. There is much evidence of interest and goodwill towards TNAs, both inside and outside the University. This goodwill has been demonstrated by recent national corporate and local business financial donations such as \$25,000 from Home Depot Canada, \$50,000 from the Canadian Pacific Foundation, and \$12,500 in total from the Mountain Equipment Co-op, Canada Trust Friends of the Environment and the Peterborough Field Naturalists. There has also been the creation of a \$100,000 "John de Pencer Trent Nature Areas Endowment Fund". The student body at Trent have been donating, since 1998, via an annual levy \$7,500 per year, to the NAC for use with maintaining and creating nature trails, maintaining a website, for NAC office work and for student research projects in TNAs. In-kind donations to the University have included half the cost of a computer, printer and software by Peterborough Computers for Stewardship Plan preparation and for NAC office work, GIS software from ESB Canada to assist with Plan preparation, tools from the Peterborough stores of Canadian Tire and the Home Depot store, free transportation by Century Airline Services from, and back to, Pearson International Airport for British conservation volunteers, prizes donated by Sooters and Quinte Photographic for NAC photographic competitions, free snowshoe use by B&B Surplus for winter events in TNAs. This extensive interest and goodwill needs to be effectively tapped on an ongoing basis to assist with the stewardship of the TNAs. The continuity provided an individual contact/organizer at Trent or from the community is imperative to keep this going.

#### **Recommendation 4.**

That an ongoing campaign, organized and coordinated by the Development Office, commence immediately to raise funds for implementation of the Stewardship Plan. The raising of funds, in conjunction with the Development Office, will be an important task for the University Naturalist/NA Manager. Also that a campaign seeking goodwill donations be the responsibility, on an ongoing basis, of an individual at Trent or from the community.

5. A University committee, such as the NAC, whose membership, in large part, changes annually, does not have sufficient expertise, continuity of experience, knowledge about TNAs, information or resources, or time available to advise effectively the University on the responsible stewardship of its TNAs. This Committee also does not receive the professional information (and has never been provided with the resources to obtain such information and advice) necessary to advise effectively the University about conditions in, and uses of, the TNAs that may be detrimental to the academic program.

#### **Recommendation 5.**

That the current NAC be replaced by a 9-member advisory committee, the "Nature Areas Stewardship Advisory Committee" or NASAC. Three core members, one from each of the Departments of Biology, Geography, and Environmental and Resource Science / Studies, would each serve for at least 3-year terms on the Committee. Other members would be the Manager of Security, Parking & Grounds Services or Director of Physical Resources, the Vice-President of Finance or delegate (ex officio), an elected staff member, an elected undergraduate student and an elected graduate student. The University Naturalist/NA Manager would provide professional advice to the Committee and could also be the secretary for the NASAC.

It is suggested that the NASAC reports to the President, the BOG and the Senate through the President's Executive Group (PEG).

6. Because vegetation change and ecological processes are not static, but are ongoing, and the use of TNAs may change, it is necessary that the Stewardship Plan be reviewed at least every 5 years.

#### **Recommendation 4.**

That the Stewardship Plan and the condition of the TNAs be reviewed at least every 5 years by the NASAC in the light of previous years experience.

7. The lack of permanent office facilities for the NAC for archiving information and records has resulted in the loss of much irreplaceable data and information about TNAs. Chairs of the NAC have not always passed information on to their successors and minutes and other material do not get sent to the University archives. This has led to inefficiency and lack of knowledge about TNAs and decisions made by successive NACs. Since 1996, as a temporary measure, desk space for the NAC computer and printer, and a filing cabinet was provided in the Trail Studies Unit (TSU) office in the Environmental Sciences building. However, a temporary arrangement of office space for the NAC is not a viable or responsible way to undertake work associated with, or to maintain records and other materials about TNAs. Undoubtedly, without permanent office space, records of the many activities related to the TNAs, and student research reports collected during the past 8 years will be lost, and there will be continued lack of continuity of effort and efficiency by the NAC. There are now too many important documents, information and maps of TNAs available in the Trail Studies Unit for use by students and others for these materials to be stored and managed by the Chair of the NAC, or NASAC, or by the Chair's secretary. Furthermore, an office is needed so that students can go there to use the resources related to the TNAs for their course work and for research projects.

#### **Recommendation 5.**

That permanent office space be allocated to the NAC, or NASAC, for maintaining records and for office work associated with TNAs so that continuity of effort and efficiency by the advisory committee can be improved. Ideally, such space would be part of a Nature / Environmental Interpretation Centre.

8. The willingness in recent years of community, including Home Depot store employees, Peterborough Field Naturalists, and University volunteers to work alongside international (British) and provincial (Federation of Ontario Naturalists) conservation volunteers in TNAs indicates that there is a reservoir of individuals committed to volunteering to help maintain and create nature trails in TNAs. Local volunteer assistance in the management of TNAs should be encouraged. Recent years experience has also demonstrated that large groups (10 to 15 persons) of volunteers can accomplish much work in TNAs so visits by groups of volunteers should continue to be promoted. However, for effective tapping of volunteer assistance it is necessary that a Trent or community individual be responsible for seeking volunteers.

#### **Recommendation 6.**

That local volunteer assistance be encouraged in the stewardship of TNAs. For safety and liability reasons volunteers should be trained and directed. It is also recommended that the recent practice of hosting international and provincial "Conservation Working Holidays" in TNAs should continue and that partnerships with conservation organizations, such as the Federation of Ontario Naturalists, be promoted.

9. Many parks are assisted financially and in other ways by Friends groups. There is interest in such a group at Trent. The participation of the public and Trent individuals interested in nature and the University Nature Areas should be encouraged by the formation of a Friends of Trent University Nature Areas Association (FOTUNA)

#### **Recommendation 9.**

That a Friends of Trent University Nature Areas Association (FOTUNA) be established to help financially and assist with the stewardship of TNAs.

10. The University has not exploited the value and immense potential for educational and interpretive purposes of the TNAs on the Symons Campus, especially for their use by area schools, for research, for recreational use by the University and Peterborough community. These environmental assets (the TNAs), could be of tremendous value for promoting the University and for fundraising purposes. Promotional and fundraising activities would be greatly enhanced by a Nature and Environmental Interpretation Centre which, preferably, could be situated on the unused Lockington Property on Pioneer Road. This property, adjacent to the Wildlife Sanctuary Nature Area, is only a 5 to 10 minute walk from the Symons Campus core. The abandoned house on this site easily could be renovated, using skilled volunteers, as a community project (interest has been expressed to undertake this). Furthermore, a University Visitor Centre could be part of an Interpretation Centre at this site, thus assisting with staffing and operating costs. A parking lot around this multi-use Centre would enhance security for the TNAs and make it unnecessary to maintain the parking lot for the Wildlife Sanctuary Nature Area on University Road.

It is suggested that an arboretum of native shrubs and trees, along with a cedar-bedge maze for environmental interpretation, located in adjacent fields, would be excellent innovations for the use of TNAs for environmental education and interpretation by schools. The arboretum, if it became a repository of a wide selection of shrubs and trees native to this area and Ontario, would be of much use for teaching and research at Trent. Collections of area and native trees and shrubs with a wide DNA base could be maintained at the University for breeding and for research purposes. Such a collection could be of much interest to the Ontario Ministry of Natural Resources, and for forestry, land rehabilitation and landscaping purposes. An arboretum, using sponsorship for the trees and shrubs, could add significant financial resources for the ongoing implementation of the Stewardship Plan. Furthermore, the establishment of an arboretum at Trent would be an excellent attraction and promotion for the University since one does not exist in this part of central Ontario. An arboretum with nature trails and a maze would complement, significantly, the appeal of a Nature/Environmental /Visitor Centre on the Lockington property.

#### **Recommendation 10.**

- a. That the University promote the use of TNAs for outdoor and environmental educational use by area schools.
- b. That a Nature / Environmental Interpretation Centre / University Visitor Centre be created in the house on the Lockington property, on Pioneer Road, adjacent to the north-west corner of the Wildlife Sanctuary Nature Area. Renovation of the house could be greatly assisted by skilled volunteers who have expressed interest in such a project.

- c. That, an arboretum of native tree and shrub species, along with a cedar-hedge maze for use in environmental education, interpretation and research, be created in fields adjacent to the Lockington Property.
- d. That, if the Interpretation/Visitor Centre is established, consideration be given to closing the parking lot in the Wildlife Sanctuary Nature Area on University Road and that it be replaced by a more secure one serving the proposed Nature / Environmental / Visitor Centre.

# THE STEWARDSHIP PLAN FOR TRENT UNIVERSITY NATURE AREAS

## 1. INTRODUCTION

### 1.1 Trent University Nature Areas (TNAs) and Reasons for the Stewardship Plan

"Trent University was blessed with a spectacular site encompassing a wonderful array of landscapes and habitats, ranging from wetlands and dry uplands to a variety of woodlots and abandoned farm fields when it admitted its first undergraduate class in 1964. However, the lack of a long-term vision and an implemented Stewardship Plan has led to an ad hoc approach towards use and management of a large part of this "Naturally Spectacular Campus", the description given to it in the 1995 University Prospectus. Trails and associated structures are not being managed and maintained on a regular basis, giving rise to safety and liability concerns. Habitat diversity and biodiversity in many areas of the campus are being compromised by excessive spread of white cedars and invasion by European buck-thorn, a noxious weed that is out-competing and displacing native species of herbs and shrubs. The University needs to decide where the Nature Areas fit as a "natural laboratory" in Trent's goals and priorities" (Jones 1995).

This was the title and opening paragraph of the 1994/95 report by the Nature Areas Committee (NAC) to the University Senate and the Board of Governors (Jones 1995). This report led to the establishment of an ad hoc Presidential Advisory Committee to arrange with the NAC the preparation of a Stewardship Plan for the 16 TNAs (Figure 1) that had been approved by the Senate and Board of Governors in 1990. A NAC proposal (terms of reference in Appendix A) for preparing a Plan was accepted by the then President Conolly in early 1996 and field work began in the following summer.

The resultant Stewardship Plan contains recommendations for consolidating, for ecological and environmental reasons, some TNAs and increasing the size of some others (Figure 2). It further recommends implementing a responsible stewardship strategy for the TNAs. Endorsement of this Plan by Trent University, and the Peterborough community, will ensure protection of the natural heritage of the Symons Campus TNAs for teaching, scientific research, nature interpretation, biological preservation, outdoor recreation and aesthetic appeal, for many years to come.

The Stewardship Plan is divided into three parts:

- A - Background
- B - The Stewardship Plan
- C - Appendices

Part A, Background, contains environmental, human and institutional history of the TNAs, their current conditions, such as their regional context, a general overview and uses, as well as synopses of individual TNAs and management issues.

Part B, the Stewardship Plan, includes the mission statement for the TNAs, an outline of general policies relating to TNAs, the classification and zoning of the TNAs, management prescriptions, potential new initiatives, management and development scenarios, institutional arrangements, financing of TNAs, and conclusions and recommendations.

Part C, consists of various appendices.

## 1.2 Objectives of the Plan

Trent University extols the pursuit of excellence in teaching and research as its major goal. The purpose of the Stewardship Plan is to ensure that in addition to this major goal there shall also be excellence and responsibility demonstrated in the stewardship of the TNAs on the Symons Campus. Thus the main goal of the stewardship planning process was to develop an implementation strategy for the stewardship of the TNAs as a whole and also for individual TNAs.

The objectives in the Plan are:

- to protect the natural heritage values of the TNAs for academic, research and environmental benefit
- to protect green spaces for educational and recreational uses by city and university community users
- to classify each Nature Area for the potential function of resources and to aid in development of management prescriptions
- to identify other areas on the Campus that should be identified as TNAs or be added to existing TNAs
- to determine if some adjacent TNAs should be consolidated
- to outline the kinds of research, educational and recreational activities that each Nature Area can sustain in relation to its environment and potential users
- to make recommendations for the protection, use and management of the TNAs
- to identify responsibilities, priorities and funding needs as well as a strategy for policy enforcement and responsible stewardship.
- to produce a list of recommendations for the long term maintenance and viability of the TNAs for academic, research and recreational use

## 1.3 Methods Used to Produce the Plan

In order to accomplish the goals and objectives of the Stewardship Plan, information and data were collected using field research, literature survey and interviews.



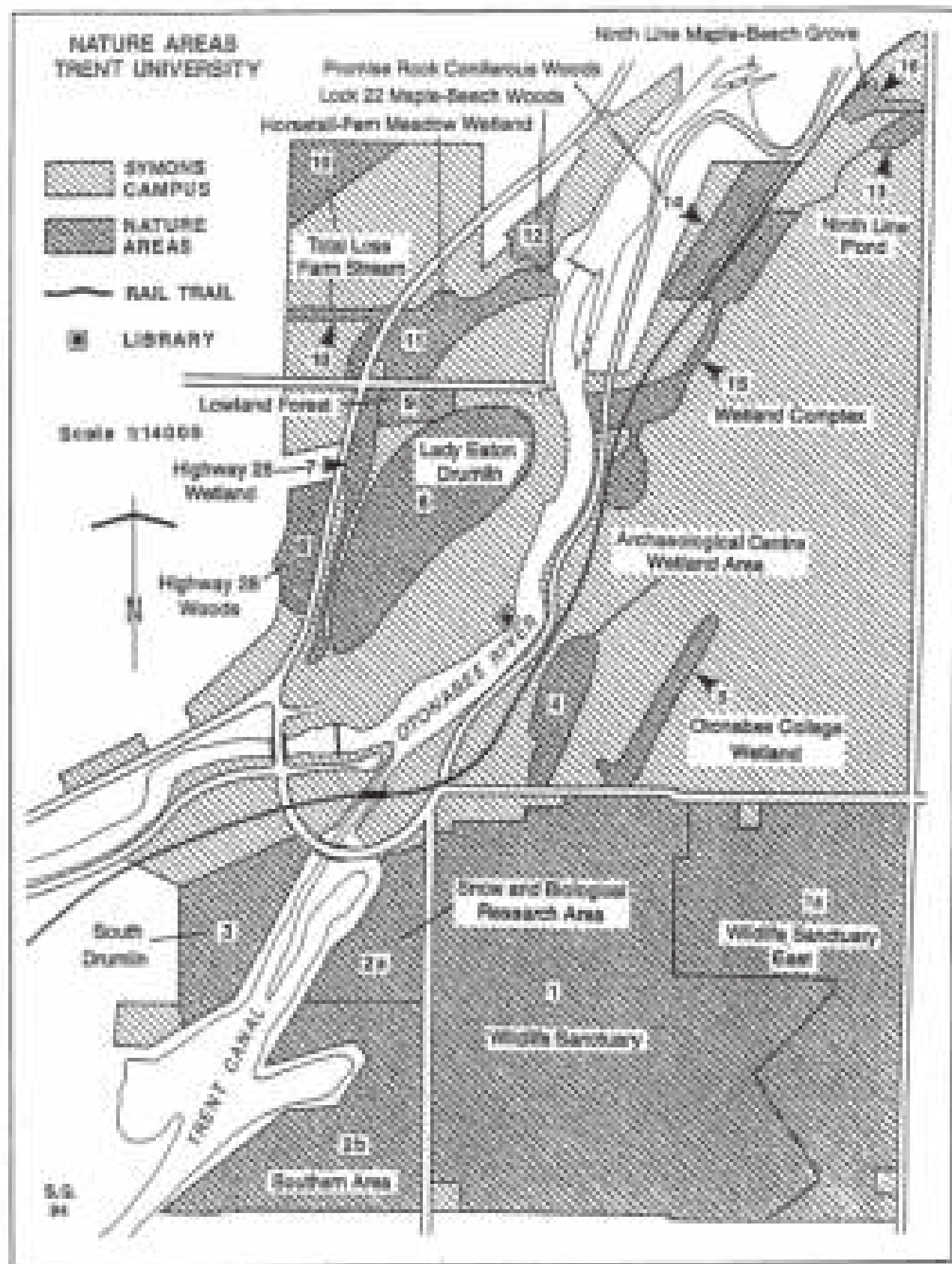
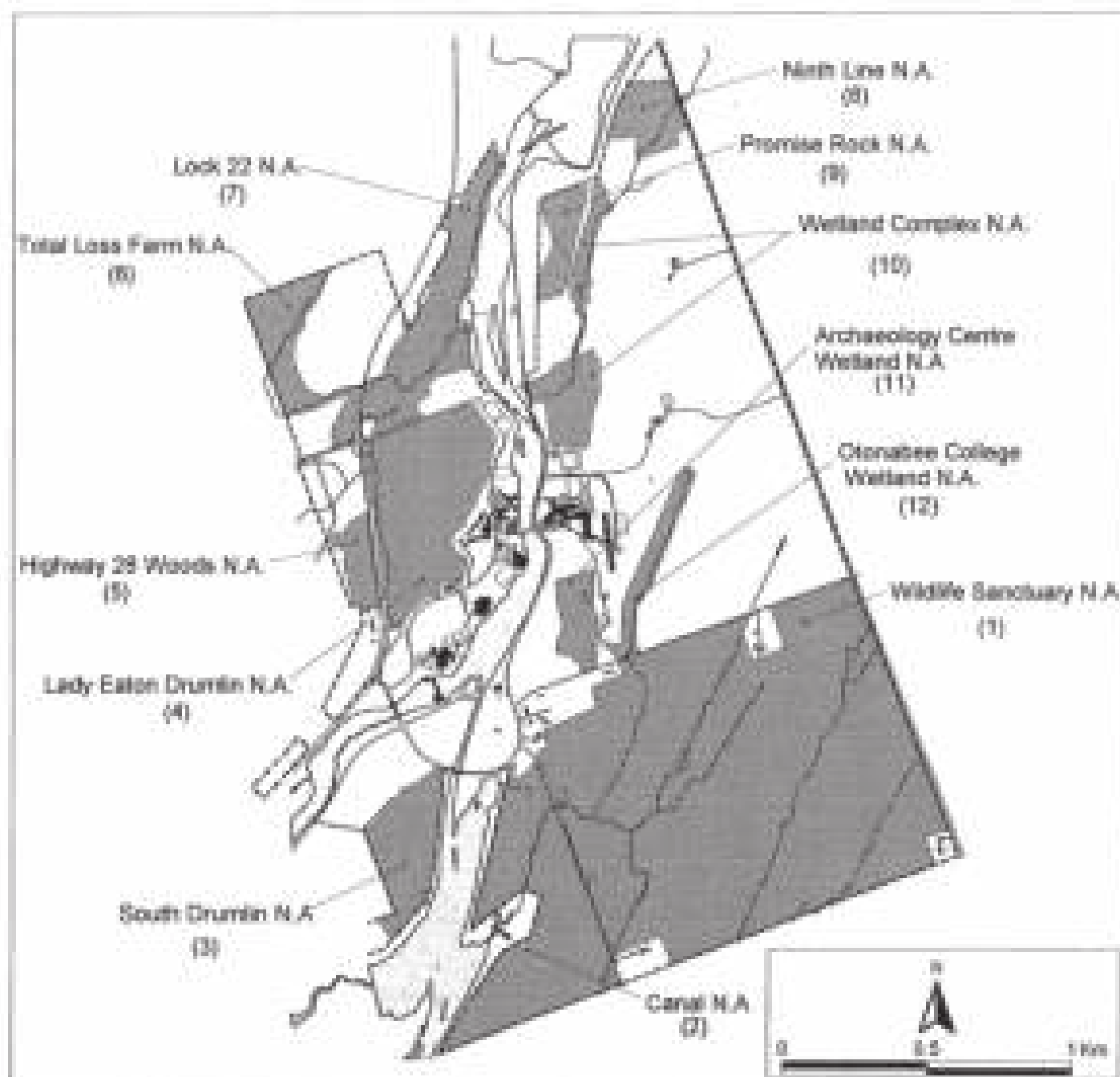


Figure 1. Nature Areas on the Symons Campus, Trent University, Peterborough, Ontario, approved by the Board of Governors in 1988.





## Legend

- Campus Boundary
- Road
- Stream (Seasonal)
- Dam, Lock
- Water (River, Pond)
- Parking Lot
- Trent Nature Areas
- Building

Data from the Trent  
University Nature Areas  
GIS database

Corporate support from:  
**Peterborough Computers,**



April, 2002

## Size of Each Nature Area (Approximate)

| Number | Name                            | Percentage |
|--------|---------------------------------|------------|
| 1      | Wildlife Sanctuary N.A.         | 100        |
| 2      | Canal N.A.                      | 27         |
| 3      | South Drumnin N.A.              | 14         |
| 4      | Lady Eaton Drumnin N.A.         | 10         |
| 5      | Highway 28 Woods N.A.           | 7          |
| 6      | Total Loss Farm N.A.            | 61         |
| 7      | Lock 22 N.A.                    | 22         |
| 8      | North Line N.A.                 | 6          |
| 9      | Promise Rock N.A.               | 2          |
| 10     | Wetland Complex N.A.            | 11         |
| 11     | Archaeology Centre Wetland N.A. | 2          |
| 12     | Otonabee College Wetland N.A.   | 4          |

C:/Trent/working.apr

Figure 2. Nature Areas on the Simcoe Campus, Trent University, Peterborough, Ontario.



The study began with a systematic review of existing biophysical information about the Symons Campus. This was followed by approximately 5 weeks of field survey during summer 1996 by Ms. Rosita ben-Chiel. Ms. ben-Chiel was the original surveyor of the biophysical endowments of the Campus in 1989 that led to the identification of the 16 TNAs that were subsequently approved by the Board of Governors and University Senate as areas for protection from development.

### 1.3.1 Vegetation Communities and Vegetation Types

Vegetation communities (Appendix B) in each Nature Area were mapped on aerial photographs obtained from Northways Map Technology Limited and then traced onto Mylar overlay. The aerial photography had been commissioned by the City of Peterborough and the flights were flown on May 6-7, 1996. The photograph scale is approximately 1:6250. A reference set of the 21 photographs covering the Trent University Symons Campus is held by Trent University Beta Library, Map Section. Communities identified on the photographs were ground surveyed and boundaries refined where necessary. During the field survey, vegetation characteristics such as age structure and dominant species were recorded, as were details concerning uncommon flora and fauna, recreational uses and any special features not previously recognized. Dominant species were determined by estimating relative percent cover.

Because so many different vegetation communities occur in TNAs, mapping all of them would be too complex for the purposes of this Stewardship Plan. Instead, a vegetation classification system using vegetation types (Table 2) has been used to describe the general appearance, character and form of the vegetation in each Nature Area. The classification system used was based on a synthesis of the systems outlined in Lee et. al. (1998) and Reuschke (1990) with the community classes of vegetation described by Lee et. al. (1998) being termed vegetation types for the purposes of this Stewardship Plan (Table 2). Vegetation types were determined by a visual assessment of the relative percentage of cover of the dominant vegetation cover type comprising the uppermost strata. Vegetation types with a minimal area of 1 ha were mapped and described. However, unusual or significant vegetation communities e.g., wetlands, mature deciduous woodlands were mapped at a finer scale (to a minimum size of approximately one-quarter ha). A brief description for each of the vegetation communities identified in TNAs is given in Appendix B.

### 1.3.2 Soils

Soil classifications were assigned according to the mapped units of Soils of Peterborough County (Gillespie and Acton 1981). Observed soil moisture and texture were noted for most wetlands and forest communities.

### 1.3.3 Hydrology

Water levels and soil moisture conditions vary seasonally and from year to year. Hydrological descriptions are based upon field investigations conducted during summer 1996, as well as a review of aerial photographs and Ontario Base Maps. Conditions during that summer were probably wetter than normal. Consequently, some areas that were saturated in August 1996 were fairly dry in June 1997.

Each Nature Area was classified according to its natural values, predominant potential function and how its resources were being utilized. Classification was based on topography and soils, hydrology, vegetation and wildlife, natural and cultural features of significance, land use of area and surroundings and recreation potential was used in order to classify the TNAs and to designate zoning within. Definitions for the classification were used as templates for comparing attrib-

**Table 2. Vegetation Types Occurring in the Nature Areas on the Symons Campus, Trent University, Peterborough, Ontario**

| Vegetation Type | Vegetation Characteristics                                                                                                                   | Environmental Characteristics                                                                              |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Forest          | Tree cover >60%                                                                                                                              | Site conditions and substrate types variable                                                               |
| Woodland        | 25% < tree cover ≤ 60%                                                                                                                       | Site conditions and substrate types variable                                                               |
| Plantation      | Tree cover >60%<br>Community resulting from, or maintained by, cultural or anthropogenic-based disturbances                                  | Site conditions and substrate types variable                                                               |
| Swamp           | Tree or shrub cover >25%<br>Dominated by hydrophytic shrub and tree species                                                                  | Variable flooding regimes<br>Water depths <1 m<br>Standing water or vernal pooling >20% of ground coverage |
| Marsh           | Tree and shrub cover ≤ 25%<br>Dominated by emergent hydrophytic macrophytes                                                                  | Variable flooding regimes<br>Water depth <2 m                                                              |
| Agricultural    | Field of pasture or cultivated for crops                                                                                                     | Site conditions and substrate types variable                                                               |
| Old field       | Abandoned agricultural field undergoing secondary succession.<br>Vegetation herbaceous, herbaceous with shrubs, tree seedlings and saplings. | Site conditions and substrate types variable                                                               |

ites of the TNAs. The stewardship recommendations in the Plan are based on the classification and designated by the authors.

### 1.3.4 Summary descriptions for each Nature Area

Summary descriptions, accompanied by a contour map and a map of vegetation types for each Nature Area, are presented in Appendix D.

### 1.3.5 New Initiatives

New initiatives for the TNAs were developed, based on management prescriptions as well as information gathered from a Visitor Survey in 1995 and an Interpretive Survey in 1999, both surveys were in the WSNA.

# PART A BACKGROUND AND CURRENT CONDITIONS

## 2. HISTORY OF THE TNAs

### 2.1 Environmental History

#### 2.1.1 Physiography

About one billion years ago, subterranean rock, which stretched from Peterborough to Labrador, was compressed and folded upward into a mountain range higher and more rugged than the present day Rockies. Many of these formations were subject to enormous heat and pressure and the resulting metamorphic rocks formed the base layer of the bedrock in the TNAs today (Adams & Collins 1985, Adams & Taylor 1992). This mountain building was followed by a period of relative geological stability when erosion became the dominant land-shaping force. For the next 450 million years the mountains wore away until they were undulating hills.

Inland seas, that once covered the Michigan Basin and the Gulf of St. Lawrence, spilled over much of North America about 480-460 million years ago, covering it in a warm, shallow sea. Over the next 20 million years the progressive accumulation of large quantities of sediment, marine life and vegetation, cemented into beds of shale which, under pressure, further solidified into limestone. Limestone over metamorphic rock is the predominant geologic formation underlying the TNAs today. Evidence for the former Ordovician Sea is the many marine fossils encrusted within slabs of limestone scattered around the campus and in exposed rocks along the Chumbeo River.

#### 2.1.2 Glacial History - the Pleistocene

The Ordovician Sea gradually disappeared with the rebounding of the earth's crust and, hundreds of millions of years later, there were, during the last 2 million years (the Pleistocene Age) four periods of glaciation. The familiar terrain of Symon's Campus is the legacy of the last of these glaciations, the Wisconsin (Chapman and Putnam 1973, Branger 1992). The glacial advance during the Wisconsin covered this region in a sheet of ice up to three km thick and receded only 12,000 years ago. Soil, rock, and till from the Canadian Shield were deposited in characteristic landforms that are readily recognizable on the Symon's Campus, such as the Lady Eaton Drumlin (LEDNA) and Canal Nature Area (CNA) drumlins. Also, when the ice melted, some granite boulders (glacial erratics) that had been carried down from the Canadian Shield were deposited and

can be seen on the ground in some of the TNAs, and along field boundaries to where they were moved by settlers during clearance of the land for farming.

Drumlins, of which there are over 4,000 in southern Ontario, are elongated hills with a characteristic asymmetrical shape: a steep slope, the "stoss", giving way to a more gently sloped "lee" end. Those in the Peterborough Drumlin Field are oriented in a south-southwest direction, indicating the movement of ice from the northeast.

The melting Wisconsin ice sheet generated large quantities of water that drained via several well-developed spillways into Lake Iroquois (present day Lake Ontario). The Otonabee River follows the course of one of these major Wisconsin drainage channels (Brown 1994). The bank of the spillway can be observed on the west side of Highway 28, skirting the Highway 28 Woods Nature Area. For a more detailed account of the glacial features of the Peterborough area see Adams & Taylor (1992).

## 2.2 History of Human Settlement

### 2.2.1 The First Settlers

The discovery of a 9,500 to 10,500 year old Paleo-Indian projectile point just northwest of the Lock 22 Nature Area in Smith Township, suggests that the area around Trent University occasionally may have been visited by bands of nomadic hunter-gatherers following wandering herds of large mammals.

About 3000 years ago, developments in tool making, clay cooking, and agriculture enabled native populations to subsist on smaller areas of land. The Hopewellian mound-builders, semi-nomadic hunter-gatherers who practiced limited farming, occupied this area approximately 2,100 years ago. The Hopewellians were displaced by the Iroquois about 1,000 years ago, who were in turn driven south beyond Lake Ontario by the Algonquin and Huron peoples (Parrish 1967). The Algonquins and Hurons left a substantial record of their presence in this region, including petroglyphs in Petroglyphs Provincial Park, some 35 km north-east of Peterborough, and village remains near Douro Lake.

By the 1760s the Mississaugas, a sub-tribe of the Ojibwa of the Algonquin people, occupied this area and a region between present day Sault St. Marie and North Bay.

### 2.2.2 European Settlers

Samuel de Champlain was probably the first European explorer to pass through the Kawarthas. Of the Otonabee, he wrote in 1632: "This river is very beautiful, and passes through a number of beautiful lakes and river-meadows with which it is bordered; many islands of varying dimensions, abounding in deer and other wild animals, many good fishing spots full of excellent fish, and a great deal of very good cleared land abandoned by the Indians on account of the wars..." (Horton 1967).

During the early 1800s, European settlers moved north from Lake Ontario. Two of the first settlers in this area in 1822 were Robert Reid and his brother-in-law, Thomas A. Stewart. Reid was granted nine lots on the east bank of the Otonabee River, land that included 4 of the 12 designated TNAs, and Stewart settled on seven lots of land just south of Symons Campus. On the west bank of the Otonabee, John Smith was granted lot 21 of Concessions 3 and 4 (4 of the 12 designat-



ed TNAAs, as payment for surveying parts of Smith and Douro Townships (Jamieson 1989). More settlers arrived shortly thereafter, encouraged by William Horton, who wanted to send impoverished Irish farmers to Upper Canada at the expense of the British. Peter Robinson was appointed to oversee the immigration of over 2000 settlers to Scott's Plains (now Peterborough). In return for land grants, settlers were required to clear five out of every 100 acres of bush, construct a log shanty, and clear a section of road (Theberge & Theberge 1982).

### 3.2.3 Human Impacts on TNAs

It is not known whether native communities settled on any of the land comprising the Symon's Campus, but it is likely that aboriginal peoples hunted and fished nearby as the Otonabee River was a major route for traveling north to the Kawartha Lakes. There are remains of longhouses at the east end of Stony Lake. If land was cleared, it may have been used to grow corn, beans, and squash. Soils in such clearings often became infertile after about 15 years of use, then entire communities would move to other areas and again, using fire, create new forest clearings (Van Asten 1994).

Before European settlement, mammals in this region were impacted by the fur trade. Jacob Herkimer, for example, had established a trading post on the banks of Rice Lake in 1798 and traded with the natives for fox, bear, lynx, and beaver (Parnett 1967). Large fur-bearing mammal populations declined in this region as the fur trade grew, and by the early 1830s, native hunters had turned to smaller game and fish to compensate for the scarcity of large game (Van Asten 1994).

Lumbering served local needs in the early 1840s, when logs were being processed at several mills in Peterborough. Charles Perry began purchasing land around Nassau in 1851, and by 1854 had constructed the Nassau Mill, the largest sawmill in the Peterborough region, on the site of Trent's present hydroelectric facility (Jones & Dyer 1987).

The settlement of Douro and Smith townships (Trent University straddles both) involved the rapid clearing of the forested landscape for agriculture. The fertile soils of the southern portions of both townships encouraged settlement, and in only 56 years most of Smith and Douro had been cleared of trees (in 1881, 74% of Smith's and 65% of Douro's lands were cleared; Jamieson 1989; Gillespie & Acton 1981). A rail line extending from Port Hope to Peterborough facilitated lumber production. Peterborough County produced over 50 million board feet of lumber, 18 million of which came from the Nassau Mill. The demand for lumber came mostly from the British market and was for squared timber (usually red or white pine) for use in shipbuilding and as beams for construction purposes (Theberge & Theberge 1978).

Trees were planted as well as felled. Some evidence of a tree planting initiative established in 1833 may still be seen in and around Trent's Nature Areas. A provincial Act encouraged farmers to plant trees (walnut, ash, elm, maple, oak, pine, and hickory) by providing them 25 cents for each tree planted in the vicinity of property boundaries, roads, and highways (Van Asten 1994).

Cultivation of crops on the Symon's Campus was occurring in the early 1830s. Township Assessment Rolls, for example, indicate that Robert Reid had 130 of his 1,080 acres under cultivation, some of which were likely in the present day Wildlife Sanctuary Nature Area. By 1840, George Cunningham had cleared one half of the area around the Otonabee College Wetland and Archaeology Centre Wetland TNAs. John Smith cleared the west bank around 1826 and cultivated 14 acres (5.5 ha) in the Total Loss Farm NA (Jamieson 1989).

The mechanization of farming practices in the late 19th and early 20th centuries intensified land use. Tractors replaced horses, and farmers turned to dairy production, meat cattle, and poultry, as well as wheat, barley, oat, and corn production. Lime and phosphate fertilizers were applied to increase yields and were later replaced by inorganic fertilizers and pesticides (Van Asten 1994). Mixed farming, including orchards, fall and winter wheat, dairy and meat cattle, and oats, occurred by the end of the 19th century (Van Asten 1994) on land now in the Wildlife Sanctuary Nature Area.

### 2.3 Institutional History of TNAs

The creation of a university campus in Peterborough began with the donation of 100 acres of land to the nascent university by the Canadian General Electric Company in 1942. The donated land, situated on the banks of the Otonabee River at Nassau Mills, north of the city of Peterborough, was on a spectacular site. The Committee on the Campus Area (1963), in its report to the November meeting of the Campus Planning Committee believed that the University should have four major considerations in mind in determining the size and limits of the University campus. These considerations were (a) Academic purpose and concepts, (b) The importance of what is seen, (c) The importance of free ground, (d) Provision for unforeseen development within the University. The Committee explained the "Importance of what is seen" as follows:

"A University has a high responsibility to create on its campus buildings and vistas which please and awaken the imagination and show respect for the gift of natural surroundings. The beauties of nature and buildings on the campus are part of the University's commitment to order and excellence, and if a University fails to enhance its surroundings, or is careless about them, it will inevitably be doing subtle damage to its own capacity for excellence. The example it sets in each aspect of its life will affect its standards in every other aspect, and the physical surroundings are of fundamental importance. The outlook from the campus to the fringes must be considered in this mind".

Over the next few years, a further 1,360 acres, mostly farm land, but also including businesses and homes abutting the original 100 acres, were purchased or expropriated for future expansion of the University. The result was one of the largest campus landholdings in Canada, if not in North America.

The first president of Trent University, T.H.B. Symons, in 1964 envisioned that the campus would become an asset for the whole area and not just for the university. He stated that:

"The University sees the Otonabee campus as a continuation of the beautiful river parklands of the city, available for the pleasure of the citizens of the community as much as for the members of the university" (Peterborough Examiner, March 5, 1964)

The campus on the Otonabee, initially named the Nassau Campus, was renamed in 1992 the Symons Campus, in honour of the founding President.

#### 2.3.1 The Wildlife Sanctuary and Wildlife Sanctuary Committee (WSC)

Professor R.L. Edwards, in 1964, proposed to President Symons that a field station encompassing about 550 acres (223 ha) of forest, meadows, wetlands and abandoned farm land be created at the south end of the campus. This field station would provide natural habitat for teaching and research by biologists, geologists, geographers and others (Edwards 1964). In the late 1960s some 250 acres (101 ha) of farmland, bounded by University and Pioneer Road, were set aside as a bio-

logical and geographical research and teaching centre and became known as the Trent Wildlife Sanctuary. Formal research studies by Trent faculty did not materialize to any significant extent but the Sanctuary became regularly used for the teaching of biology courses. Gradually community and university recreational activities began in the Wildlife Sanctuary because this extensive natural area is within easy reach of Peterborough and the main campus. By the early 1970s, cross-country skiing, birdwatching, hiking and orienteering became established and generally accepted pastimes in the Sanctuary. In 1973, a LLP grant was used to upgrade some of the existing hiking trails and paid for the construction of several dams, bridges and boardwalks (Leaver et al. 1977). Most of these trails are still used today.

In 1974, at the request of the University Engineer, a Wildlife Sanctuary Committee (WSC) was formed as a sub-committee of the Site, Planning and Development Committee, to oversee the maintenance and care of the Wildlife Sanctuary. However, the WSC was not provided with a budget, terms of reference for the committee were never designated and it was not clear what the committee could do about decisions it made. It was authorized only to make recommendations.

During its first years, the WSC did undertake some management operations using grants solicited by the Development Committee and provided by the Eaton Foundation (\$22,500) and the Richard Ivy Foundation (\$10,000) (Board of Governors, Physical Planning and Development Committee document, 1988). Most of the funds were used to construct a wire fence, topped with barbed wire, along the west and north boundaries of the Wildlife Sanctuary to keep out stray dogs. Two marked trails, 1.5 and 3.5 miles long, respectively, were cleared and posted. In addition, some low weirs were constructed to create landing ponds for waterfowl and several swamp areas cleared of stumps and debris.

The WSC oscillated, depending on its composition, in its vision for the future use of the Wildlife Sanctuary. In 1977 and 1978 the Committee seemed to place more of an emphasis on promoting the biological integrity of the Sanctuary and less on recreation. For example, Professor Hagat, the WSC Chair, wrote in a letter to Dennis Desjardins, who had requested that a ski trail be created to link Otonabee College to the Wildlife Sanctuary, "the Wildlife Sanctuary exists primarily as a nature preserve and as a study area for those Departments of the University with relevant professional interest, Biology and Geography chiefly" (Hagat, correspondence, 1977). In the a 1977 meeting of the Committee, it was decided that "disturbance should be kept at a minimum" (Wildlife Sanctuary Minutes, October, 1977). In that same year, however, the Committee obtained a Canada Works Program grant to hire 4 students and produce a Trail Guide and walking tours of the Sanctuary. The WSC, in 1978, acknowledged that protection of the diversity of habitats within the sanctuary was critical and efforts to encourage diversity might mean the selective removal of some vegetation types (WSC Minutes 1978). However, in 1982, with some members from the Geography Department represented (including the chair), public use of the Sanctuary lands was actively promoted. Also by 1982, a Katiwewik group had groomed existing trails, cleared several new trails and posted signs. The Sanctuary at this point seems to have been valued by the university community and the community at large as a recreational resource. The tension between preservation and recreation, however, was never entirely reconciled by the WSC.

In 1978, five years after its creation, the WSC requested clarification of its terms of reference (WSC minutes, December 7, 1978). The subsequent terms of reference reiterated that the Committee was advisory to the Site Development Committee. The Committee was not given licence to actually do anything beyond formulate policy and "review requests by university and non university groups for use of the Sanctuary" (WSC terms of reference, 1979). The Committee was supposed to defer to the Site Development Committee for any decision making. When it did make recommendations, the Site Development Committee either was very tardy in responding or it did not respond at all.

It was not clear who was responsible for actually doing the necessary work to maintain the Sanctuary. Some maintenance work, such as picking up garbage, snow ploughing the Sanctuary parking lot and felling dangerous trees and stags was undertaken by the Department of Physical Resources. But beyond these activities, Physical Resources had no working budget, little time and even less labour allotted to the maintenance of the Sanctuary. As Mr. R. Ross, Director of Physical Plant and General Services, made it clear in a reply to a request by Dr. Hagar for aid with the repair of a damaged fence and signage for the Sanctuary that, "there is no allowance in our budget for this kind of work" (correspondence: G. Ross to F.A. Hagar, March 22, 1978). This, essentially, remains the budget situation to this day. Funding for the upkeep of the Sanctuary, according to the 1979 terms of reference, was from a dwindling Second Decade Fund donation without any obvious plan for how these funds were to be supplemented or replenished. The limited annual funding available to the WSC, the lack of continuity of Committee membership from year to year, along with the unfocused mission of the Committee resulted in decisions on the management of the Sanctuary being of a reactionary nature. The Committee recognized on several occasions that its approach to management was arbitrary and ad hoc. When problems arose, such as the control of unleashed dogs and the use of snowmobiles in the Wildlife Sanctuary, the WSC would meet to resolve these difficulties. Invariably solutions were short term and not always well thought out. For example, replacing the garbage bin at the Sanctuary Parking Lot simply attracted more garbage than it could contain (WSC minutes, December 1 and December 7, 1979).

In 1978, Dr. Neil Brown, a member of the committee, formulated some objectives for the management of lands at the Wildlife Sanctuary and outlined a series of methods on how these objectives might be achieved (Brown, 1978). The Committee, in the same year, also recognized that, in order to develop a coherent set of management policies, it was logical to extend the Committee's mandate to include all open and unused land on Campus (correspondence: Hagar to Space Utilization Committee, June 9, 1980). The Committee repeated the request for this enlarged mandate for the next 2 years without receiving a definitive response from Senate. When a response was provided, it was clear that the Board of Governors was not prepared to permit a Committee, charged with the maintenance of one natural area, to provide recommendations to higher levels of Administration on how to manage other open areas on the campus. The President and Vice Chancellor Donald R. Theall wrote to Dr. Hagar, Chair of the WSC, "I hasten to point out that this responsibility is to be exercised exclusively by the Property Committee or the Board of Governors" (correspondence: Theall to Hagar, September, 1981). The Committee attempted to lobby the Senate on several other occasions for a wider mandate out of a concern that certain portions of Campus land were suffering from benign neglect and mismanagement. Professor John Marsh, for example, wrote to the Site Development Committee in 1983, "... again, if no other group on campus is going to show concern for and manage these areas and their problems, might I suggest the WSC be given a wider mandate to assume this responsibility" (correspondence: Marsh to McCue, Site Development Committee, June 10, 1983). It was not until 1989, however, that the WSC, of its own volition, and in response to proposed development ideas that might have an impact on the Wildlife Sanctuary and other areas, instigated a biophysical study of all of the Nassau Campus to determine if other lands were worthy of protection as TNAs.

In 1989, the WSC adopted a long term strategy for the protection and use of the Wildlife Sanctuary, promoting the values of nature protection, education, research, and recreation. The Committee also acknowledged three traditional kinds of uses of the Sanctuary by Trent and the surrounding community: namely scientific research by faculty and students, education, and recreation. The WSC did not consider these uses incompatible with one another (WSC minutes, January 23, 1989).

### 2.3.2 Nature Areas on the Nassau (Symons) Campus

At its February meeting in 1989, in response to ongoing discussions within the University that some development of the Nassau Campus could help alleviate serious underfunding of the University, the WSC decided that the rest of Campus should be surveyed to "identify, evaluate and map any other environmentally significant areas on Campus". In addition, the appropriate and inappropriate use of these areas would be outlined and management policies would be formulated for sustained protection and long term use of all naturally significant Nassau Campus lands (WSC, Feb 6, 1989). In April 1989 Vice-President (University Services) Hamilton circulated a report titled "On the Development of the Nassau Campus" which recognized part of the Wildlife Sanctuary as a "natural" zone on the Nassau Campus, with the remaining lands designated as University Campus and University Endowment Land (Hamilton 1989).

In order to undertake a biophysical survey of the campus, review available literature and prepare a report, the WSN hired, with remaining Trust Funds and a small award from the Nind Fund, a student naturalist, Rosita Ben-Ofiel. The subsequent report entitled "Nature Areas and their use on the Nassau Campus Trent University Peterborough, Ontario" (Ben-Ofiel et al. 1989) identified 15 additional Nature Areas (Figure 1) on the Nassau Campus, that, along with the Wildlife Sanctuary, made up about 50% of the land base of the Campus. The report also made 10 recommendations.

These recommendations were that the University:

- recognize the ecological values and constraints, such as steep slopes and poorly drained areas, of the campus
- plan and manage the campus in a manner consistent with the philosophy and practice of ecologically sustainable development
- recognize, in its plan for the campus, the TNAs indicated in this report and include them in a nature protection zone
- adopt a policy prohibiting building and incompatible use, such as vehicular use, in the nature protection zone.
- appoint a permanent committee reporting to Senate with the sole responsibility of providing advice and ensuring wise use of the nature protection zone.
- manage the nature protection zone to ensure its protection and appropriate use
- promote awareness, and appropriate university and public use of the nature protection zone.
- encourage further investigation of the natural characteristics of the nature protection zone.
- designate and manage land outside but affecting the TNAs as a buffer zone to ensure that there are no detrimental impacts on the TNAs.
- identify any other nature areas not included in the 1989 study and place them in the nature protection zone.

The report and its recommendations were discussed by the Physical Planning and Development Committee. This Committee made the following recommendations to the Board of Governors on March 30, 1990:

THAT the Board of Governors recognize the ecological values and constraints of the University's lands, and agree that these lands be planned and managed in a manner consistent with the philosophy and practice of ecologically sustainable development.

THAT the University's lands within the City of Peterborough, be divided into the following three recognized zones as set out on the 1:2000 master map prepared by the Senate Site Development and Space Utilization Committee, and outline on the map attached as Appendix B to this report:

(1) THE UNIVERSITY CAMPUS, consisting of all the lands thus identified on the master map together with all the lands constituting Peter Robinson and Catharine Parr Trill Colleges in downtown Peterborough;

(2) THE UNIVERSITY NATURE AREAS, consisting of the sixteen numbered areas identified in the Wildlife Sanctuary subcommittee report and identified on the master map, as areas in which building and incompatible use will be prohibited;

(3) THE UNIVERSITY ENDOWMENT LANDS, consisting of the remaining University lands in Peterborough.

In connection with (1) – (3) above, the Committee further recommends:

THAT the board recognize in principle the role of the Senate, and particularly of the Nature Areas Committee of Senate, in making recommendations concerning the management of the University Nature Areas.

The BOG minutes of March 30, 1990 also state that:

"These widely-supported recommendations by the Physical Planning and Development Committee had been presented to the University Senate for endorsement. They called for approximately half of the 1400-acre Nassau Campus to be designated as the nature zone protected from building and incompatible use. (It was understood that necessary servicing through the Nature Areas and the building of shelter-type structures would not be prohibited)"

The Board resolved:

THAT the recommendation of the Physical Planning and Development on university land use, (described above as the recommendations related to the TNAs), be approved as amended to add "within the City of Peterborough" in paragraph #2.

The Board of Governors, thus officially recognized the 16 TNAs identified in the Ben-Obel et al 1989 report being of such significance that they should be preserved and be protected from development. The TNAs thus were included in the zoning map of the Trent University Lands (Figure 3), approved by the Board of Governors, as the University Nature Area zone (Board Minutes, March 30, 1990). The remainder of the Nassau Campus, where development could occur, was zoned as University Endowment Lands and University Campus lands.

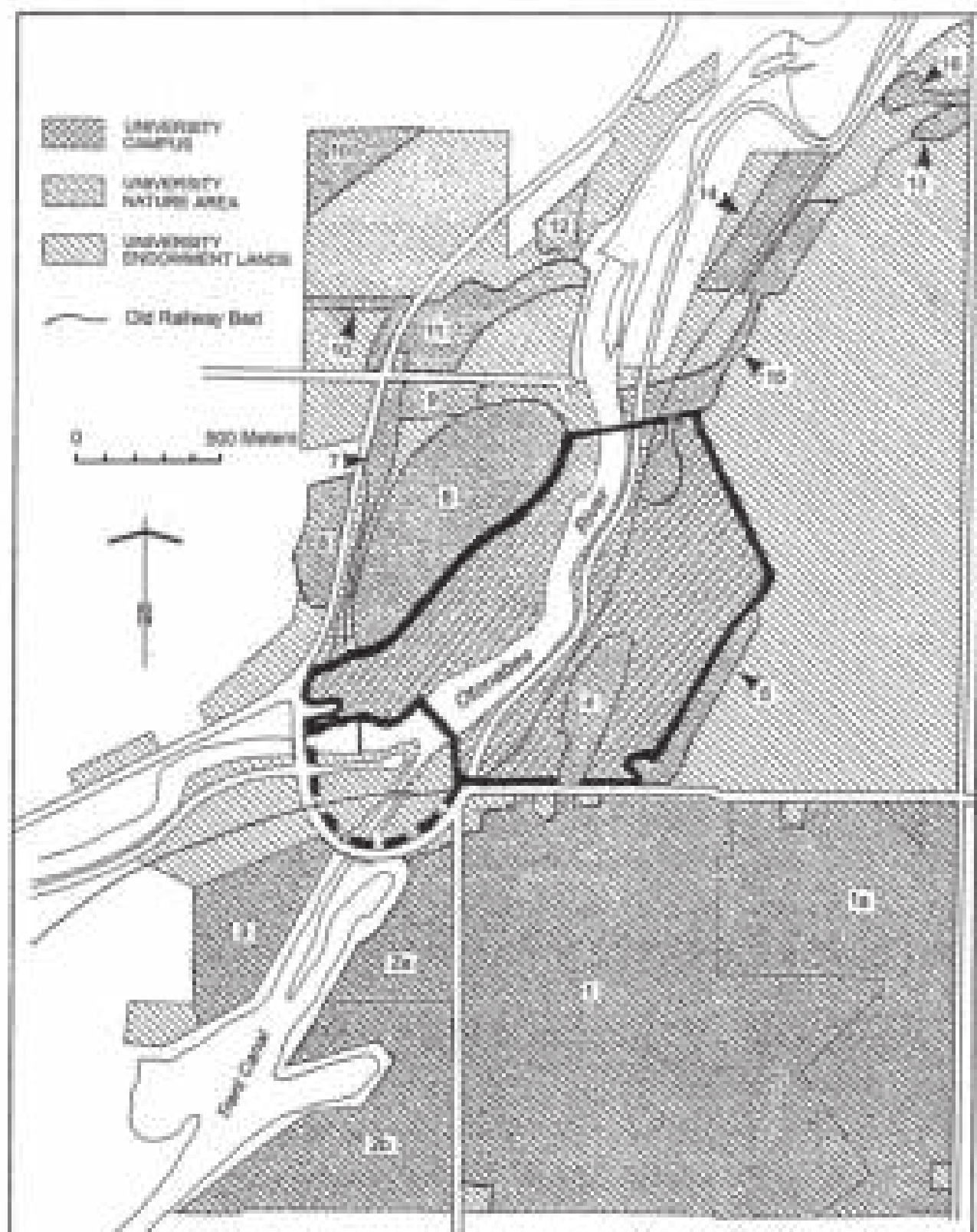


Figure 3. Zoning of lands, on the Nassau Campus (Symonds Campus), Trent University, Peterborough, Ontario, approved by the Board of Governors in March, 1990.





The report to the Board of Governors and the Board's recommendations were endorsed by Senate in October of 1990.

Recommendation 5 in the Ben-El-Mechaieq et. al. (1989) study immediately was acted upon and the WSC was replaced by the Nature Areas Committee (NAC) in 1990 and given the task of advising the Senate and the Board of Governors on the wise use and management of the TNAs. However, by and large, the remaining recommendations of Ben-El-Mechaieq et. al. (1989) were not implemented.

### 3.3.3 The Nature Areas Committee (NAC)

The newly constituted Nature Areas Committee (NAC) was instructed to report directly to Senate with both revised and expanded terms of reference. The membership of the NAC was to be:

- 1 faculty member from the Biology Department
- 1 faculty member from the Geography Department
- 1 faculty member from the Environmental and Resource Studies Program
- 1 faculty member at large.  
(all four faculty to be chosen by the Senate Nominating Committee)
- 1 TSU student
- 1 JBC student
- 1 GSA student
- 1 Trent University Naturalist/NA Managers Group student rep.  
(all four to be chosen by the respective constituencies)
- The Chair of the Site Development Committee, or his or her delegate (ex officio)
- The Director of the Physical Resources Department, or his or her delegate (ex officio)
- The Vice-President (University Services) ex officio.

The terms of reference set for the NAC were:

- to advise Senate on the wise use of the University Nature Areas
- to advise the Board of Governors on the management of the TNAs to ensure their protection and appropriate use
- to promote awareness of and appropriate university use and public use of the TNAs
- to encourage further investigation of the natural characteristics of the TNAs
- to designate lands outside but affecting the TNAs so that they can be managed as a buffer zone to ensure there are no detrimental impacts on the TNAs
- to identify any other TNAs not included in the 1989 study and recommend their inclusion as TNAs

While the NAC still held a predominantly advisory role, for the first time the term "management" appears in the terms of reference of a committee dealing with the TNAs. By attending to both policy and management, the Committee was obliged to consider long term planning for the TNAs. But, as with its predecessor, the WSC, the NAC was not provided with a budget or any means to gather information about the TNAs. Never-the-less, one of the first tasks undertaken by the NAC was preparation of a general TNAs policy.

This general Nature Areas policy states that:

- the purpose of the 16 TNAs designated on the Symons Campus and approved by the Board of Governors is to protect their natural elements, processes and values, and to encourage members of the university and public to use them for:
  - academic course work
  - outdoor education
  - nature interpretation
  - environmental research
  - appropriate non-mechanized outdoor recreation.
- all research in the TNAs must be approved and recorded by the committee, and one copy of any paper, report or publication resulting from such research must be given to the committee for retention in its archives in the University Archives.
- there shall be no
  - collecting of rocks, soil, plants, animals or artifacts except for research and teaching and only with the permission of the committee.
  - cutting of wood except for vegetation management and trail maintenance authorized by the Committee.
  - hunting in the TNAs, as per City By-law.
  - lighting or fires in the TNAs except with the permission of the committee.
  - camping in the TNAs.
  - motorized vehicles, including snowmobiles, trail bikes, and all-terrain vehicles, in the TNAs except for maintenance authorized by the committee.
  - mountain-biking in the TNAs.
  - dogs shall be kept on a leash at all times, as per City By-law Number 92-115.
  - the environmental manipulation of the TNAs will be minimized, but may include thinning and planting, and will vary from area to area.
  - chemical spraying will be minimized.
  - additional biophysical and ecological information on each Nature Area will be collected whenever possible and retained in the committee archives, in the University Archives.
  - monitoring of biophysical and ecological changes and human impacts will be undertaken.
  - archaeological and historical sites and artifacts will be studied and recorded whenever possible, and protected.

- questions regarding the TNAs and the policy governing them should be addressed to the Chair of the NAC.

This Policy was approved by Senate in December of 1990 and currently applies to all 16 TNAs but has not fully been implemented because the NAC does not have a budget or technical support for advising, promoting, encouraging, designating, identifying or carrying out any management of the TNAs or nature trails. Neither was it clear if policy or recommendations proposed by the NAC to the Senate and the Board of Governors would be acted upon.

Several subcommittees of the NAC were formed in 1990, to cope with the more complex problems additional TNAs posed. This approach resulted in the NAC becoming pro-active by taking several initiatives, including clearing overgrown nature trails, promoting a proposal (Wildlife Sanctuary Committee 1990) for a Trent University Nature Interpretation Centre (TUNIC) and the publication of brochures for the Lady Eaton Drumlin Nature Area and the Promise Rock Nature Area (Heath n.d.)

The NAC, like its predecessor the WSC, suffers from lack of continuity. For example, at the end of the first year of NAC's existence, the first chair of the NAC (who was also one of the longest serving chairs of the WSC), was assigned to another committee. A letter to the Dean appealing this decision (correspondence: R. Jones to Dean D. Morrison, February 27, 1991) resulted in re-assignment of this individual to the NAC. Lack of continuity continues to bedevil the NAC (personal communication of past chairs of WSC and NAC: Professors J. Marsh, T. Hutchinson, T. Mathews and R. Jones).

A proposal for an interpretation centre (TUNIC) in the Holmes property near the parking lot for the WSNA on University Road was submitted to the Senate. The centre would serve to promote public environmental education and nature interpretation. The Committee felt that general interest in these areas was "greater than ever (TUNIC proposal, May, 1990)". However the revenue generating potential of this scheme was not evident, while the cost to convert the Holmes property and create parking space was estimated at \$190,000 (Eric Wilke, University Architect). The then President of Trent University, John Stubbs wrote to R. Jones "as you can appreciate, the primary stumbling block to any major initiative is financial and this has been made extraordinarily difficult by financial parameters announced recently for the next three years" (correspondence: J.C. Stubbs to R. Jones, March 23, 1992).

The NAC continued to be frustrated by the lack of any University funding for the TNAs. In March 1992, following a request for information to the Department of Physical Resources about the income received as a result of leasing lands in TNAs for farming purposes, the NAC was informed that leased agricultural land in the WSNA generated approximately \$2,500 per year (NAC minutes, March 2, 1992). These funds were considered to be part of general revenue for the University, some of which went into the maintenance and repairs in TNAs provided by the Physical Resources Department (NAC minutes, March 11, 1994). The Committee noted that the maintenance provided by the Physical Resources Department was irregular and no details of maintenance carried out were provided. The Committee "felt the lack of budgetary backing is hamstringing the Committee" (NAC minutes, November 4, 1992).

The lack of funds and other difficulties encountered by the NAC were highlighted in the November 4, 1992 minutes. The Committee cited the inadequacy of the budget, the lack of continuity of membership, the limited meeting time of the Committee and the inability of Physical Resources to respond to requests for maintenance because of funding and labour shortages, as part of a "litany of concerns and frustrations" (NAC minutes, November 4, 1992).

The Committee obtained an Environmental Youth Corps grant in 1993 to employ three students during the summer to clear and mark trails. A new sign also was erected in the Wildlife Sanctuary NA parking lot by the Department of Physical Resources. Dr. Doug Sadler, a well known local naturalist and weekly contributor of a nature column in the Peterborough Examiner was endorsed by the Committee as the "University Naturalist" and over the course of the year, he conducted several hikes through the TNAs.

Although not part of its mandate, in 1994 the Committee began to consider fundraising options, such as selling Eastern white cedars for cedar oil extraction and as nursery trees. Selling cedars for profit was not considered economically viable because the income would not or would only just cover the costs of harvesting and transportation of cedars to an extraction plant. It is, however, a possible method for controlling the overabundance of cedars in some TNAs. Some young cedars were sold by the Department of Resources to a landscaping contractor and some revenue was passed on to the NAC.

In 1994, for the first time, the President and members of the Board of Governor's Property Committee, were invited to tour the several of the TNAs. President Conolly visited the Wildlife Sanctuary on July 28th, and the Board of Governors hiked through part of the Sanctuary in October. After some members of the Administration had observed the dangerous nature of the rotting bridge near the WSNAs parking lot it was rebuilt by the Department of Physical Resources. Following these initiatives, there was an increased level of interest shown by the Administration for the maintenance, protection and management of Trent's Nature Areas.

Two open houses were held in 1995 to solicit views from the University community and public on management and use in the TNAs, modeled after the Ontario Ministry of Natural Resources public input strategy. The first open house was held on January 24. A 12-question Information Input Form was circulated both at the meeting and around the campus. Of the 180 respondents, a majority of TNA users were both willing to volunteer work and pay a user fee for use of the areas and close to half of respondents felt that the main management objective of the areas should be nature preservation (Kivari and Shillinglaw, 1995). A second open house, held on March 23, presented these results along with an overview of the management planning process (NAC minutes, March 17, 1995).

In the fall of 1995, the 1994/95 Chair presented to the Senate a comprehensive report detailing the problems faced by the NAC (Appendix E) (Jones 1995). This report had been endorsed by the 1995/96 NAC. The report stressed that "the lack of a long-term vision and an implemented Stewardship Plan has led to an ad hoc approach towards use and management of a large part of this Naturally Spectacular Campus", (the description given to the Symons Campus in the then current University Prospectus). The report to Senate emphasized that despite the importance and value of the TNAs to the University for education, research, nature enjoyment and interpretation, recreation opportunities and promotion, the TNAs were not being dealt with in a manner that reflected responsible stewardship. This lack of a stewardship of the TNAs was due to the lack of a long-term plan for the TNAs. It was stressed that such a Stewardship Plan was sorely needed.

The 1994/95 NAC report also was presented to the Board of Governor's Property Committee and according to Committee meeting minutes, the report was "well received" (NAC minutes, January 24, 1996).

The favourable response by the President and the Board of Governors to the 1994/95 NAC report to Senate probably stemmed from two key approaches by the NAC. First, the Committee had made a concerted effort to raise the profile of the TNAs by special invitations, newspaper articles

(The Peterborough Examiner January 29, 1995, The Trent Fortnightly January 21, 1996) and two Open Houses. The greater profile encouraged discussion within Trent Community, and several strongly worded letters were written by faculty and students to the administration. Second, the 1994/95 report had carefully assessed the consequences of continuing a policy of "benign neglect" and pointed to possible costs to the University's administration of continued lack of stewardship of the TNAs.

On May 15, 1996, President Connolly, in response to Professor Marsh's NAC outline for developing a stewardship plan for TNAs, informed the NAC that "we are supportive of the initiative, and we would like the process to begin as soon as possible" (correspondence, Connolly to Marsh, May 15, 1996). A total of \$13,000 per year for 3 years was authorized for hiring student assistants and for one faculty course release.

Other notable events in 1995 included the creation of a Promise Rock nature trail in the PRNA and a successful application to the Ontario Work Studies Program for student assistance during the 1996 academic year. Proposals to the "Beyond Our Walls" fundraising for the TNAs totaling \$451,000 were submitted by R. Jones and J. Marsh, on behalf of the NAC.

In 1997 a Geographical Information Systems (GIS) initiative was begun to prepare electronic maps of the TNAs for inclusion in the Stewardship Plan and for other purposes, such as academic studies and research, associated with the TNAs. Some GIS maps, for example, were prepared of parts of the Wildlife Sanctuary NA for fieldwork by classes in General Ecology and Plant Ecology. This GIS work has continued each academic year since by the hiring a student qualified in GIS and using funds from the Ontario Work Study Program. Additionally, a second student has also been hired each year to work on trail creation and maintenance, brochure preparation, organizing and promoting faculty and student led interpretive hikes in the TNAs, and running a photography competition.

The parking lot off of University Road in the Wildlife Sanctuary NA was graded and improved in 1997/98.

Also in 1997, Hike Ontario was contacted by R. Jones and Caitlin Clark, a graduate student in the Frost Centre, to arrange for volunteers from the British Trust for Conservation Volunteers (BTCV) to come to Trent University for a conservation holiday to construct boardwalks and undertake nature trail maintenance in the Wildlife Sanctuary NA. The Ontario contact organization for the BTCV, however, changed from Hike Ontario to the Federation of Ontario Naturalists (FON) and the project became part of the FON "Working for Wilderness" program. The Trent project was so successful that in 1999, 2000, and 2001 further Working for Wilderness projects for BTCV volunteers were organized at Trent. Mr. J. Cashmore, who participated in the 1996 "Holiday" was hired (for continuity and experience reasons) as the local organizer, with assistance from R. Jones. To date (March 2002), the FON "Working for Wilderness" projects have accomplished the replacement of three boardwalks and the construction of three new boardwalks in the Wildlife Sanctuary NA, and the creation of a year-round trail from the campus core to the Wildlife Sanctuary NA. In 2000 a looped trail, with benches constructed at scenic lookouts, was created in the Lady Eaton Drumlin NA. This trail ascends the north face of the Lady Eaton Drumlin from the North Parking lot and also from the parking lot behind Lady Eaton College. Access from the LEC parking lot via a safe trail which replaces several, informal, unsafe and difficult paths running directly up the east slope of the drumlin, has allowed for increased use of the Lady Eaton Drumlin NA for fieldwork by undergraduate classes. The 2001 FON "Working for Wilderness" project was canceled by Trent because of the foot and mouth scare. However, Trent was fortunate because FON volunteers and Canada World Youth participants assisted with boardwalk construction, nature trail creation and

maintenance, on a couple of weekends, the three student hired for summer maintenance work in TNAs. A new trail with a boardwalk was created in the Canal NA and another trail, with a boardwalk was added to the looped system in the Wildlife Sanctuary NA. Signs and posts for the nature trails were procured but there was not time to erect them. A number of benches also were erected along nature trails in the Wildlife Sanctuary and Canal TNAs by three students employed with funds donated for during the "Beyond our Walls" fundraising campaign.

An interpretive program has been mounted each year since 1994 using Trent faculty and students as leaders. Occasionally community members, such as Dr. Doug Sadler have led interpretive walks.

An annual photographic competition was initiated in 1997 for the best photographs taken by Trent students in the TNAs. Prizes were donated by Sooters in 1997 and 1998 and then by Quinte photographic from 1999 to 2001. The competition lapsed in 2001/2002.

Several interpretive brochures and trail maps have been published along with the drafting of a guide book to the TNAs.

A most significant event occurred in 1997 when the undergraduate student body voted in a referendum for an annual levy of \$2.00 per student. This would amount to approximately \$7,500 per year for use in promoting and maintaining the TNAs. The petitions (Appendix I) promoting this levy request to the student body of the TC&A stated that:

This small contribution would have a huge impact. We could:

- Hire students in the summer and during the year to maintain hiking and skiing trails, prepare maps and brochures, and lead nature walks
- Create a nature interpretive centre to host school groups and members of the community
- Provide a diverse and accessible site for ongoing research by Trent students and professors
- Ensure beautiful vistas to heighten the senses and straighten crooked nerves"

Passage of the levy resulted in the NAC having access to funds for office expenses, hiring students for office assistance and for management and maintenance work of formal trails in TNAs for the first time. Since 1998, the student body has contributed some \$35, 000 towards TNAs and for the preparation of this Stewardship Plan. Funds have been used for undergraduate student assistance in the summer and during the academic year, financing undergraduate research and for office expenses associated with TNAs. These funds are not sufficient, however, to employ two students each summer. Two students are required because, for safety reasons, individuals must not work alone in any Nature Area at tasks such as maintaining and creating nature trails. Requests to the Administration by the NAC for funds from the Trent operating budget to employ a second summer student assistant have been rebuffed. However, for the first time, the Administration did accede to a request by the NAC for funding and allotted \$5,000 for 2002 summer work in TNAs. Requests by the NAC to the Administration for funds from the University budget to match each year the generosity of levy funds from the student body have been rejected.

A plan for using the TNAs for interpretive purposes was proposed by Carlin Clarke, a graduate student in the Forest Centre Program, in her M.A. thesis (Clarke 1999).

In 1999, as part of the "Beyond our Walls" fundraising campaign, funds totalling \$75,000 (\$25,000 from Home Depot, Canada and \$50,000 from the Canadian Pacific Foundation), were donated to Trent University for use with the TNAs. Proposed uses for the funds included: improving safety for visitors by repairing dilapidated boardwalks, increasing trail signage, clearing and creating nature trails, providing seating benches at viewpoints along nature trails, constructing an interpretation centre, establishing a position of Trent University Naturalist, and maintaining a Nature Areas website. In addition, funds would also be used to promote community use and education in conservation.

In 2001, a \$100,000 Endowment Fund was set up for the TNAs by family and friends of John de Pencier, a former Chair of the Board of Governors.

## 1. CURRENT CONDITIONS OF TNAs

### 1.1 Regional and Local Context

#### 1.1.1 Regional Context

The 790 ha (1460 acre) Symons Campus is situated in the north end of the city of Peterborough in the Kawartha Lakes region of Ontario. In this region is one of the most important geological boundaries in the province – the southern margin of the Precambrian or Canadian Shield. The Shield rocks, north of this boundary, are a significant source of metallic minerals; while south of the boundary, soils derived from limestone rock form are used for agriculture (Adams and Taylor, 1985).

The topography of the region slopes upwards to the north and the climate is isolated from Lake Ontario effects by the Oakridges Moraine to the south (Adams and Taylor, 1985). The key feature of the Kawartha region is the natural freshwater drainage system with its many lakes. The Otonabee River, which bisects the Symons Campus, drains many of these lakes, and along with the Trent Canal are part of the Trent River watershed. Water based recreational activities centred on the numerous lakes and rivers are the basis of the thriving tourist industry in the Kawartha Lakes region.

#### 1.1.2 Local Context

Founding President, T.H.B. Symons, envisioned that “The campus will be an asset to the whole area and not just the university” (Peterborough Examiner, March 5, 1964) and in fact, the TNAs are recognized as an important component of the City of Peterborough’s green space (Natural Areas in Figure 4).

The City of Peterborough, with a population of approximately 70,000 is the “marketing, service and shopping centre for an extensive hinterland, possesses a substantial and varied industrial economy” and is also an important centre for education at all levels, government and health care (Adams and Taylor, 1985). The largest industry in Peterborough and area, however, is the leisure industry, with thousands of visitors spending vacation time here each year (Adams and Taylor, 1985).

In 1996, the City developed a natural areas strategy to protect remaining natural areas in the city. This strategy, “The Peterborough Natural Areas Strategy”, describes the natural areas within the city and makes recommendations regarding protection and linkages between the various natural areas. Trent’s Nature Areas form the largest component (approximately 40%) of the Natural Areas and Corridors within the City limits (Figure 4). Thus, because they represent such a large area of the green space in the city, the TNAs not only will play an increasingly important role in protecting the natural heritage of the Symons Campus and the City of Peterborough, but increasingly will be important in providing space for recreational activities for the University community and for the community at large.

In October 2000, the City Council adopted “Open Space, Parks and Natural Areas Policies for the City of Peterborough” and incorporated them into the “Official Plan of the City of Peterborough, 1982, as amended October 2000”. The Official Plan includes a schedule of land-use within the City (Figure 5). The permitted land uses designated for the Symons Campus are Major Institutional and Major Open Space, however, none of the TNAs was designated as Protected Natural Areas. Under the “Open Space, Parks and Natural Areas Policies for the City of





Figure 4. Natural Areas and Flood Plain in the City of Peterborough, Ontario.



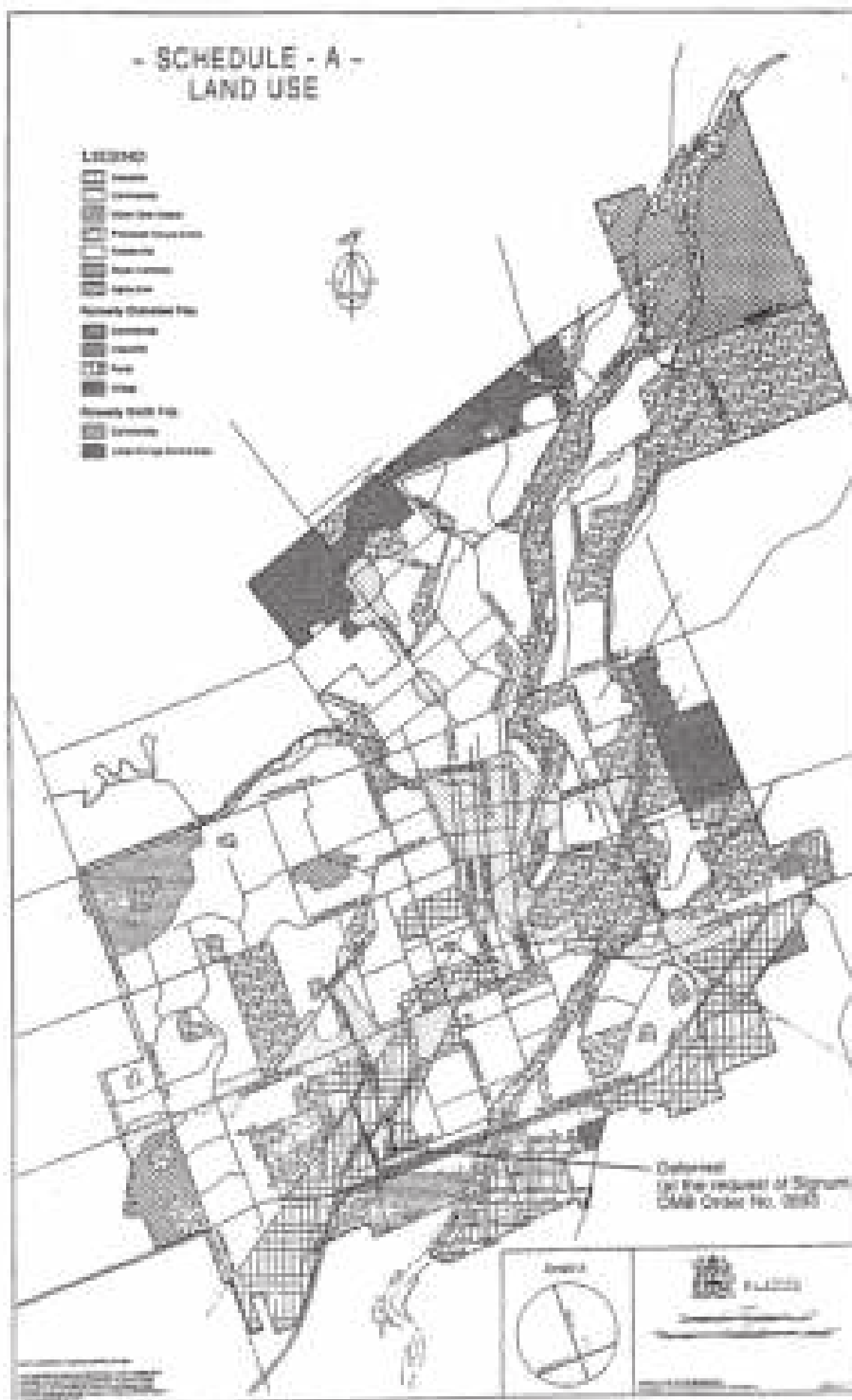


Figure 5. Land Use in the City of Peterborough, Ontario.



Peterborough” zoning criteria of permitted uses are described for the protection of public lands in the city, including TNAs. The highest degree of protection, OS1 (see Appendix F for a description of Permitted Uses and Regulations) applies to the Wildlife Sanctuary NA, the Canal NA (Figure 6), the South Drumlin NA (Figure 7) and the Highway 28 Woods NA (Figure 8). Part of the Lady Eaton Drumlin NA is zoned OS2 (Figure 9) and the remaining TNAs are zoned UC (Table 3).

| Table 3. Zoning by the City of Peterborough for Permitted Uses of the Nature Areas on the Symora Campus, Trent University, Peterborough, Ontario |                                                      |                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------|
| NATURE AREA (NA)                                                                                                                                 | CITY OF PETERBOROUGH USE DESIGNATIONS FOR PUBLIC USE | PROTECTED FROM DEVELOPMENT |
| Wildlife Sanctuary NA                                                                                                                            | Part OS1, part OS2 and part UC                       | Part yes, part not         |
| Canal NA                                                                                                                                         | OS1                                                  | Yes                        |
| South Drumlin NA                                                                                                                                 | OS1                                                  | Yes                        |
| Lady Eaton Drumlin NA                                                                                                                            | Part OS2 and part UC                                 | Part yes, part not         |
| Highway 28 Woods NA                                                                                                                              | OS1                                                  | Yes                        |
| Total Line Farm NA                                                                                                                               | UC                                                   | No                         |
| Lock 22 NA                                                                                                                                       | UC                                                   | No                         |
| North Line NA                                                                                                                                    | UC                                                   | No                         |
| Princess Rock NA                                                                                                                                 | UC                                                   | No                         |
| Wetland Complex NA                                                                                                                               | UC                                                   | No                         |
| Archaeology Centre Wetland NA                                                                                                                    | UC                                                   | No                         |
| Chenaboe College Wetland NA                                                                                                                      | UC                                                   | No                         |

The University did not seek the opinion of, or recommendations from, the NAC during the zoning process for permitted uses for TNAs that was undertaken by the City, despite the mandate assigned to the NAC by the University Senate and the Board of Governors (Part A, Section 2.3.3).

The location of the TNAs within the city boundaries suggests, that with some appropriate facilities, such as improved parking, an Environmental/ Nature Interpretation Centre and an arboretum (see Part B, Section 3.5), the TNAs could become an important asset for natural heritage studies and research and for outdoor and environmental educational use by area and local schools. Some limited use already is made of the Wildlife Sanctuary NA by some school classes, though few details are available since the University does not attempt to keep records of Nature Area use and schools do not necessarily inform the University of such use.





Figure 6. Permitted Open Space Land Use in the City of Peterborough, Ontario, Nov. 2000, for the Wildlife Sanctuary (WSNA) and Canal (CNA) Nature Areas.











Figure 8. Permitted Open Space Land Use in the City of Peterborough, Ontario, Nov. 2000, for the Highway 28 Woods (H28WNA) and the Total Loss Farm (TLFNA) Nature Areas.

commenced in Summer 2003. In many TNAs, informal trails have caused vegetation destruction and soil erosion, such as the many unseal trails ascending the east and south slopes of the LLENA and the trails on the SDNA.

As a result of international and conservation volunteers working in TNAs since 1998, many hand tools for constructing boardwalks and bridges, clearing and maintaining trails have been donated and purchased. In 2001, a large garden tractor, with a mowing attachment and a trailer, was purchased with funds from the "Beyond our Walls" fundraising campaign. Temporarily, tools are stored in an unused trailer located in the grounds of the Physical Resources grounds equipment shed, while the tractor and trailer, and wheel barrows are stored in the shed. However, a permanent storage facility is required for the Nature Area tools and equipment.

For administrative purposes the NAC has temporary office space in the Trails Studies Unit in the Environmental Sciences Building. In this office the NAC has a computer and printer, half of the cost for which was donated by Peterborough Computers with the remainder coming from funds donated to the TNAs. Software for GIS purposes and for the preparing Plan was donated by ESRI Canada. An used office desk was donated. A digital camera, for recording purposes, was acquired in 2001. The NAC sorely needs permanent office space assigned to it by the University.

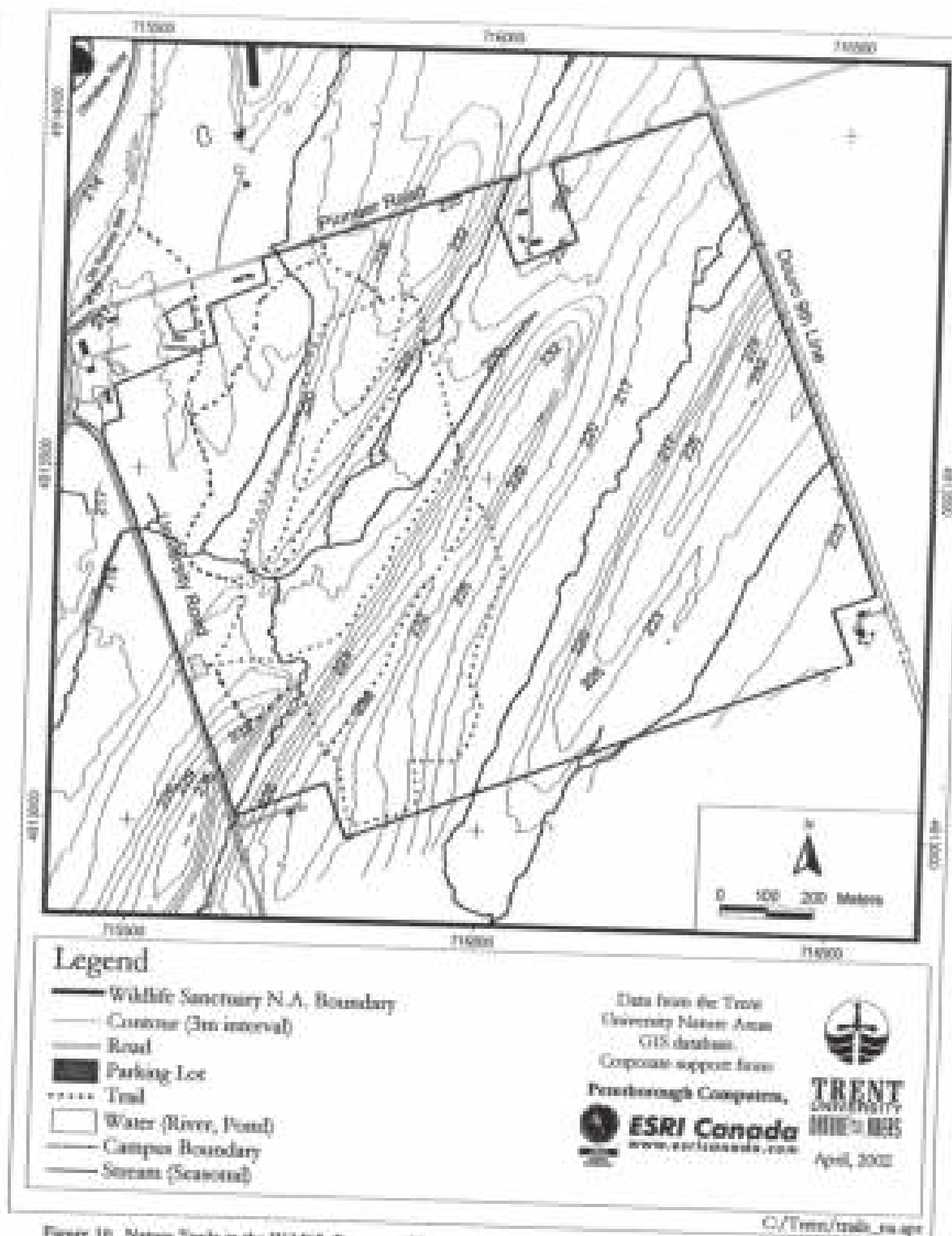


Figure 10. Nature Trails in the Wildlife Sanctuary Nature Area, Symons Campus, Trent University, Peterborough, Ontario.



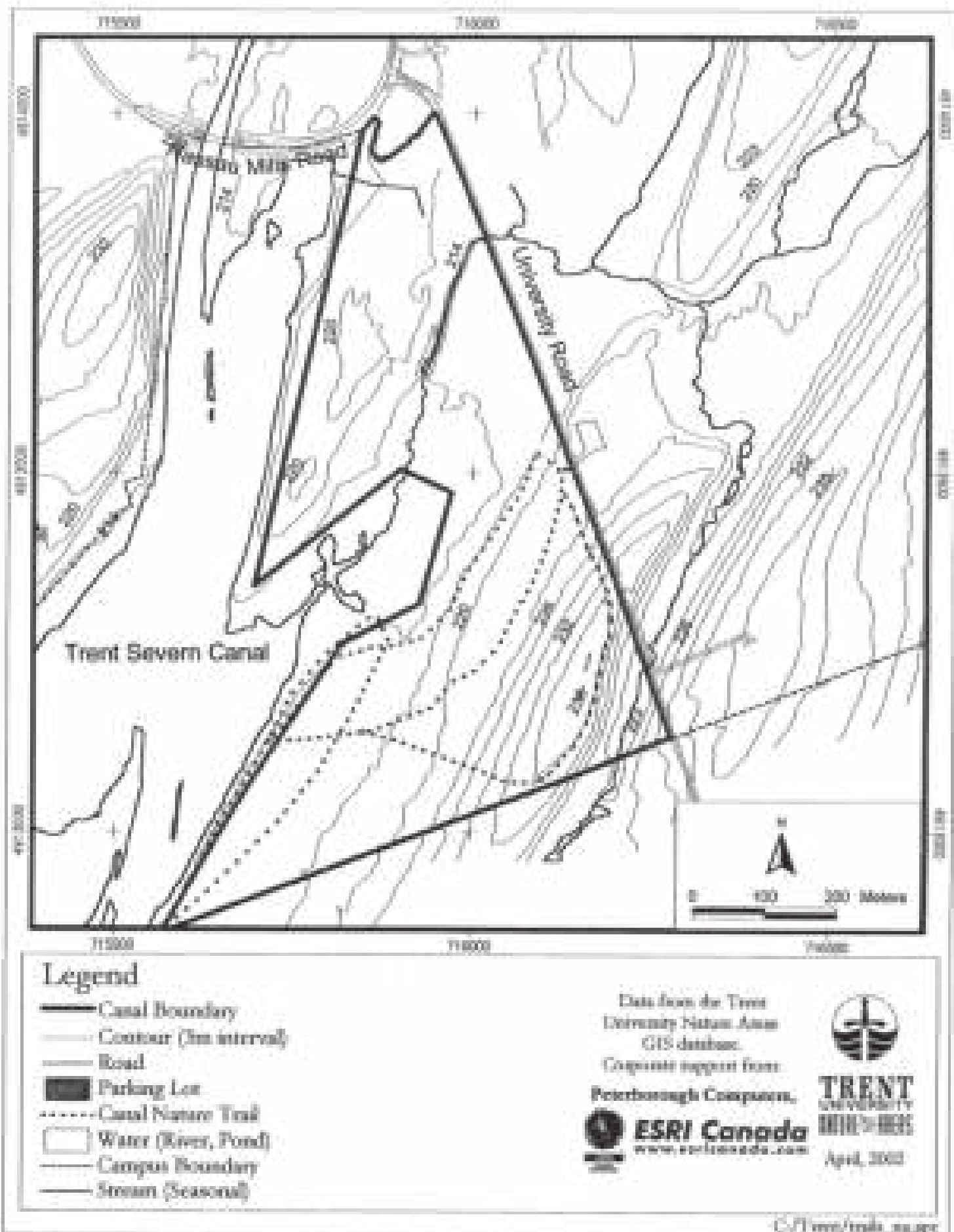


Figure 13. Nature Trails in the Canal Nature Area, Symons Campus, Trent University, Peterborough, Ontario.





### 3.3 Uses of TNAs

#### 3.3.1 Education

Almost 20 undergraduate courses, at all year levels, in Biology, Environmental & Resource Sciences and Geography use the TNAs for field work. During the past 5 years, for example, the number of students enrolled each academic year in undergraduate courses using TNAs ranged between 792 and 1066 (Table 4) and the average number of student enrolled per year in courses using the TNAs was 974. In some courses, students use TNAs on several different occasions. These data do not include summer school courses. The TNAs used most frequently for teaching purposes are the WSNA, LEDNA and PENNA.

| Table 4. Enrollment in Courses Using Nature Areas on the Symes Campus, Trent University, Peterborough, Ontario |            |      |           |                  |
|----------------------------------------------------------------------------------------------------------------|------------|------|-----------|------------------|
| Academic Year                                                                                                  | Department |      |           | Total enrollment |
|                                                                                                                | Biology    | ERS  | Geography |                  |
| 2001/02                                                                                                        | 444        | 245  | 100       | 789              |
| 2000/01                                                                                                        | 682        | 248  | 94        | 1024             |
| 1999/00                                                                                                        | 620        | 264  | 106       | 990              |
| 1998/99                                                                                                        | 567        | 251  | 168       | 986              |
| 1997/98                                                                                                        | 649        | 297  | 120       | 1066             |
| Totals                                                                                                         | 2972       | 1305 | 591       | 4868             |

Other non-University organizations, such as junior, intermediate and senior school classes have used the WSNA for outdoor education purposes over the years. Orienteering clubs, and survival courses, have also used the WSNA.

Fleming College has used the WSNA for non-credit courses.

#### 3.3.2 Research

Many research studies have been conducted by faculty, graduate students and undergraduate student in TNAs. These have included studies of Nature Area soils, amphibians, insects, fungi, birds, and plants. There have also been several recreational and user surveys. Titles of publications and reports are included in Appendix H.

#### 3.3.3 Interpretation

The first recorded interpretive use of a Nature Area was the 1973 preparation of an orienteering map and guide for a course in the WSNA (Ashley, 1978). This was followed in 1977 by a guide to trees and shrubs in this Nature Area and the placing of identification plaques on some trees (Ashley, 1978). An interpretation plan was prepared by Ashley in 1978. In the intervening years, some of the recommendations made by Ashley have been implemented, though not necessarily in reference to her plan. Some other interpretive initiatives have included interpretive pamphlets for the LEDNA and the PENNA, a WSNA, a trail guide focusing on six of the TNAs, a series of

topic specific brochures relating to wildlife and vegetation in the TNAs and the inclusion of some of TNAs in a new trail guide to Peterborough County (Brown et al.) and a pamphlet on poison ivy (Mohammed n.d).

Many community and university guided walks, particularly during the academic session, have been held over the years. An extensive interpretation plan was developed by Colin Clarke in 1996 as part of her thesis requirement for an MA in the Frost Centre (Clarke 1999).

Non-university organizations, such as the Peterborough Field Naturalists (PFN), have held interpretive walks in the WSNA, the LEONA and PRNA for their members and for the general public. Many bird observing hikes and winter bird counts have been held in TNAs. Winter twig identification workshops using TNAs have been conducted by the PFN. Nature interpretive walks, including downy woodpecker expeditions, were organized in TNAs for participants at the annual meetings of the Federation of Ontario Naturalists held at Trent in 1987 and 1995.

### 3.3.4 Recreation

TNAs are used for a variety of recreational purposes by the Trent University community and by the members of the Peterborough and area community. Recreational activities, usually involve use of the nature trail systems in the Wildlife Sanctuary NA (Figure 10), the Promise Rock NA (Figure 11), the Lady Eaton Drumlin NA (Figure 12), and the Canal NA (Figure 13). Activities include walking, hiking, jogging, orienteering, cross-country skiing, snow shoeing, tobogganing, bird-watching, nature appreciation and photography. Based on limited visitor surveys, it is estimated that there are between 10,000 to 15,000 day uses per year of the WSNA, alone, with the majority of users being members of the public. The Conference Centre informs conference participants that Trent has nature trails that can be visited.

### 3.3.5 Agriculture and Forestry

Several parcels of land in the eastern half of the Wildlife Sanctuary NA and all of the North Line NA are leased by farmers and remain under cultivation or are grazed. The income from these leases goes into the general revenues of the University.

There are conifer plantations, mainly red pine, in the LEONA (Figure 4-2, pg. 253) and TLFNA (Figure 6-2, pg. 267) which have not been managed since Trent acquired them. These plantations are in need of management attention for optimal growth if they are to be used for lumber in the TNAs.

The volunteer (not planted) Eastern white cedar stands, established in many abandoned fields since Trent acquired the land, have not been managed and have no significant economic value. Some Eastern white cedar saplings from the CNA and WSNA were sold to a landscaping company in the mid-1990s and cedar boughs for making wreaths have been sold in recent years.

### 3.3.6 Adjacent Lands and Landuse

Adjacent lands and land-use bordering the TNAs are summarized in Table 5.

## 3.4 General Management Issues

The lack of a consistent planning and management strategy for TNAs has meant that pressing issues such as loss of open field habitat, encroachment by exotic and invasive species, trail erosion, and conflicting uses of the areas, lack of and loss of information for management and use, have been largely ignored or dealt with on an ad-hoc basis.

Table 5. Lands and Land-use Bordering the Nature Areas on the Symons Campus, Trent University, Peterborough, Ontario

| Nature Area (NA)              | Size of Nature Area (ha) | Adjacent lands and land-use |              |                                |                     |                     |                      |                 |
|-------------------------------|--------------------------|-----------------------------|--------------|--------------------------------|---------------------|---------------------|----------------------|-----------------|
|                               |                          | Urban                       | Agricultural | Donation River or Trent Canal* | Another Nature Area | Central campus core | Botany Gateway Trail | Road or highway |
| Wildlife Sanctuary NA         | 164                      |                             | x            |                                | x                   |                     |                      | x               |
| Canal NA                      | 37                       |                             | x            | x                              | x                   |                     |                      | x               |
| South Draculin NA             | 14                       | x                           |              | x                              | x                   |                     | x                    | x               |
| Lady Bacon Draculin NA        | 31                       |                             |              |                                | x                   | x                   |                      | x               |
| Highway 28 Woods NA           | 4                        | x                           |              |                                | x                   |                     |                      | x               |
| Total Loss Farm NA            | 10                       |                             | x            |                                | x                   |                     |                      | x               |
| Lock 22 NA                    | 21                       | x                           | x            | x                              | x                   | x                   |                      | x               |
| Ninth Line NA                 | 8                        |                             | x            | x                              |                     |                     | x                    | x               |
| Promise Rock NA               | 9                        |                             | x            |                                | x                   |                     | x                    |                 |
| Wetland Complex NA            | 11                       |                             | x            |                                | x                   | x                   | x                    |                 |
| Archaeology Campus Wetland NA | 5                        |                             |              |                                |                     | x                   |                      | x               |
| Donation College Wetland NA   | 8                        |                             | x            |                                | x                   |                     |                      | x               |

\*Trent Severn Waterway Lands

### 3.4.1 Ecological

#### i. Preservation of Ecological Character

The ecological character of much of the land outside the central core of the Symons Campus, with the exception of farmed areas, is in a state of flux as secondary succession proceeds on abandoned farm fields. Secondary succession leads, not only to changes in plant species composition and abundance, but also to associated change in animal species composition and abundance. In the absence of a management plan for the Symons Campus, there has not been a program or effort to study and document the progress of secondary succession and possible loss of biodiversity in TNAs. The result of shrub and tree establishment in abandoned fields is that the amount of open grassland habitat in TNAs is in rapid decline. Loss of these open habitats will have an increasingly negative effect on bird and small mammal populations characteristic of such habitats. In other words, in the absence of a Stewardship Plan, "benign neglect", by default, has been University policy and has allowed so-called 'nature' to take its course in many TNAs and on Endowment Lands. This particular successional process, of so-called "nature" cannot be described as pristine nature "taking over" but, rather, it is a successional process primarily influenced by human activity. For example, the species of trees invading many abandoned fields are determined, to a large extent, by the supply of seeds from trees growing along fence lines, many of which were planted there by farmers and landowners. Many non-native species of plants,

introduced by European settlers when they cleared the forest for agricultural purposes, are involved in the successional processes on the Symons Campus.

## II. Exotic Species

Many species of plants listed in the flora of Ontario are not indigenous, but were brought from Europe and Asia and have become naturalized here. While these species can be considered exotic, they are generally accepted as being part of the biological landscape.

Some exotic plant species are aggressive invaders and out-compete native species. A good example of an aggressive invader in many habitats, ranging from dry calcareous till soils to seasonally flooded wetlands, on the Symons Campus is European buckthorn (*Rhamnus cathartica*). This species has invaded the general Peterborough area during the past 25 years. It is also a problem in many other areas of southern Ontario and eastern North America. Seeds from the purple fruits of this noxious shrub are dispersed in bird droppings and by small mammals. Seedlings grow to become tall shrubs or a small tree, often with several stems that can reach heights of 5 to 6 m. It has dense branches, armoured with thorns, rendering, in many instances, the edges of woodlots difficult to penetrate. When present in dense stands, European buckthorn shades out native tree seedlings and shrubs. It also invades abandoned fields, fence lines and land beneath hydro lines. Buckthorn becomes particularly pernicious beneath isolated 'perch' trees frequented by birds that have fed on buckthorn berries. Buckthorn forms a significant component of the understory of woodlot edges unless it becomes shaded out by the developing tree canopy. Within woodlots, buckthorn only seems to thrive where sufficient light penetrates the canopy, as for example through gaps left when trees die or fall.

Other undesirable exotic plant species in TNAs which can displace native species include Norway maple (*Acer platanoides*) and Scots pine (*Pinus sylvestris*). Lilac (*Syringa vulgaris*), a cultivated shrub, can spread and create dense stands that out-compete native species. This has happened around abandoned habitations in the WSNAs.

It is also possible that exotic insect pests with cyclical populations, such as the gypsy moth, may eventually pose a threat to TNAs. The last concern to note is the release of trapped animals, such as grey squirrels, in the Wildlife Sanctuary NA parking lot which may affect indigenous squirrel populations.

## III. Invasive Native Species

One native species, Eastern white cedar, which is a major component in the secondary succession in some TNAs, is highly invasive, particularly in upland abandoned fields in the WSNAs and CNA. It has established in such high densities that other indigenous species cannot establish or thrive (see Section 3.1.2). White cedars also are a nuisance where they constrict formal trails or obscure magnificent vistas.

Another native potentially invasive tree species is the black locust (*Robinia pseudoacacia*), which has become locally abundant in some TNAs, probably having been originally planted around habitations. Sumach (*Rhus typhina*), can also spread and cover significant areas, as near the parking lot in the WSNAs and the LIDNA.

## IV. Nuisance Species – Plants

Nuisance species are those species which interfere with recreational activities, such as poison ivy (*Rhus radicans*). All parts of the poison ivy plant produce an irritating oil which can cause severe

skin blisters and/or rashes in humans. In serious cases, hospitalization may be necessary. Dense stands of poison ivy are present along sections of trails in the CNA, WSNA, LEDNA, and PRNA. When poison ivy exists away from trails it is not considered a nuisance species because poison ivy is a natural component of the vegetation of this region.

#### v. Nuisance Species – Animals

These include animals such as trapped grey squirrels and skunks released into TNAs, primarily in the WSNA parking lot on University Road, and abandoned domestic and wild animals.

### 3.4.2 Human Uses

#### i. Inappropriate Recreational Activities

For a variety of reasons, a number of inappropriate recreation activities have occurred, or are occurring, in some TNAs. Activities are deemed inappropriate when they detrimentally impact the environment or human uses of the area and are inconsistent with the preservation of nature and objectives for human uses and experiences. Some reasons for inappropriate activities in TNAs include: lack of clear policy on appropriate uses, lack of public awareness of appropriate uses, lack of control of inappropriate uses and a tradition of certain inappropriate uses. Inappropriate recreational uses include: hunting which can cause a loss of birds/mammals, noise, threat to public safety; snowmobiling which is noisy and can damage vegetation, possibly disrupting wildlife and causing snow compaction on trails which may affect survival of vegetation; motor bike riding which causes noise and trail erosion; mountain bike riding which causes trail erosion and disruption of other recreationists; plant collecting; camping which often involves cutting of vegetation and lighting of fires that may accidentally get out of control; sexual activity of some people which degrades the recreational experience of others, creates a health hazard and discourages use of TNAs.

Dogs are a nuisance in TNAs when they run free and interfere with wildlife and recreation. In the absence of a Stewardship Plan, dogs are being walked and allowed to run free in the WSNA and in other TNAs, despite the Peterborough City By-law 91-115, reference to which is prominently displayed in the WSNA parking lot, stating that dogs must be leashed and their faeces be picked up. However, this notice is generally ignored or dogs are un-leashed once the owner is out of sight of the parking lot. Large, running dogs and barking dogs can be intimidating to trail users, particularly for individuals and families with small children. Another irritation to trail users is the frequent occurrence of dog faeces on trails and around the parking lot. In addition to being malodorous and interfering with walking or skiing, dog faeces are a potential health hazard.

Also, dogs can interfere with wildlife, and nesting birds. In addition to disturbing the animals, the presence of dogs can affect viewing opportunities of wildlife for other users. The Wildlife Sanctuary NA, in fact, originally was intended to be a wildlife preserve and, to this end, in the mid-1970s, donated funds were used to construct a chain link fence along the north and west boundaries to keep out stray dogs. Lack of funds apparently precluded completion of the fence along the eastern and southern boundaries.

#### ii. Agricultural Impacts

Farming practices on and adjacent to designated TNAs have concerned members of the NAC (NAC minutes, December 16, 1993). Fields cropped with corn are usually treated with herbicides to control weeds and pesticides. It is not known if some of these herbicides and pesticides get carried into adjacent wetland areas.

### iii. Education and Research Impacts

Since the monitoring of use of TNAs has never been undertaken, it is not known if or how any of the TNAs have been impacted by class or research use, especially when the same sites are used year after year. In some fields in the CNA and WNA, soil pits dug for teaching purposes have not been infilled. Such pits become obscured by vegetation growth and can pose a hazard to walkers.

### iv. Impacts of Existing and Proposed Uses of Adjacent Lands

The NAC should be consulted and any NAC environmental concerns be addressed before any development on University lands adjacent to any TNAs. Consultation with the NAC of proposed uses of adjacent University land must be more than just informing the Committee that a development is proposed.

### v. User Conflicts

Conflicting interests are an inevitable consequence of multi-use activities in TNAs, and are evident, to a greater or lesser degree, in most dry-land TNAs. Conflicts between dog walkers, whether dogs are leashed or unleashed, with other users is discussed above. Also mentioned above is the conflict between mountain bikers and other users. In winter there is a conflict between walkers and cross country skiers using the same formal trails, and the nuisance, to skiers and walkers alike, of dog faeces on trails.

### 3.4.3 User Safety Issues

Ensuring the safety of all academic and non-academic users and of visitors in TNAs is part of the stewardship of TNAs. The TNAs are likely to receive increasing academic use and visits as the student population at Trent expands, as the Colleges become concentrated in the campus core and as new buildings are constructed. Other developments likely to lead to increased use of TNAs include the recent upgrading of formal trails in the WNA, the creation of formal trails in the Canal NA, the Lady Eaton Drumlins NA and the Promise Rock NA. The eventual completion of the Rotary Greenway Trail through the campus and the incorporation of TNAs into the City of Peterborough's green space and possible increased use by school classes will all lead to an increase in public use of TNAs.

#### 1. Condition of Trails and Boardwalks

The parking lot, maintained by the Department of Physical Resources, in the WNA, off University Road, with its large informative sign, invites public use of this Nature Area and the Canal NA across the road. With such public and University usage comes an expectation that formal trails and associated structures will be maintained in a safe condition. However, the patrolling of formal nature trails on a regular, or even irregular basis, to identify short-term or long-term safety issues that may affect users and visitors is not happening.

Many of the formal nature trails in TNAs, exhibit signs of soil erosion or advanced deterioration and require attention. The most serious problems occur in the LEDNA and WNA. Soil erosion, for example, is so severe on the east, north and south slopes of the Lady Eaton drumlin that the trails on them are dangerous for academic users, research users, recreational users and for visitors. Remedial action has not been taken to curb the erosion of these slopes. In fact, at the south end of the drumlin, a new informal, unsafe, trail, just to the north of the severely eroded trail that ascends this end of the drumlin, runs straight up the drumlin slope. The vegetation on this trail

has been killed, the soil is exposed to water erosion, and is being carried downslope. Already this trail is creating an eye-sore and will become very seriously eroded in the next few years unless an alternative, environmentally friendly, trail is created for ascending the south end of the Lady Eaton drumlin.

Due to lack of trail maintenance, vegetation along many sections of the trails in the WENA had grown to become almost impassable by the early 1990s. Clearing vegetation from many trails occurred in summer 1993, along with the replacement of some faded trail markers and signs. There remain, however, along the trails white cedar stumps from saplings cut down in 1993 that are hazardous and should be removed.

By the mid-1990s, boardwalks along trails in the WENA, because of lack of maintenance and repair, had deteriorated to such an extent that they posed a serious hazard for academic, research and recreational users and visitors. The timbers of the major bridge near the University Road parking lot, over which all trails were routed, had rotted and were very dangerous to cross. It was only after a visit in 1994 by some members of the Board of Governors, President Conolly and Vice-President Sullivan that this bridge was replaced, with the work being undertaken by the Department of Physical Resources. Meanwhile, the rotted boardwalks, despite persistent complaints by individuals and the NAC, did not receive attention until summer 1998. At this time, two of them were replaced as part of the Federation of Ontario Naturalists (FON) "Working for Wilderness" conservation program. The participants in this program were international volunteers (British Trust for Conservation Volunteers BTCV), volunteers from the Federation of Ontario Naturalists (FON), Peterborough Field Naturalists (PFN), Trent and the community. Department of Physical Resources personnel provided invaluable assistance for this project.

In 1999, as part of another international "Working for Wilderness" project, a connection from the central campus core was made for the year-round academic, research and recreational use of the formal nature trail system in the WENA. This connection was achieved by constructing a bridge across a seasonally flooded silver maple (*Acer saccharinum*) wetland in the WENA and creating a formal trail from Pioneer Road by the ball-diamond to the new boardwalk. The part of the trail through the silver maple wetland to the bridge site was cleared by five 16-year old female volunteers from Quebec, in Peterborough on a conservation exchange, and by local volunteers with the assistance of Mr. D. Payne, Department of Physical Resources. The Quebec volunteers also helped move tons of stones from a fence-line to the building site for subsequent inclusion in cribs supporting the boardwalk.

In August 2000, another international "Working for Wilderness" project created a formal, looped trail through the deciduous forest of the LEENA and along the drumlin summit. A new trail up the north slope of the Lady Eaton Drumlin (Figure 12, pg. 79) from the North parking lot to connect with the looped trail also was created to replace the eroding, informal trails on this slope. Benches were constructed along the drumlin summit at viewpoints looking east and north over the Otonabee River. A side trail, beginning at the Lady Eaton College parking lot, for ascending the east slope by academic, research and recreational users accessing the forest and looped trail on the drumlin summit, was identified and partially cleared but was not completed (Figure 12). This trail, to replace several very steep, eroding, unsafe, informal trails ascending the east slope of the drumlin, should be completed and signed. The informal trails scar the east slope and are an eye-sore in the magnificent backdrop behind Lady Eaton College.

The 2001 international "Working for Wilderness" project was cancelled because of the foot and mouth scare. Never-the-less, 3 students employed during the summer accomplished the construction and extension of several boardwalks and placed benches at viewpoints in the WENA and CNA. FON and Canada International Youth volunteers also assisted the 3 summer students

with boardwalk construction and trail maintenance. A large number of trail signs and posts to be placed along formal trails were purchased but lack of time precluded their installation in 2001. Posts and signs should be installed in summer 2002.

In the WSNA a set of steps on a dramatic slope near the blue and yellow trail halfway point, needs attention as these steps ice-over in winter and are a potentially serious hazard to skiers and walkers. The steps should be repaired, drainage improved or an alternate route created.

A formal nature trail (Figure 13, pg.82) was created in the Promise Rock NA in 1994 and connected to the Rail Trail, now named the Rotary Greenway Trail. However, there is a serious poison ivy problem that needs addressing along a major section of the trail passing through the white pine stand and in the immediate area around the Promise Rock.

## **ii. Fire Hazard**

A potential fire hazard exists in many TNAs when spring and summer conditions are particularly dry, and where major sources of fuel exist in the form of deadfall, grass and other flammable materials. Fires can be ignited by lightning strikes or by human carelessness. Many cigarette butts may be observed along formal, and informal, trails and where benches have been installed. The areas of greatest concern at present are the WSNA and CNA because of their extensive, much used, formal trail system and fields covered with much dead grass and herbaceous litter. Fire pits, too, are relatively common in TNAs.

The lack of a plan to fight a wildfire in any TNAs and the lack of maps and signs identifying routes to reach potential fire sites is of concern and must be addressed. Many potential emergency routes into and within TNAs are not open for rapid access as they are blocked by ditches, overgrown vegetation or fallen trees.

### **3.4.4 Institutional Responsibility for TNAs**

While the University Charter specifies that the Board of Governors has ultimate responsibility for all the University lands, day-to-day responsibility is presumably part of the mandate of the Department of Physical Resources. However, in the absence of a campus master plan, there has always been confusion about responsibility for the overview and maintenance of lands outside of the central campus core. This confusion may have arisen because of budgetary restraint, the Department of Physical Resources insisting, for decades, that it did not have the budgetary means or the personnel available to carry out these responsibilities. Consequently, there has never been a clear indication of who has "hands-on" responsibility for these lands and TNAs in particular, coupled with a lack of institutional interest and concern, despite their importance to the teaching and research programs in Biology, Environmental and Resource Science / Studies and Geography at Trent. The lack of institutional interest and responsibility for the TNAs was characterised as "design neglect" in the NAC Report to Senate in 1995 (Appendix E).

The mandate set for the NAC in 1989, as an advisory committee to the Senate and Board of Governors, does not include actual hands-on-management responsibilities. Even if the NAC had been expected to have some management responsibility, it was not provided with funding or manpower resources to undertake management/maintenance responsibilities. The Committee did not have funds or resources to obtain professional advice to determine whether or not the natural heritage characteristics or functions of TNAs were in decline. The NAC does not know if any TNAs are under threat from over-use by the academic, research and recreational uses. The NAC works essentially in an information void about the TNAs and to rectify this undesirable situation is one of the reasons for preparing this Plan.



## I. Ground Management

As mentioned earlier, the lack of a Stewardship Plan for the TNAs, has resulted in very little management of, or knowledge about environmental and natural heritage conditions in TNAs. Budgetary reductions and restraint, which began in the early 1970s, with concomitant reduction in personnel numbers, have, according to past Directors of this Department, never allowed Physical Resources personnel the necessary time to undertake active responsibility for TNAs. Such actions that have undertaken by the Department of Physical Resources in the TNAs, have usually been reactive and related to safety and liability concerns. For example, action was taken in the past when users reported hazardous limbs and dead trees adjacent to formal trails. However, in the absence of trail maintenance in the 1980s and early 1990s, concerned members of the public often removed fallen limbs from trails, cut back impeding branches, replaced cedar logs on dilapidated boardwalks and picked up garbage on trails and from the parking lot in the WSNA. While acts such as this by members of the public are commendable, they do not eliminate the need for a regular schedule of trail condition and safety assessments, maintenance and repair. Following some trail clearing and widening in 1993 the Department has mowed some trails. The Department of Physical Resources manages the University Road parking lot that serves the WSNA. This includes garbage removal, daily opening and closing of the parking-lot gate and snow ploughing.

Management activity instigated by the NAC in TNAs, has been sporadic and has been mainly concerned with formal walking trails in the WSNA, and, more recently, with the trails in the CNA, the LEDNA and the PRNA. The maintenance and improvement of these trails depended, mainly on the initiative of individual NAC faculty members willing to submit proposals to government agencies for funding summer assistants, and then to supervise the work of the assistants. In 1993, for example, three students were employed with funds from the Ontario Youth Corps to clear brush and saplings from trails in the WSNA so that trails would be wide enough for mechanical mowing by the Department of Physical Resources. In recent years, the NAC has used funds for hiring summer assistants from a student levy fund and from development funding raised in the "Beyond our Walls" campaign for trail creation and maintenance. In 2002, a lawn tractor mower and a trailer were acquired by the NAC with development funds for trail maintenance and creation.

From a ground management perspective, there is no one with the responsibility to visit the TNAs, even once a year, to assess and make a report on their condition. There have been killed for firewood in Nature Areas without permission. Trails have been created by motorized vehicles in some TNAs. Tree limbs and even wooden pallets have been thrown in streams for motorized vehicles to cross.

## II. Funds for Management

Neither the NAC nor its predecessor, the WSC, received budgetary or professional support from the University. The only funding available to these committees was from a small Trust Fund, now depleted and overspent.

The University receives income from agricultural land that forms part of the Wildlife Sanctuary NA and the Ninth Line NA but the proceeds go to general University revenues. The Department of Physical Resources acceded to requests by the NAC for \$3,000 per year for the years 1998 to 2000, inclusive, to cover the costs of accommodation and local travel of volunteers of external organizations undertaking international conservation "Working Holidays" to improve the nature trails in TNAs. The Department also provided invaluable in-kind assistance which greatly enhanced the accomplishments of the volunteers participating in the "Working Holidays" proj-

ects. The Department of Physical Resources, however, refused to provide funds for international conservation projects after the year 2000, although some in-kind assistance would be available.

The financing that has occurred for the ongoing management of TNAs, essentially trail maintenance and dealing with some safety issues, has been sporadic and has been mainly from government summer "make-work" programs for high school and university students. Applications for such funds and subsequent supervision of hired students have depended on the initiative of the respective NAC Chair or individual faculty members on the NAC. However, in the absence of a Stewardship Plan or of an individual with responsibility for the TNAs, government funding for summer student assistance for TNAs maintenance and management has not been effectively tapped.

For the past 6 years, two students have been hired during the period September to April of the following year with funds from the Ontario Works Study Program (OWSP) to work for the NAC on tasks such as trail creation and management, interpretive programs, organizing a photography competition, GIS mapping, brochure preparation, and office work. The funds required from the employer for these students came from the Trust account, resulting in an increasing deficit and some funds have come from the student levy.

The NAC has raised funds for the TNAs, even though raising funds is not in the terms of reference for the Committee. For example, the Chair of the NAC in 1994/95 initiated the sale of TNA products such as hats, mugs and shirts. Sales of these items have been organized on a sporadic basis but, if sales were organized on an ongoing basis, they could provide an income of up to \$1,000 per year for the TNAs.

The most positive initiative for annual funding for TNAs occurred in spring 1997 when, as a result of the initiative and enthusiasm for TNAs of several committed students, the Trent Central Student Association passed a referendum proposal (Appendix I) for an annual levy of \$2.00 per student to be used for TNAs. The funds were for such uses as hiring students to assist with management and maintenance of the TNAs, for student research in TNAs, for NAC office activities, and for the creation of an interpretive centre. For 1997/98, and subsequent years, the levy has amounted to approximately \$7,500.00 annually. The NAC, however, does not consider the student levy to be an legitimate alternative to the allocation of ongoing operating funds from the University budget for annual maintenance and management of TNAs. A request by the NAC for the University to at least match each year the generous gesture of levy income from its students was rejected until the year 2002 when \$5,000 was budgeted to assist with the summer work planned in the TNAs. The NAC believes that the Development Office should be actively seeking donations to match the levy funds received from the student body for TNAs.

Funds from the sale of Eastern white cedar seedlings and boughs for wreaths were transferred to the NAC Trust account by the Department of Physical Resources in the mid 1990s and in recent years.

A donations box on a metal post was erected in the Wildlife Sanctuary NA parking lot in December 1999. By the end of 2001, about \$200.00 had been collected.

Capital financing and gifts in kind for use during the international conservation "Working Holidays" in TNAs were solicited on behalf of the NAC during the period 1988 to 2000. These funds helped to finance construction of boardwalks and bridges by volunteers, and to purchase tools. Contributors included:

- Mountain Equipment CO-OP (\$5,800)
- Canada Trust Friends of the Environment, local chapter (\$4,000)
- Canadian Tire Corporation Store, Peterborough (tools to the value of \$500)

- Century Airline Service, Peterborough (transport of ITCV volunteers \$350)
- Home Depot Store, Peterborough (tools to the value of \$400)

A recent major source of development funding for the TNAs was funds raised as part of the "Beyond Our Walls" capital campaign. The donors were Home Depot Canada (\$25,000) and the Canadian Pacific Charitable Foundation (\$50,000). These funds have been used to reconstruct and build new boardwalks, purchase signs and posts, create new nature trails, construct benches at viewpoints, purchase a lawn tractor mower and trailer for nature trail maintenance, tools, and to employ summer student assistants.

Gifts for an annual competition for the best photographs taken in TNAs by Trent students were provided by Souter's in 1997 and 1998 and then by Quide Photo Service in 2000 and 2001.

For several years, B & B Surplus provided snow shoes, free of charge, for a snow shoeing event in the WSNAs and CNA.

In 2001, friends and family of John D. de Pencier, a former Chair of the Board of Governors, established the "John de Pencier Endowment for the Nature Areas" to commemorate his long time involvement and service to Trent University. Income from this fund will aid with the management of TNAs and promote public use of TNAs.

### 3.4.5 Information for Academic, Research and Management Use

Because of the lack of a Stewardship Plan and institutional commitment to its TNAs there is no one committed to, or in charge of the TNAs. The result is a severe lack of information about TNAs for undergraduate students enrolled in courses using TNAs. Similarly there is a lack of information for researchers and for ongoing management of TNAs. Practically the only source of information available about the natural heritage of TNAs is the 1989 report, "Nature Areas and their Use on the Nassau Campus, Trent University, Peterborough, Ontario", prepared by Rosita Ben-Oliel et al.(1989) and anecdotal information from individual committee members or individuals. The 1989 report is available on the Nature Areas' website.

The dearth of professional and even general information about TNAs affects the deliberations of the NAC – a committee whose mandate includes "advising Senate and the Board of Governors on the wise use and management (stewardship) of TNAs". Often members of the NAC have only minimal knowledge about TNAs. Many topics get rehearsed year after year because of lack of knowledge passed on from previous years. Because the Chair of the NAC usually changes annually, he or she may not be familiar with sources of whatever data or information may be available about the TNAs. Even ex-officio members of the University Administration can change from year to year and some may never attend NAC meetings.

The lack of information applies at all aspects of TNAs. For example:

- there is no information about who is in charge of TNAs or who is responsible for safety and ongoing maintenance and management of TNAs
- there is no system or individual charged with gathering information about TNAs for teaching purposes or research or for ongoing management purposes
- there are no ongoing professional studies of change in the ecological conditions in TNAs, such as vegetation change, which may be leading to the loss of habitat and biodiversity, changes that are of importance to current, and especially important to future teaching and research programs
- it is not known if the natural heritage of any TNAs is being threatened by over use or by

- invasion of alien species
- there is no ongoing gathering of information about the academic, research or recreational use of TNAs and what the impacts are, if any, of these uses on the natural heritage of respective TNAs, what is known is largely anecdotal
- there has not been ongoing, or even sporadic, collecting of information about safety issues, such as trail conditions or hazards which could impact academic, research or recreation users of TNAs
- there is no ongoing information about public use of TNAs
- there are no procedures in place to report sightings of plants or animals occurring in TNAs
- there are no systematic species lists for TNAs for academic or research use
- there is a distinct lack of information about the cultural heritage of TNAs and the rest of the Symons Campus, for that matter (Appendix G)

This dearth of information about TNAs has a number of academic, research and managerial consequences. Because of the lack of ongoing professional monitoring and quantification of ecological or vegetational change in TNAs it is not known if animal populations are in decline or whether or not the natural heritage of TNAs is in decline. If habitat and biodiversity in TNAs are declining, then there will be a detrimental effect on ongoing teaching programs and research in Biology, Environmental and Resource Science/Studies and Geography. For example, the impact of invasion of TNAs by European buckthorn and the over abundant growth of white cedars of white cedars on habitat and biodiversity in some TNAs is unknown and is of concern.

There has never been systematic collection and centralization of data about TNAs for teaching and research purposes, such as student project reports, even though 800 to 1000 students register annually in courses in Biology, Environmental and Resource Science and Geography using TNAs because no one had this responsibility, and in any case the NAC did not have funds for office expenses such as photocopying. In 1990, for example, in the ERS course "Management of Forest Ecosystems" (ES 325) students began annual monitoring of some woodlots in TNAs. A collection of the best student reports would have been invaluable for academic use to compare change over time in these woodlots. Even with the income from the Student Levy, but with no one having the responsibility to organise, collect, supervise and maintain such reports, nothing has happened or is likely to happen with the current situation of dealing with TNAs. It is not surprising then, that there is critical lack of information for teaching purposes and research and for the wise use and management (stewardship) of TNAs.

There is not even a system for teaching and research purposes to maintain and retrieve what data currently exist. Minutes of previous NAC meetings or issues brought before the NAC, for example, do not necessarily get sent to the University Archives. Such information, as is available about TNAs, may be held by faculty members in various academic departments, some may be found in the University Archives and some in the Department of Physical Resources. Undergraduate students and others seeking information become very frustrated to discover that there is not a single place to find data, information or maps about the environment, natural heritage, management, or use of the TNAs.

Members of the public or university community seeking information by phone about TNAs are likely to be passed on to a departmental secretary in Biology, or Environmental and Resource Science / Studies or Geography or perhaps to an individual, who may or may not be a member of the NAC. Sometimes telephone calls get forwarded to the Department of Physical Resources.

While the NAC created a website for TNAs in 1996 there are not funds provided from the University budget to maintain it. Consequently, information on the website is often not up-dated and

little new information gets added to the site. A funded, maintained, searchable, website would be an excellent and efficient way to provide academic, research and other information about the TNAs that is needed by undergraduates enrolled in academic and research courses using TNAs.

There is a lack of information about the fire risk in TNAs and possible danger to University and public users of these areas. This includes lack of information about the accumulation of plant litter in TNAs. Escape routes and exits from TNAs have not been signed. Signs indicating no lighting of fires have not been erected so fire pits are relatively common on all parts of the Symons campus. Given the fact that this region experiences hot, dry summer spells, such as in the summer of 2001, a wild fire, whether naturally or human-caused, appears inevitable. As well as a dearth of knowledge about the use of TNAs for academic and research purposes, very little is known about their use by non-university groups and organizations. For example, in the early 1990s the WSNAs was advertised as a site for collecting plants as part of an "edible wild" public interest course offered in Peterborough. This use was only discovered when R. Jones saw a course description in an advertising brochure. Permission for use of the WSNAs for this purpose had not been obtained from Trent and the course had been running for several years. However, use of TNAs for this purpose ceased upon request to do so by the organization running the courses.

The WSNAs continue to be used by school groups and other organizations, but there is no system to record such use or to advertise that permission, or at least notification of use, should be sought from Trent University. For many years, Lakeshore College School has been using the WSNAs for orienteering purposes.

The problems of collecting, storing and disseminating professional and other information about TNAs will continue unless a person, such as the proposed University Naturalist/NA Manager, has these responsibilities on an ongoing basis. A University advisory committee, such as the NAC, without an operating budget, whose composition changes annually, whose members have little institutional knowledge and probably have little knowledge about TNAs, will not have the will or the capability to undertake the vital functions described above that affect the academic program.

### 3.4.6 Volunteer Issues

In the past when questions were raised with Administrators about the management of and work in TNAs, such as formal trail creation and maintenance, often the suggestion was made to "make use of volunteers" even though there were no funds available to hire an organizer or to seek, train and supervise volunteers. Never-the-less, the tremendous response by local individuals willing to assist the volunteers who paid to participate in the three international "Conservation Working Holidays" held in TNAs since 1996 has demonstrated that there are many university and community individuals willing to volunteer to maintain the natural heritage of TNAs. The number of volunteers and hours worked during the three conservation holidays held from 1996 to the year 2000 are shown in Table 6.

The three international "Working Holidays" to date have resulted in donations to Trent University for the TNAs totaling \$9,800 for materials and supplies as well as gifts in kind, with a value at least \$1,000, from local commercial organizations. To this one can add \$34,500 to represent the sum of the individual costs for the BTCV volunteers, at an average of \$1,500 per person (for registration costs with the BTCV and travel costs), to come and work at Trent University.

In addition to "Working Holiday" participants, 14 volunteers in 2000 and 12 in 2001 from the Federation of Ontario Naturalists worked for one and a half days each year in the Wildlife Sanctuary NA to build boardwalks and carry out maintenance along nature trails. Additionally,

Table 6. Volunteer Affiliation, Number of Volunteers and Estimated Hours Worked by Volunteers During International Conservation "Working Holidays" Held in the Years 1996 to 2000 in the Trent Nature Areas on the Symons Campus, Trent University, Peterborough, Ontario.

| Volunteer affiliation                     | Year*  |       |        |       |        |       |
|-------------------------------------------|--------|-------|--------|-------|--------|-------|
|                                           | 1996   |       | 1998   |       | 2000   |       |
|                                           | Number | Hours | Number | Hours | Number | Hours |
| British Trust for Conservation Volunteers | 6      | 170   | 7      | 200   | 30     | 185   |
| Federation of Ontario Naturalists         | 1      | 30    | 3      | 90    | 3      | 90    |
| Trent community                           | 6      | 52    | 6      | 45    | 4      | 25    |
| Peterborough Field Naturalists            | 4      | 30    | 3      | 40    | 3      | 15    |
| Peterborough Community                    | 1      | 30    | 3      | 30    | 1      | 30    |
| Home Depot, Peterborough                  |        |       |        |       | 4      | 25    |
| Others                                    |        |       | 1      | 60    |        |       |
| TOTAL                                     | 19     | 312   | 29     | 665   | 38     | 470   |
| Summer students**                         |        |       | 1      | 1260  | 1      | 630   |

\* The "Working Holiday" scheduled for the year 2001 was canceled by the University because of the foot and mouth disease scare. \*\* Summer students hired with Student Levy funds.

In 2001, Canadian and Indian Canada World Youth volunteers constructed a boardwalk in the Wildlife Sanctuary NA.

Importantly, this kind of cooperation and participation with international, provincial and local organizations and community volunteers greatly assists when seeking funds from large organizations such as the Canadian Pacific Charitable Foundation which gave Trent University \$50,000 for use with its TNAs and Home Depot Canada which gave \$25,000 for the same purpose.

However, unless the current lack of a managerial system for the TNAs is addressed, the continued use of volunteers is not a realistic option for maintenance activities in TNAs. Currently, no one at Trent University has the responsibility to seek, train and supervise volunteers or even to suggest the nature of work volunteers could undertake in TNAs. If the proposed University Naturalist/Manager is not hired then the task of training and supervising volunteers should devolve to the Department of Physical Resources. Members of the NAC are unlikely to volunteer time, or may not have the time, or skills to train or supervise volunteers, or even to know which formal trails require maintenance.

# PART B

## THE STEWARDSHIP PLAN

### 4. MISSION STATEMENT AND GOALS FOR TRENT UNIVERSITY NATURE AREAS

#### 4.1 Mission of Trent University

The Mission Statement for Trent University states that:

*"Trent University aspires to be Canada's outstanding small university, known for its commitment to liberal undergraduate education in the humanities, social sciences and natural sciences and to the centrality of the individual student. Within a collegial setting the university offers undergraduate and graduate programs, both traditional and inter-disciplinary, which seek to advance learning through the creative interaction of teaching and research to the highest quality."*

#### 4.2 Mission for Trent University Nature Areas

The Committee on the Campus Area in 1963 believed that part of the University's commitment to order and excellence included the beauties of nature, as well as the buildings on the campus (Part A: Section 2.3), and with the overall University Mission Statement and Goals in mind, the Mission Statement for its TNAs is as follows:

*"Trent University espouses, in its aspiration to be Canada's outstanding small university, active and responsible stewardship of its Nature Areas in order to protect their natural heritage so as to provide unique opportunities for undergraduate and graduate student education, for teaching and research, for aesthetics and for recreation. Furthermore, the University will be vigilant in its stewardship of its Nature Areas to ensure that future generations will have the benefit of a campus that provides a wide degree of habitat and biodiversity, aesthetic and recreational qualities that students, faculty and staff have been fortunate to experience since the University's inception. Trent University further recognizes the importance of its Nature Areas in the community and that the Nature Areas are an essential part of the City of Peterborough Major Open Space, Parks and Natural Areas system. The University also will seek mutually beneficial partnerships and linkages with universities, colleges, schools, and other public and private sector institutions and organizations, including our alumni, to assist with the active, ongoing stewardship of its Nature Areas".*

### 4.3 Goals for the Stewardship of TNAs

The goals for the Stewardship Plan for TNAs are:

- to enhance the reputation Trent University, as an institution of higher learning and as an institution caring for nature and the environment, by the commitment to competent and responsible stewardship of its TNAs
- to ensure long-term excellency of TNAs for education, research and enjoyment by students, faculty, staff and the public
- to maintain and promote habitat diversity and biodiversity and in TNAs
- to promote appreciation and understanding of nature and the environment along with environmental responsibility
- to promote interaction between the public and the University
- to maintain a safe environment in TNAs for teaching, research and recreational activities
- to maintain on the TNAs website a readily accessible collection of biophysical and cultural data and information about the TNAs for teaching and research purposes
- to promote the use of TNAs for use by schools for nature and environmental education and outdoor education
- to create an 'Nature/Environmental Interpretation Centre' for use by the university, schools and public
- to promote and develop designated TNAs for recreational use by the University community and public
- to make accessible at least some TNAs for persons with disabilities
- to review periodically, at least every 5 years, the Stewardship Plan and implement appropriate policy and management changes



## 5. GENERAL POLICIES FOR THE PROTECTION, MANAGEMENT AND USE OF TNAs

To achieve the goals set in Section 4 a series of general policies for the protection, management and use of TNAs are described below.

### 5.1 Nature Protection

Nature protection will be supported by research, monitoring, public education and the enforcement of regulations.

There shall be no removal of plants and animals, including wildflowers and medicinal plants, except as approved by the NAC for management, research or teaching purposes.

If a particular Nature Area or part of a Nature Area is being degraded biologically or physically by overuse, then use of it will be discouraged or even be prohibited.

Naturalization will be undertaken only with indigenous species and environmental manipulation will be minimized.

Exotic species will be controlled where feasible.

Plant diseases and insect infestations will not be controlled by pesticides or other means unless they threaten adjacent properties.

Chemical spraying of pests and weeds will be minimized.

There shall be no cutting of wood other than for forest management, educational or research purposes, vegetation management and trail maintenance purposes, unless approved by the NAC.

Identified sensitive areas, e.g. areas especially vulnerable because of their species composition, such as the presence of endangered species, geomorphological or hydrological conditions will be given special protection, which may include restrictions on human entry.

Environmentally degraded areas will be restored as funding permits.

No commercial mineral exploration or extraction will be permitted.

### 5.2 Cultural Heritage Protection

Sites with high cultural value will be protected. This can include public exclusion from cultural sites that contain especially rare, valuable, fragile or dangerous artifacts.

### 5.3 Safety

Procedures to deal with emergencies, such as accidents and wildfires, in TNAs will be prepared.

Wildfires will not be allowed to burn in the TNAs due to the potential danger they pose to University facilities and adjacent private property. For the same reason, prescribed burning will only be employed as a management tool under the strictest of supervision and safety

precautions. If possible, other forms of vegetation management that perform some of the natural functions of fire should be employed to achieve environmental objectives.

There shall be no lighting of fires in TNAs except with permission of the NAC.

#### 5.4 Education and Interpretation

One of the major rationales for the TNAs is to provide opportunities for education (formal) and interpretation (informal). Such educational and interpretation uses must be consistent with the policies set for the TNAs, the zoning of each nature area, and the management prescription for each area.

Education and interpretation that take advantage of the special attributes of the TNAs and which contribute to their protection and appropriate use will be especially encouraged.

Large-scale use of the TNAs by non-University groups for educational and interpretive purposes will be determined upon submission of an application form.

Charges may be levied for the provision of educational and interpretive materials and services.

A web site shall be maintained to inform and educate the public about TNAs, to provide information for teaching purposes and also for the Trent community.

A data base on use of the TNAs for educational and interpretive purposes should be maintained.

#### 5.5 Research

Research that takes advantage of the special attributes of the TNAs and that contributes to the protection and management of them is encouraged.

Research must be consistent with the policies for TNAs and the management prescription for each Nature Area.

Research in TNAs must receive the approval of the NAC, and upon completion two printed reports and an electronic file must be given to the NAC.

The NAC shall maintain a list of research projects it deems of particular interest, or value for management purposes.

The NAC will encourage student research in the TNAs by providing modest research grants as funding allows.

#### 5.6 Recreation

The TNAs provide many opportunities for outdoor recreation. These must be consistent with the policies set for the TNAs and the management prescriptions for each area.

There shall be no motorized vehicles, including snowmobiles, and all-terrain vehicles, in the TNAs except for emergency and maintenance purposes as authorized by the NAC.

Trail biking is prohibited in TNAs.

Certain forms of non-motorized recreation may be prohibited in portions of a Nature Area, for reasons of environmental protection or safety, or where the activity could affect ongoing research.

Hunting and fishing are prohibited in TNAs.

Camping, campfires or overnight use of the TNAs are prohibited.

Generally, competitive sporting events will not be permitted in the TNAs, unless activities are confined to trails and appropriate warning signs erected before the event and then removed upon completion of the event. Permission for such events must be sought from the NAC by submission of the appropriate application form to the NAC at least 14 days prior to the day the event is scheduled.

Generally, buildings, substantial modification of the terrain, hydrology, vegetation or wildlife shall not be permitted for recreation purposes, other than to create and improve formal trails.

Users of the TNAs shall pack out their garbage, as garbage cans usually will be provided only at trailheads.

Maps, statements of regulations, a code of behaviour, interpretation materials, and information for inclusion in the web site shall be prepared and be updated regularly to encourage appropriate recreational use of the TNAs.

The amount and impacts of recreational use shall be monitored to ensure protection of the environment, the provision of high quality recreation experiences, and to guide management.

## **5.7 Enforcement of City By-laws and Regulations**

All City By-laws relating to use of City of Peterborough Major Open Space, Parks and Natural Areas system shall be enforced.

TNAs staff and volunteers will be encouraged to advise visitors and users of TNAs to comply with City By-laws and University regulations applicable to TNAs.

Signs and publications must be provided to advise users of and visitors to the TNAs of City By-laws and regulations applicable therein.

Dogs shall be prohibited from TNAs because running and barking dogs can significantly disturb and interfere with wildlife, such as ground nesting birds, create conflicts with other users, and reduce the opportunities of other users to view wildlife.

## **5.8 Public Involvement with TNAs**

Input on use of TNAs, the maintenance of trails, the organizing of interpretive events, and fundraising activities by members of a Friends of the Trent University Nature Areas (FOTU-NA) association shall be promoted.

Programs for volunteer assistance by organizations outside the University, such as the Federation of Ontario Naturalists "Volunteer for Nature" program (formerly the Working for Wilderness" program) which encourages volunteers to undertake conservation work in TNAs shall be fostered. FON "Working for Wilderness" projects at Trent University have been practically the only way the University has received major assistance from volunteers with maintenance and development of the TNAs.

Table 7. Summary and Classification of the 12 Nature Areas on the Symons Campus, Trent University, Peterborough, Ontario.

| Nature Area (NA)              | NA No. | Area (ha) | Habitat                                               | Nature Area Classification |         |
|-------------------------------|--------|-----------|-------------------------------------------------------|----------------------------|---------|
|                               |        |           |                                                       | Class A                    | Class B |
| Wildlife Sanctuary NA         | 1      | 164       | Old field, woodland, forest, plantation, marsh, swamp |                            | X       |
| Canal NA                      | 2      | 37        | Old field, woodland, swamp, (shoreline)               |                            | X       |
| South Drumlín NA              | 3      | 14        | Old field, woodland, forest, (shoreline)              |                            | X       |
| Lady Eaton Drumlín NA         | 4      | 31        | Old field, woodland, forest, swamp                    |                            | X       |
| Highway 26 Woods NA           | 5      | 4         | Woodland, forest                                      | X                          |         |
| Total Loss Farm NA            | 6      | 10        | Old field, woodland, forest, plantation, marsh, swamp | X                          |         |
| Lock 22 NA                    | 7      | 21        | Woodland, forest, marsh, swamp                        |                            | X       |
| Ninth Line NA                 | 8      | 8         | Agricultural, woodland, marsh                         | X                          |         |
| Promise Rock NA               | 9      | 6         | Old field, forest, swamp                              | X                          |         |
| Wetland Complex NA            | 10     | 11        | Old field, woodland, marsh, swamp                     | X                          |         |
| Archaeology Centre Wetland NA | 11     | 5         | Woodland, marsh, forest                               | X                          |         |
| Otonabee College Wetland NA   | 12     | 6         | Old field, marsh, swamp                               | X                          |         |

## **6. CLASSIFICATION AND ZONING OF TNAs**

### **6.1 Classification of TNAs**

Each Trent Nature Area has been classified as either a Class A Nature Area or as a Class B Nature Area (Table 7, opposite), according to the predominant potential function of its resources. These classifications and their overall purpose within the TNAs land base are indicated below:

#### **6.1.1 Class A Nature Area**

This class will be applied to TNAs containing an abundance of one or more biophysical resources that are either (a) provincially or regionally significant; (b) unique to Trent campus; (c) the best example of a biological or physical feature of interest within the TNAs.

The major management objective for a Class A Nature Area is to maintain or enhance the quality of its biophysical resources within the context of natural processes that occur in this type of ecosystem (e.g. succession).

Class A TNAs are: Highway 28 NA, Total Loss Farm NA, Ninth Line NA, Promise Rock NA, Wetland Complex NA, Otonabee College Wetland NA and the Archaeology Centre Wetland NA.

#### **6.1.2 Class B Nature Area**

This class will be applied to TNAs containing biophysical resources that are representative of natural areas in the region surrounding Peterborough, are of general interest to the Trent community and to those which are amenable to low intensity recreational uses and/or nature interpretation.

The major management objective for a Class B Nature Area is to maintain or enhance the quality of its most significant biophysical resources.

Class B TNAs are: Wildlife Sanctuary NA, Canal NA, South Drumlin NA, Lady Eaton Drumlin NA and the Lock 22 NA.

### **6.2 Zoning in TNAs**

The purpose of zoning is to designate lands in each Nature Area that will be managed with the same set of policies. The management policies applicable to a given zone may differ somewhat according to the classification of the Nature Area, since the latter determines the primary function of the particular Nature Area. The zoning scheme used within TNAs will be:

#### **6.2.1 Nature Reserve Zone**

Nature Reserve Zone applies to TNAs containing biophysical resources that are either:

- (1) provincially or regionally significant;
- (2) unique to the Symons Campus;
- (3) the best example of a biological or physical feature of interest within the TNAs.

Nature Reserve Zones will be managed to maintain or enhance the quality of their biophysical resources.

### 6.2.2 Natural Environment Zone

Natural Environment Zone applies to TNAs lands containing biophysical resources that are:

- (1) representative of natural areas in the region surrounding Peterborough in their present state;
- (2) in the process of regenerating into natural vegetation communities;
- (3) important habitat for native wildlife in their present state.

Natural Environment Zones will be managed to maintain or enhance the quality of their biophysical resources.

### 6.2.3 Cultural Environment Zone

Cultural Environment Zone applies to TNAs lands containing archaeological, cultural or historic resources of interest to the Trent community. Management of Cultural Environment Zones will be to protect, or in some cases, enhance these cultural or historic resources.

### 6.2.4 Recreation Zone

Recreation Zone applies to TNAs lands with existing formal trail development (or where deemed appropriate) or undeveloped areas with high recreation potential, where the development of extensive recreation will not have adverse effects on any natural or cultural resources of significance.

### 6.2.5 Research Zone

This zone applies to specific TNAs lands on which ongoing research or monitoring is taking place, or on which long term research is proposed and has been approved by the NAC. Research Zones will be managed to ensure that conditions for research and/or monitoring are maintained.

### 6.2.6 Facility Zone

This zone applies to TNAs lands developed (or to be developed) as access or staging areas for visitors to the TNAs. Facility Zones will be managed to maintain their existing or planned functions, for example parking lots.

### 6.2.7 Transition Zone

This zone applies to TNAs lands that were previously used for farming where the vegetation communities are in a state of transition. Much of the vegetation cover on these lands is not native to our region, or the pattern of transition from farm to forest is producing a vegetation community that is unnaturally dominated by one tree species (in this case, Eastern White Cedar). Transition Zones may or may not be actively managed, depending on their location relative to Nature Reserve and Natural Environment Zones, and to recreation or interpretive trails.

### 6.2.8 Special Management Zone

This zone applies to TNAs lands that are being used for functions unrelated to conservation, recreation or research. At present, this applies only to lands being leased for agricultural purposes. Management will be to minimize adverse impacts on other Nature Area functions.

### 6.3 Zoning Maps of TNAs

The zoning applied within each Nature Area is illustrated in Figures 14 to 19, inclusive.

### 6.4 Management Policies Applicable to Specific Zones in TNAs

In addition to the general policies applicable to all TNAs lands, policies specific to development and management of four of the zones (Nature Reserve, Natural Environment, Cultural Environment, and Recreation Zones) shall apply. These policies are listed below. No policies specific to Research, Facility, Transition and Special Management Zones are proposed. Thus, management practices used in lands under these zones will be specific to the land area involved, its zoning designation and biophysical resources, and its relationship to adjacent lands.

#### 6.4.1 Nature Reserve Zones

In general, active management will be undertaken only to protect or enhance the natural character of these zones for the appreciation of their natural features.

No new utility lines or rights-of-way will be developed.

Vegetation will not be actively managed, other than in specific instances to maintain significant species or communities, prevent the invasion of non-native species, or prevent the dangerous accumulation of wood fuel that could pose a serious fire hazard.

Non-native plant species will not be deliberately introduced. Where they are already established, a management programme to eradicate them shall be developed. Such a programme should be as specific as possible to the exotic species and have minimal effect on the natural ecosystem.

The cutting of live or standing trees will normally not be permitted. Exceptions to this policy will be considered when necessary to prevent dangerous wood fuel accumulation, to eliminate a potential hazard to humans, to control a serious insect or disease outbreak, or as a means of promoting natural succession in the absence of fire.

Pesticide or herbicide use will normally not be permitted in Nature Reserve zones, or in adjacent zones when such spraying could potentially result in the movement of these chemicals into Nature Reserve Zones. Exceptions to this policy will be considered if there is no other feasible means to control a serious insect or disease outbreak, or any exotic species that threatens the biotic integrity of the ecosystem the zone was established to protect.

Animal populations will not be manipulated or controlled, except as part of approved research projects, or when essential to protect human health and safety, the health of native species resident in the TNAs, the health of domestic animals on private land outside of the TNAs, or the ecosystem the zone was established to protect.

Watercourses and wetlands will not be manipulated, other than to prevent the loss of significant species or communities, or the loss of interpretive features.

No agricultural practices will be permitted other than for research or vegetation management purposes.

#### 4.4.2 Natural Environment Zones

Development will be limited to recreational and interpretive trails, interpretive signs and displays, and temporary facilities for research and management. The location, design and materials of any interpretive facilities within these areas will, to the maximum extent possible, reflect the environmental character of the area.

New utility lines or rights-of-way should not, wherever possible, be routed through Natural Environment zones.

Vegetation will not be actively managed, other than in specific instances to maintain significant species or communities, prevent the invasion of non-native species, or to prevent the dangerous accumulation of wood fuel that could pose a serious fire hazard.

Non-native plant species will not be deliberately introduced. Where they are already established, a management programme to eradicate them should be developed. Such a programme should be as specific as possible to the exotic species and have minimal effect on the natural ecosystem.

Commercial tree cutting will not be permitted.

Live or dead trees may be cut to prevent dangerous wood fuel accumulation, to eliminate a potential hazard to humans, to control a serious insect or disease outbreak, or as a means of promoting natural succession in the absence of fire.

Tree cutting on a small scale may also be permitted for other TNAs management and development purposes, provided that such cutting has minimal impact on the area where it occurs. Tree cutting may be approved to provide material for the construction and maintenance of trails, trail bridges, wet area crossings, interpretive signs and displays, or to maintain or enhance a view-scape.

Pesticide or herbicide use normally will not be permitted in Nature Environment Zones. Exceptions to this policy will be considered if there is no other feasible means to control a serious insect or disease outbreak, or any exotic species that threatens the biotic integrity of the ecosystem of the affected zone or nearby Nature Reserve or Natural Environment zones. Spraying of poison ivy will also be permitted along formal trails where the plant is deemed by the NAC to pose a hazard to trail users.

Animal populations will not be manipulated or controlled, except as part of approved research projects, or when essential to protect human health and safety, the health of species outside the zone, or the ecosystem the zone was established to protect.

Watercourses and wetlands will not be manipulated, other than to prevent the loss of significant species or communities, or the loss of interpretive features.

No agricultural practices will be permitted.





## Legend

- Stream (seasonal)
- Campus Boundary
- Road
- Parking Lot
- Building

## Zoning Code

- Cultural Environment
- Natural Environment
- Nature Reserve
- Recreation
- Research
- Special Management
- Transitional
- Facilities

Data from the Trent  
University Nature Areas  
GIS database

Corporate support from:  
**Pricewaterhouse Coopers,**



April, 2002

C:/Trent/zoning.apr

Figure 14. Zoning for the Wildlife Sanctuary Nature Area (WSNA), Symons Campus, Trent University, Peterborough, Ontario.



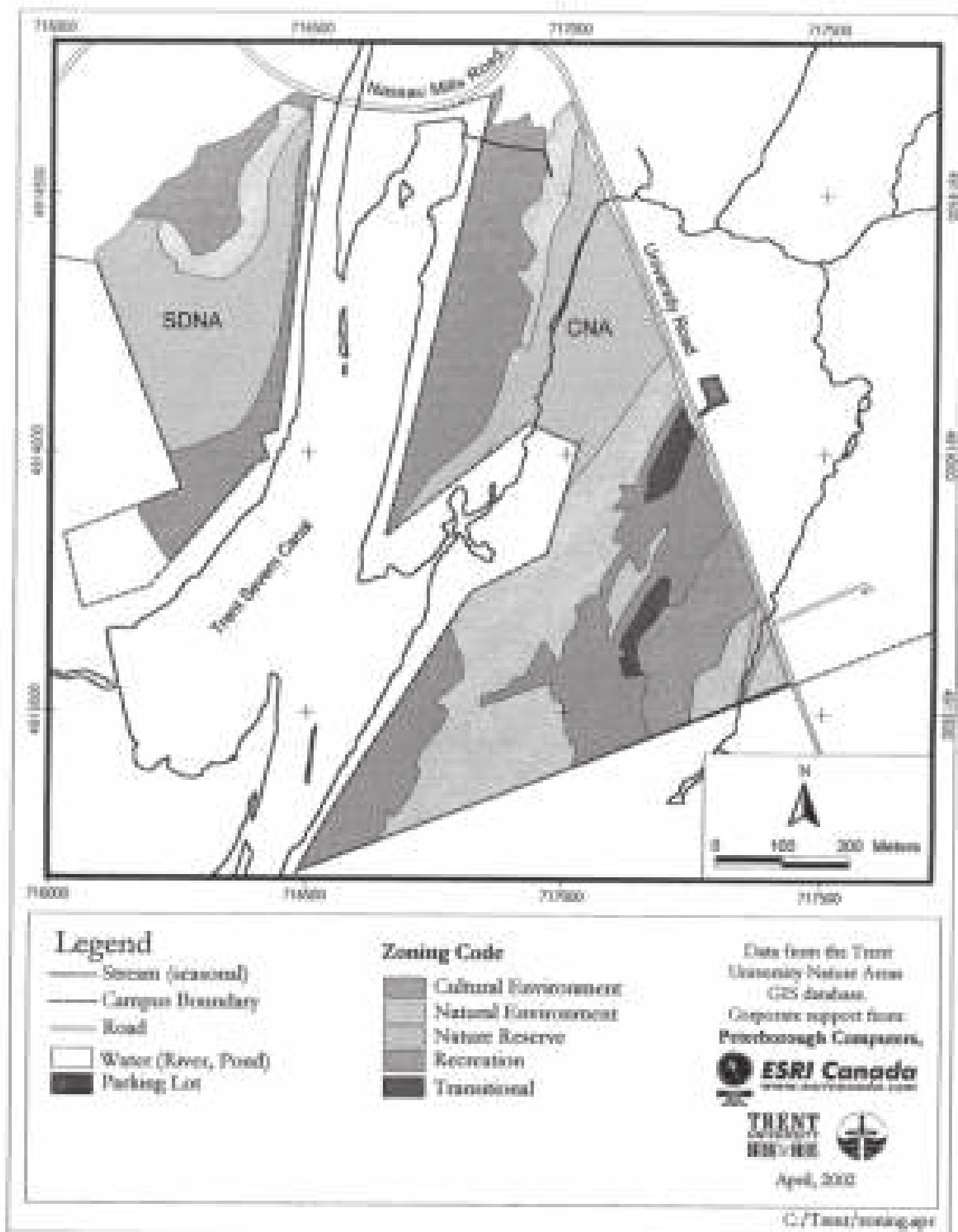
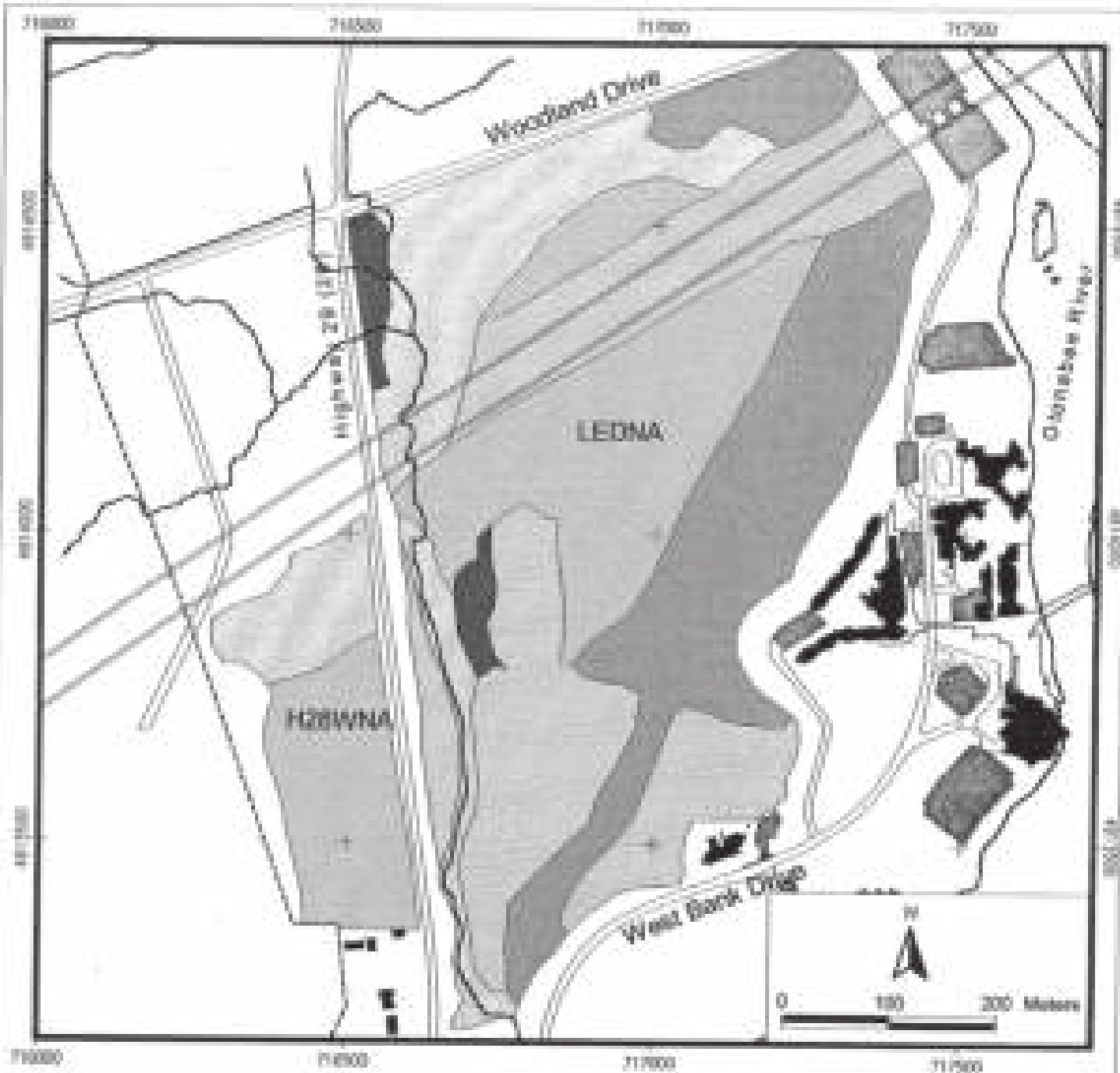


Figure 15. Zoning for the South Dundas Nature Area (SDNA) and Canal Nature Area (CNA), Symons Campus, Trent University, Peterborough, Ontario.





## Legend

- Stream (seasonal)
- Bridge
- Campus Boundary
- Road
- Hydro Line
- Water (Raven, Pond)
- Parking Lot
- Building

## Zoning Code

- Natural Environment
- Nature Reserve
- Recreation
- Special Management
- Transitional

Data from the Trent University Nature Area GIS database.  
Corporate support from Peterborough Companies.

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Figure 18. Zoning for the Highway 28 Woods Nature Area (H28WNA) and Lady Eaton Driveway Nature Area (LEDNA), Syntex Campus, Trent University, Peterborough, Ontario.



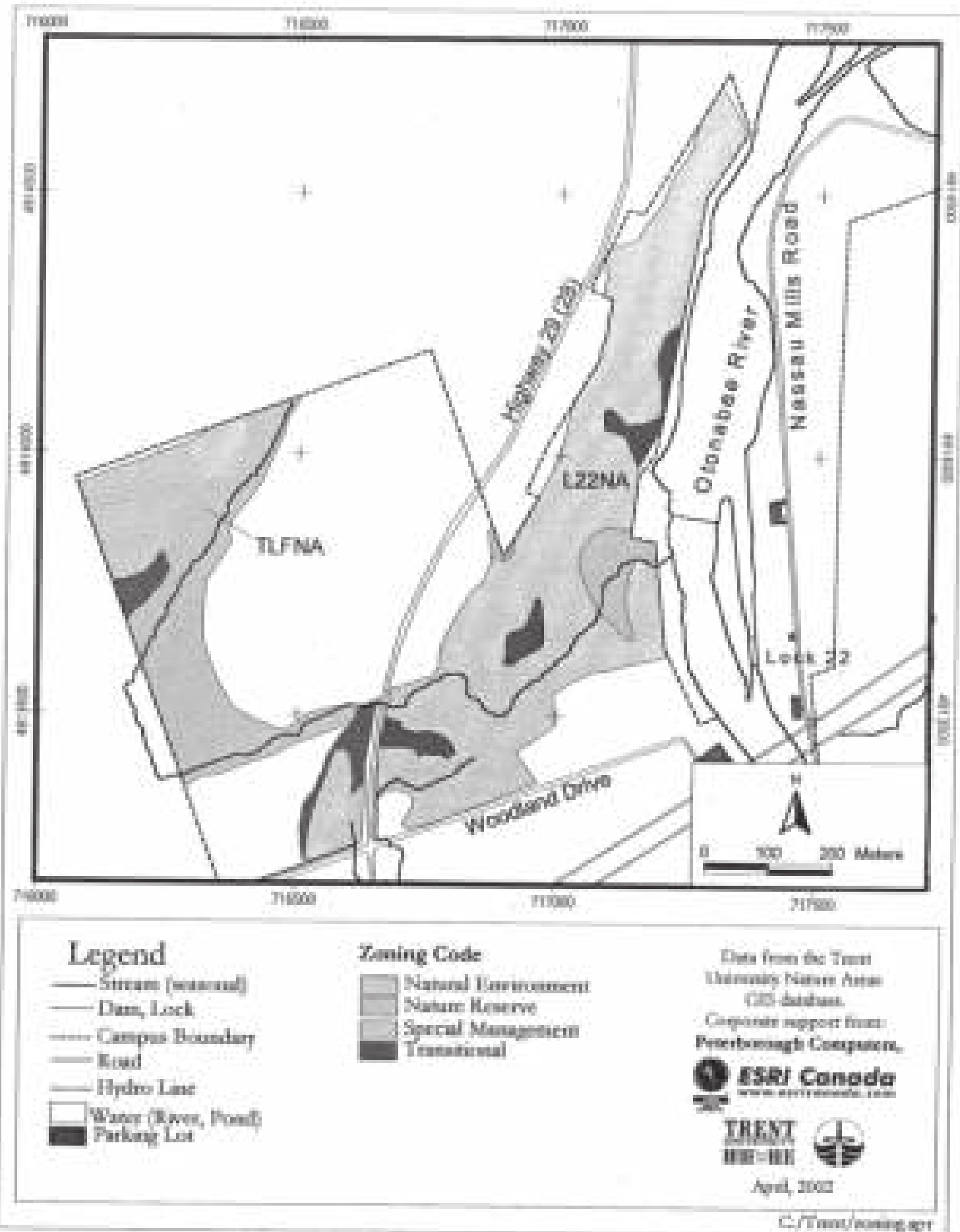
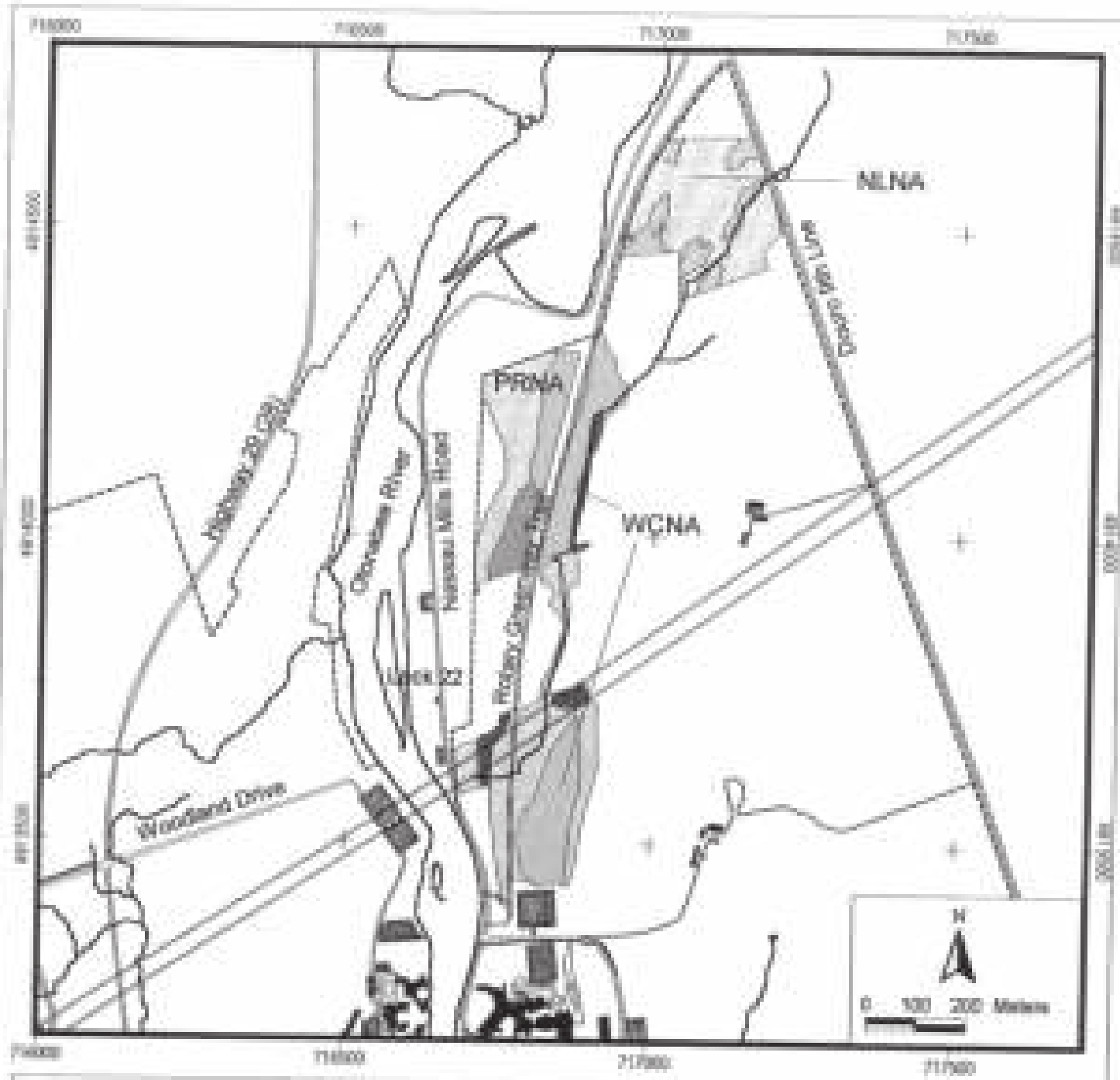


Figure 17. Zoning for the Total Loss Farm Nature Area (TLFNA) and Lock 22 Nature Area (L22NA), Symons Campus, Trent University, Peterborough, Ontario







### Legend

- Stream (seasonal)
- Dam, Lock
- Rotary Gateway Trail
- Campus Boundary
- Road
- Hydro Line
- Water (River, Pond)
- Parking Lot
- Building

### Zoning Code

- Natural Environment
- Nature Reserve
- Recreation
- Special Management
- Transitional

Data from the Trent University Nature Areas GIS database.  
 Corporate support from:  
**Pearlborough Companies,**  
 **ESRI Canada**  
[www.esri.ca](http://www.esri.ca)  
   
 April, 2002

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Figure 18. Zoning for the North Line Nature Area (NLNA) and Promise Rock Nature Area (PRNA), and Wetland Complex Nature Area (WCNA), Symons Campus, Trent University, Peterborough, Ontario.



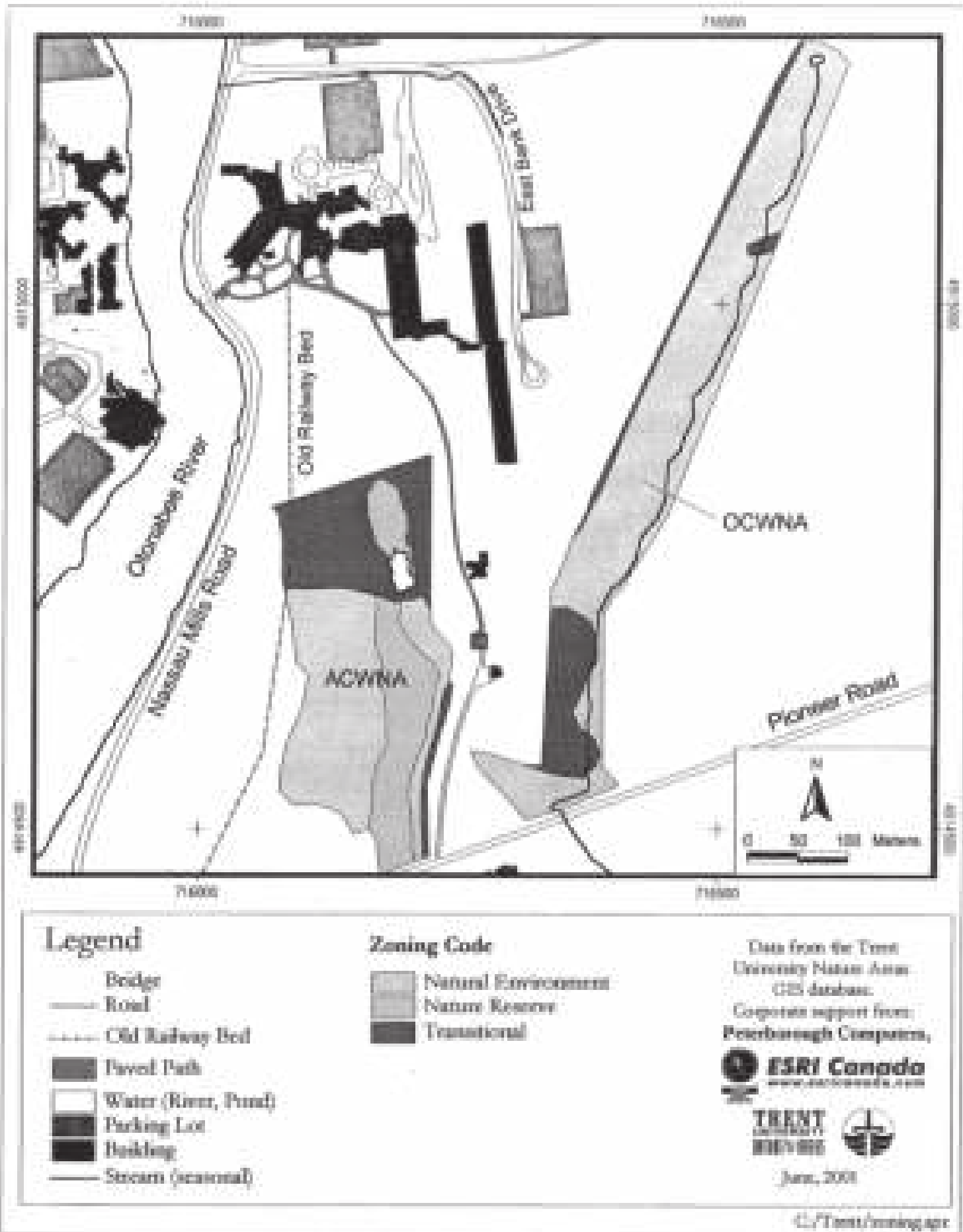


Figure 19. Zoning for the Archæology Centre Wetland Natural Area (ACWNA) and Otonabee College Wetland Natural Area (OCWNA), Syme Campus, Trent University, Peterborough, Ontario.



### 6.4.3 Cultural Environment Zones

Development will be limited to interpretive facilities and trails, interpretive signs, displays and research and management facilities.

New utility lines or rights-of-way should not, wherever possible, be routed through Cultural Environment zones, except as required for interpretive facilities.

Vegetation species native to the area may be introduced to provide an appropriate setting for the interpretation of historical, cultural or archaeological buildings or artifacts.

Live or dead trees may be cut to prevent dangerous wood fuel accumulation, to eliminate a potential hazard to humans, or to control a serious insect or disease outbreak.

Tree cutting may be approved to provide material for the construction and maintenance of trails, trail bridges, wet area crossings, interpretive signs and displays, or to maintain or enhance a view-scape.

Herbicide treatment of poison ivy will be permitted along formal trails and interpretive nodes where the plant is deemed to pose a hazard to trail users. Blanket spraying of trails is not permitted unless the trail is covered by woodchips and poison ivy is invading growing up through the woodchips.

### 6.4.4 Recreation Zones

Development will be limited to recreational and interpretive facilities and trails, and research and management facilities.

Vegetation management will be for the purpose of maintaining appropriate recreational, scenic and natural areas.

Live or dead trees may be felled to prevent dangerous wood fuel accumulation, to eliminate a potential hazard to humans, or to control a serious insect or disease outbreak. Whenever possible, it is desirable, to leave felled trees to rot and decompose, thus providing micro-habitats for decomposer organisms, other plants and animals.

Tree cutting may also be approved to provide material for the construction and maintenance of trails, trail bridges, wet area crossings, interpretive signs and displays, or to maintain or enhance a view-scape.

Herbicide treatment of poison ivy will be permitted along formal trails and interpretive nodes where the plant is deemed to pose a hazard to trail users. Blanket spraying of trails is not permitted unless the trail is covered by woodchips.

## 7. MANAGEMENT GUIDELINES AND PROCEDURES FOR TNAs

### 7.1 Management Guidelines and Procedures for all TNAs

This section outlines general management guidelines and specific management procedures for TNAs based on the goals and policies set in Sections 5 and 6. Also included are specific management guidelines for individual TNAs (7.2) and a set of priority recommendations (7.3). Management guidelines and procedures may change in the light of experience or to deal with unforeseen situations. Any changes in guidelines and procedures shall be approved by the NAC.

#### 7.1.1 Preservation of Ecological Character

There generally shall be low management or manipulation of TNAs, consistent with the objective of sustaining a high degree of habitat diversity and biodiversity. This means that all or parts of some TNAs will be most protected from unnatural alteration. As a rule, natural ecological processes will regulate the character of TNAs. Some designated grassland areas, for example, will be allowed to continue their succession to woodland.

To maintain long-term habitat diversity, and hence biodiversity and to maintain a variety of ecosystems for teaching and study purposes there can be some active management of vegetation in parts of some of the TNAs. For example, to maintain areas of open grassland habitat for studies of associated animal populations such as ground-nesting birds, a phased program of ploughing, seeding and grazing by stock animals may be necessary. Short and long term studies of methods of maintaining habitat diversity, and the comparison of 'human-maintained' stages of succession with naturally occurring ones, are to be encouraged.

#### 1. Vegetation Management

The ecological character of TNAs is determined to a large extent by their vegetation. Consequently, the management of grassland, wooded and wetland vegetation will influence the particular TNAs' ecological, teaching, research, recreational and scenic values. For example, the open habitat of some designated grassland areas may need to be maintained by active management in order to keep invading tree seedlings and saplings in check in to maintain a high degree of biodiversity. Thus, limited clearing of vegetation may occur for the purpose of maintaining habitat diversity, species diversity and wildlife habitat.

Only those forest operations concerned with the protection and maintenance of TNAs and their use or for long-term objectives will be permitted. However, where there are coniferous plantations or stands, they may be managed, but in a way which will not affect adjacent vegetation or environments, if these plantations or stands are to be used for providing materials for maintenance of TNAs. The neglected conifer plantations in TNAs will be evaluated and necessary logging and maintenance undertaken to bring these plantations into acceptable silvicultural condition for sustainable lumber production for use in TNAs.

Artificial revegetation of areas is an acceptable practice where natural regeneration is very slow, or species diversity is deemed desirable. Only species native to this region will be used with accurate mapping of such plantings.

Management will involve the removal or reduction of exotic or introduced exotic plant species in TNAs. Specific examples include European buckthorn (*Rhamnus cathartica*), Scotch pine (*Pinus sylvestris*), Lilac (*Syringa vulgaris*), and Purple loosestrife (*Lythrum salicaria*). Other species may be

identified later. A program to control European buckthorn, the major invasive exotic species on the Symons Campus, should begin promptly with the criteria for priority being the extent and severity of invasion, and/or natural character of area being invaded.

Sites where European buckthorn is in the initial stages of invading natural areas can be controlled with relatively little cost and effort. Fruit producing shrubs could be treated by the EZ-JECT system, which inserts capsules of glyphosate into the bark, or they can be cut down and the stumps treated with 50% glyphosate. Glyphosate treatment must occur within 5 to 10 minutes of stump exposure. Initially, female (fruit bearing) trees should be felled to reduce the amount of fruits (seeds) available for dispersal. Merely cutting down buckthorn is not a cost- or time-effective method of control because many new shoots, often 20 or more, grow from the cut stump. A program to pull up seedlings (25 cm or less in height, taller ones are difficult to pull up) should be instituted. Sites treated for buckthorn invasion should be monitored to determine effectiveness.

Scotch pine seedlings, saplings and trees should be cut down whenever found in TNAs to prevent establishment and spread of this non-native species.

Purple loosestrife, another invasive exotic plant, should be pulled up in the initial stages of invasion in TNAs wetlands. Highest priority sites are the Otonabee College Wetland NA and the southern section of the Wetland Complex NA.

Management actions may include measures to reduce the population size of an invasive native species where overabundance of this species is leading to loss of habitat or biodiversity. Examples include Eastern white cedar (*Thuja occidentalis*) Black locust (*Robinia pseudoacacia*) and sumach (*Rhus typhina*). In stands of Eastern white cedars clearings may be created to provide for natural establishment or hand planting of other native tree species.

Along formal trails, vegetation may be cut and managed mechanically but cutting by hand is the preferred method. However, for poison ivy (*Rhus toxicaria*), treatment with an approved herbicide is preferred. Mechanical cutting of extensive patches of poison ivy is not recommended as small droplets of the toxic oil from cut poison ivy can be inhaled or can land on clothing, posing a serious hazard to the operator. Warning signs, with a diagram of the poison ivy plant, should be posted in appropriate areas. Trails should be kept clear to a distance of at least 0.75 m on each side of the centre of the trail. Also, a pamphlet describing poison ivy plants, its effects on people and instructions to mitigate the effects of the oil should be readily available in boxes at trail heads where this species may pose a problem.

## II. Faunal Species

TNAs must not be used as repositories for any captured or trapped native species, such as grey squirrels, or exotic animals.

Management actions will include measures to remove or control exotic or introduced exotic species in the TNAs.

Faunal research and teaching studies will need approval from the NAC and shall follow accepted procedures for the animals in question. Live trapping and release shall be the preferred practice unless satisfactorily demonstrated otherwise.

In order to promote wildlife and viewing opportunities of them dogs will be prohibited from TNAs.

### 7.1.2 Safety of Users

For the safety of users, which includes students enrolled in undergraduate classes held in TNAs, the following recommendations and guidelines must be instituted:

- immediate development of a plan to deal with accidents or emergencies in any TNAs
- identification and signing of emergency routes to TNAs
- a prominent sign at each public entrance to the TNAs displaying emergency and Security Department telephone numbers and use information for the particular Nature Area
- maps of individual TNAs showing access points and emergency routes for Trent Security, the Department of Physical Resources and non-university emergency organizations such as the Peterborough Fire Department, Peterborough Police, Ontario Provincial Police and St. John's Ambulance Brigade
- maps with this information must also be posted at trail heads
- access points and routes to all TNAs must be clearly signed and cleared
- emergency egress routes from the main trails should be posted in areas of highest concern
- directional signs, with distances in km to exits, along all formal nature trails
- signs identifying TNAs and boundaries
- warning signs indicating hazards such as poison ivy or unusual physical conditions along trails, such as steep hill ahead
- signs prohibiting campfires, dogs, mountain biking, snowmobiling or all-terrain vehicles
- at least one annual practice drill involving all Trent University personnel who have the task of dealing with safety and emergencies in TNAs. A winter practice drill should alternate with a summer drill.

It is recommended that the University prepare immediately a fire management plan for TNAs.

Fire breaks may be created and maintained in some TNAs. Such firebreaks may be appropriate in dense stands of cedars and in fields which have formal trails passing through extensive areas of litter accumulation. Consideration should be given to the value of maintaining a mowed strip around the edges of some fields as a preventative measure to restrict or at least slow down wild fire.

It is recommended that an University telephone number for TNAs with recording facilities for messages be immediately set up. Messages should be checked daily by the secretary of the Department of Physical Resources and by the secretary in the Department of the person who happens to be Chair of the NAC.

It is recommended that at least fortnightly patrolling of formal trails begin immediately so that hazards and maintenance needs can be reported on a standardized reporting form to the Department of Physical Resources for prompt action. A copy of the form shall also be given to the Chair



of the NAC. Completed actions taken by the Department of Physical Resources shall be reported immediately to the Chair of the NAC.

Groups using TNAs shall be advised, for safety purposes, to carry a cell phone or pager and a first aid kit.

Volunteers shall not work alone in the TNAs, shall receive instruction and supervision appropriate for the task(s) to be undertaken. When using tools volunteers shall carry a pager or cell phone for emergency use. Volunteers shall log-in and log-out with the Security Office.

### 7.1.3 Teaching and Research

In addition to their use by the University the TNAs shall be available, with permission, for education purposes by schools and public organizations.

Trent course instructors shall provide, each year, the NAC with the name of the TNAs to be used and the nature of the proposed use.

In order to avoid potential environmental damage due to overuse, records shall be maintained of the use of TNAs for educational purposes.

Visitor use surveys in TNAs must be approved by the NAC and the University Research Ethics Committee.

Applications to the NAC for journal studies must comply with the policies and procedures of the University Animal Care Committee.

Two paper copies of all reports and publications and an electronic file based on research in the TNAs must be provided to the NAC, one copy for inclusion in NAC files and one for placing in the University Archives. A copy of a thesis based on research in TNAs shall be provided for the TNAs database collection. Research data and data collected during field studies in graduate and undergraduate courses shall be provided to the NAC, upon request, for archival purposes.

A "Collecting Permit for TNAs" for collecting biological specimens or rocks and soils for teaching or research purposes must be obtained from the NAC. The completed application shall be submitted to the NAC not later than 4 weeks prior to the collecting date. Appropriate map(s) of the Nature Area(s) indicating proposed collecting sites must be included with the application form. The Collecting Permit shall be available from the TNAs web site. Receipt of a completed form shall be acknowledged and NAC approval or rejection shall be issued to the applicant within 7 to 14 days of notification of receipt of the form. Information from Collecting Permits is needed for the management of TNAs so as to avoid over collecting in particular TNAs or parts of TNAs resulting in possible loss of biodiversity.

#### 1. Collecting by Undergraduate Classes

Course instructors shall demonstrate to the NAC the necessity for students to collect in TNAs. A map on which the proposed collecting site(s) are shown shall be part of the application.

Instructors of courses in which collecting in TNAs is approved shall be encouraged to include in course outlines the guidelines set out in the Stewardship Plan for collecting living organisms or other materials.

tions for seeking emergency assistance must be posted.

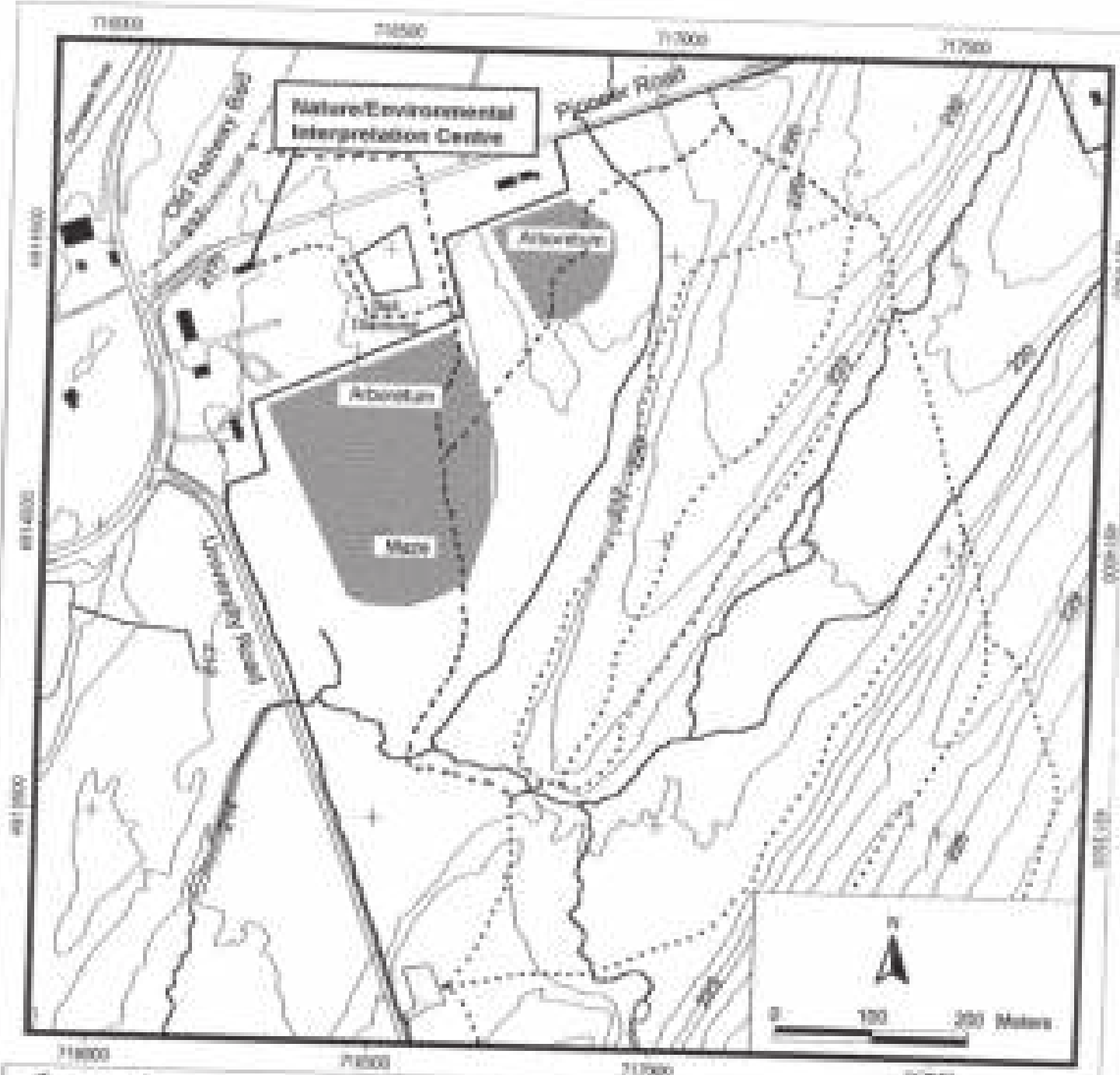
- because of the substantial use made of this Nature Area, that an emergency response plan to deal with or remove an injured person or persons immediately be prepared
- an emergency plan to prevent and to deal with a potential vegetation fire in the WSNA be immediately prepared and an annual practise drill instated
- the parking lot on University Road be closed for monitoring and security reasons but that it be opened for winter parking for cross country skiing
- the parking lot for the WSNA be at the Lockington House property on Pioneer Road. This would alleviate security problems associated with the distance of the present parking lot on University Road from the campus core because the new WSNA lot would be on the route to the Archaeology Centre regularly patrolled by University security officers. A new parking lot at the Lockington House site could also serve the baseball diamond and increase safety when ball games are underway by avoiding parking of cars on Pioneer Road.

Additional safety issues in relation to recreational use of the WSNA are listed below in the section on Recreation.

### iii. Teaching and Research

It is recommended that:

- the University promote use of the WSNA for outdoor teaching and recreation use by area schools by providing appropriate facilities
- the WSNA with its abandoned fields, farm dwellings and buildings, farm tracks, stone piles, along with other artifacts of pioneering and later farming, also be used to interpret the farming heritage of this region
- a Nature/Environmental Interpretation Centre be established at the abandoned Lockington House on Pioneer Road (Figure 20). This centre would allow Trent to use the WSNA, for increased University, schools and community education use and for promoting environmental responsibility
- the desirability of an University Visitor Centre as part of the Nature/Environmental Interpretation Centre be investigated. A combined facility at the Lockington site would bestow many advantages to the University
- an arboretum (Figure 20) be established in Fields 118, 120 and 126 (See Figure 2 in Appendix E) to enhance the educational, research and aesthetic values of the WSNA
- a permanent maze (Figure 20) with white cedar hedges be created in Field 115 (See Figure 2 in Appendix E) for use in the environmental education of school children. This novel approach to environmental education has several precedents and would be a tremendous asset for promoting the use of the TNAs and the Interpretation Centre to area schools
- researchers from other institutions, such as the OMNR in Peterborough and other universities and institutions, be encouraged to use the WSNA, and other TNAs for studies of old



## Legend

- Wildlife Sanctuary Boundary
- Contour (1m interval)
- Building
- Parking Lot
- Roads
- Water (River, Pond)
- Wildlife Sanctuary Nature Trail
- Railway Bed
- Stream (Seasonal)

Data from the Trent  
University Nature Area  
GIS database  
Corporate support from:  
Pentaborough Computers,



**TRENT**  
UNIVERSITY  
NATURE AREA



April, 2002

C:/Trent/roads\_04.apr

Figure 20. Location for the proposed Nature/Environmental Interpretation Centre in the Lockington Property located adjacent to the north-west corner of the Wildlife Sanctuary Nature Area, Symons Campus, Trent University, Peterborough, Ontario.

### 7.3.3 Invasive species

A removal and control program for the invasive alien European buckthorn species by felling fruit-producing individuals and treating the cut stump with herbicide should begin immediately in the following TNAs:

- Promise Rock NA including the open field
- Lady Eaton Drumlin NA in the coniferous and deciduous forest and the lowland area
- Wildlife Sanctuary NA, such as along fence rows and in open field habitats

The over abundance of native Eastern white cedar needs to be tackled immediately by cutting down young cedars invading remaining grassland habitat in Wildlife Sanctuary and Canal TNAs.

### 7.3.4 Formal Trails

For safety reasons, at least a fortnightly program to check formal trails in the following TNAs:

- Wildlife Sanctuary Nature Area (Figure 10)
- Canal NA (Figure 11)
- Lady Eaton NA (Figure 12)
- Promise Rock NA (Figure 13)

All formal trails should be evaluated further for hazards and damage to provide the basis for a maintenance program.

Poison ivy invading formal trails and around cultural sites should be treated with an appropriate herbicide.

The trail system in the Canal NA should be evaluated to continue the development, begun in 2001, of a formal trail system in this Nature Area.

A suggestion box should be erected at the main formal trailheads, to be checked at the time that trails are inspected for safety reasons.

### 7.3.5 Garbage

A general garbage pick-up from TNAs by volunteers also should be organized each year.

## **8. POTENTIAL AND CONTINUING INITIATIVES**

A number of potential and continuing initiatives are proposed for TNAs for teaching, conservation, research, interpretive uses, recreation, volunteering and fundraising, and for partnerships with non-University organizations.

### **8.1 Undergraduate Course in the Concurrent Education Program**

Many school teachers do not feel comfortable, because of lack of appropriate training, when taking classes into the field for nature and environmental interpretation. Students in the Concurrent Education Program could benefit if a practical undergraduate course on nature and environmental education was taught at Trent. This course could use the TNAs for a hands-on teaching approach, particularly as the TNAs are just a few minutes walk from the central campus core. A course on Nature and Environmental Education could be taught by "University Naturalist/NA Manager" (see Section II) to help defray the costs of employing this person who would also be charged with implementing the Stewardship Plan. Students enrolled in this course could gain practical experience by organizing and leading interpretive walks in TNAs for school classes. Successfully completing a course like the one proposed can only enhance the job prospects of graduates from the Concurrent Education Program and may also attract students to the Program. This course could also provide training for students seeking summer jobs as park interpreters.

The TNAs are wholly suitable for offering some Interpretation Canada's professional accreditation courses since there is expertise locally available for such courses.

### **8.2 Conservation and Restoration Ecology**

Options for old field management in the Wildlife Sanctuary NA and Canal NA could be explored in order to maintain sites at their current stage of succession for their intrinsic value, or for sites that would be allowed to continue their current path of succession (passive restoration/ rehabilitation) or there could be active restoration/rehabilitation on sites where there is invasion by non-native species such as European buckthorn. (see - Management Options for old-field sites in Southern Ontario: Guidelines and Literature Review, 1995, Southern Region Science & Technology Transfer Unit Technical Report TR-009, + 4 appendices, OMNR).

A long-term initiative to encourage forest regeneration towards the pre-European settlement type of vegetation and biotic diversity could involve increasing the population size of various indigenous plant and animal species (active restoration/rehabilitation). Introduction of the correct seed sources, and removal of human-introduced species, eventually might result in a climax forest with similarities to pre-European settlement forest for the Peterborough and the Kawarthus bioregion.

An attempt could be initiated to preserve a diversity of habitats to represent, as closely as possible, different stages in old field succession. Open habitat, for example, could be maintained in part of a large field in the WENA. In another part of the same, or adjacent fields, examples of various stages of succession which are believed to lead to climax forest could be maintained by selective vegetation removal. This development option would involve maintenance schedules for the areas in question to ensure that the various vegetation stages are sustained.

### **8.3 Research**

The research potential of TNAs is not being fully exploited. To improve this situation an information campaign should be initiated explaining the advantages and possibilities for research in

TNAs and the fact that there are onsite laboratory facilities in the ERS Building and Science Complex. The TNAs are ideal for succession studies on abandoned farmland and also for large river and river edge ecological studies. There are many opportunities for studies in TNAs of the effects of reduction of habitat diversity on plant and animal populations. For example, the population dynamics and ecological effects of spreading stands of Eastern white cedars on biodiversity could be researched. Other study areas include geomorphology and climate research, recreation use and impact studies.

While some of these research initiatives could be undertaken by faculty and students in the natural sciences at Trent University, research opportunities should be brought to the attention of OMNR and faculty at other Universities. Research partnerships could be developed with a variety of organizations to benefit Trent University and the partner organization.

### 8.4 Interpretive Development

Even though the TNAs have much to interpret and are ideally situated within the Peterborough city limits their use by Peterborough area schools for outdoor education and interpretation is and has been minimal because of the lack of any basic facilities, such as outdoor toilets. The trail system also had degenerated and was unsafe because of lack of maintenance. Recently, however, some trail maintenance and upgrading has occurred. Never-the-less, some interpretive use of TNAs has occurred by members of the public or the university community but this kind of use has been sporadic, has lacked continuity and has been devoid of a planned set of goals and objectives (Clarke 1999). An overall interpretation plan for TNAs needs to be developed.

The use of TNAs for the development of interpretation opportunities for Peterborough and area schools is recommended. Transportation costs for local schools should be low. Also the formal trail system is being upgraded, particularly during the past four years by the efforts of volunteers from the British Trust for Conservation Volunteers, Federation of Ontario Naturalists, Peterborough Field Naturalists, Peterborough and Trent University.

It is recommended that the offering of public interpretation events in the TNAs be expanded as this would be an ideal and tangible way of sharing with the community University lands and intellectual research pursuits, particularly since several of the TNAs, representing some 40% of the green space in the city, have been incorporated into the City of Peterborough Open Space Plan.

A basis for developing an interpretation plan already has been created by Clarke (2000) in her M.A. thesis titled "A Method for Natural Heritage Area Interpretive Planning Applied to Trent University Nature Areas, Ontario". She suggested that an interpretation program using a variety of techniques could be developed for TNAs (Table 3).

Collaboration with the Trent Severn Waterway could also be explored for interpretation possibilities along the Trent Canal and Otonabee River edge areas.

While expanding the interpretive use of TNAs supports the environmental focus of Trent University by increasing public awareness of local natural area features and environmental issues, the actual development of an expanded interpretation program in TNAs would hinge on the employment of an "University Naturalist/NA Manager" charged with this task (see Section 11) and a Nature/Environmental Interpretation Centre.

Table 8. Interpretive Uses and Techniques for Some of the Nature Areas on the Symons Campus, Trent University, Peterborough, Ontario. Based on Clarke 2000.

| Nature Area (NA)      | Topic                                                                                                                                                                    | Interpretation Techniques                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wildlife Sanctuary NA | General topics such as ecological history and processes; old field succession; geomorphology; wetland biology; recreation; natural history, wildlife, cultural resources | <ul style="list-style-type: none"> <li>- a staffed nature centre</li> <li>- interpretive talks</li> <li>- conducted programs</li> <li>- naturalist certification workshops</li> <li>- children's day programs</li> <li>- guided tours</li> <li>- self-guided tours (pamphlets)</li> <li>- research fieldwork - identification guides</li> <li>- viewing area</li> <li>- roving and posted interpretation</li> <li>- guided tours session</li> </ul> |
| Canal NA              | Similar topics to those for the Wildlife Sanctuary NA plus the Trent-Severn Canal edge and marshes.                                                                      | <ul style="list-style-type: none"> <li>- similar to the Wildlife Sanctuary NA</li> <li>- viewing devices such as an observation platform and board-walks in the marsh area</li> </ul>                                                                                                                                                                                                                                                               |
| Lack 22 NA            | Hydrology                                                                                                                                                                | <ul style="list-style-type: none"> <li>- guided tours</li> <li>- self-guided tours (signed)</li> </ul>                                                                                                                                                                                                                                                                                                                                              |
| Lady Egan Drumlins NA | geomorphology, plantation ecology, deciduous forest ecology, wildlife                                                                                                    | <ul style="list-style-type: none"> <li>- viewing areas</li> <li>- viewing devices</li> <li>- publications</li> <li>- guided tours</li> <li>- research fieldwork - session</li> <li>- guided tours</li> <li>- conducted program</li> <li>- naturalist certification workshops</li> </ul>                                                                                                                                                             |
| Promise Rock NA       | cultural resources<br>vegetation, wildlife                                                                                                                               | <ul style="list-style-type: none"> <li>- self-guided tours (signed)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                      |
| South Drumlins NA     | vegetation                                                                                                                                                               | <ul style="list-style-type: none"> <li>- publications</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                    |

### 8.5 Nature/Environmental Interpretation Centre and Arboretum

An effective and sustainable interpretive program using TNAs will require a Nature/ Environmental Interpretation Centre. In 1990, the Wildlife Sanctuary Committee proposed that a redbrick farmhouse, known as the Holmes property, in the south-west corner of the Wildlife Sanctuary Nature Area be renovated as a Nature Interpretation Centre. A letter from President Stubbs responding to Professor J. Marsh, Chair of the Wildlife Sanctuary Committee states:

"The idea of using the house as an interpretation centre is a very interesting one and certainly makes a good deal of sense to me. I am familiar with the Guelph Centre and also had some experience with a similar facility in Waterloo. I know, too, from conversations with Tom Whillans and others in the school sector that there is an interest in this idea"

This initiative came to naught because of the immediate lack of funds to renovate the property. Unfortunately, the Holmes house was bulldozed in 2000. Never-the-less, it is proposed that a Trent University Nature / Environmental Interpretation Centre be created by renovating and expanding an existing house on the Lockington Property on Pioneer Road. This house is on an ideal site for such a purpose because it is in the north-west corner of the Wildlife Sanctuary NA (Figure 20), has easy access to the trail system in the WSNA, has a large flat area that could contain a parking lot so that users, such as schoolchildren, would not have to cross a road to get to the Wildlife Sanctuary NA. This site is close to the campus core, can readily be incorporated into the campus security system and is adjacent to the Rotary Greenway Trail from Peterborough to Lakefield. An interpretive centre would house the office for the University Naturalist/NA Manager, a reading room/library, interpretive displays, a meeting room and facilities for storing equipment and tools.

The proposed interpretation centre at the Lockington site could also have incorporated with it an information visitor centre for the Symons Campus, thus creating a multi-functional useful building out of a currently abandoned structure. A dual use building, such as this, with much activity occurring there would solve the security problems associated with the current Wildlife Sanctuary NA parking lot on University Road.

The currently abandoned house could be renovated using skilled volunteer labour; for example, skilled employees at a local, large do-it-yourself and building supplies store, who undertake community work, have expressed interest in helping with such a project. This kind of project is also likely to attract local funding since it would also be a community asset and could be used for community and school outdoor educational and interpretive programs. Funding may well be promoted if the interpretation centre were to be named in honor of local renowned field naturalists. It is likely that there would be many University and community volunteers willing to assist with staffing of an interpretation centre, thus helping to reduce staffing costs.

An interpretation centre accompanied by an arboretum of native shrubs and trees and a cedar-hedge maze for environmental interpretation, located in adjacent fields (Figure 20), would be excellent innovations for the use of TNAs for environmental education and interpretation by schools. An arboretum, containing a wide selection of shrubs and trees native to this general area of Ontario, would be of much use for teaching and research at Trent. Furthermore, a focused collection of adapted native trees and shrubs, with a wide genetic base, could be maintained at the University to provide material for breeding and research purposes. Such an arboretum, using sponsorship for the trees and shrubs, could add significant financial resources for the ongoing implementation of the Stewardship Plan. Finally, the establishment of an arboretum, first suggested decades ago, at Trent would be an excellent attraction and promotion for the University since an arboretum does not exist in central Ontario. There is more than sufficient space in fields adjacent to the Lockington property for establishing a large cedar-hedge maze for use with outdoor environmental and nature education and interpretation. There are numerous precedents for using such structures (mazes) for such purposes. In fact, a permanent maze would be a unique asset promoting and encouraging schools to come and use the TNAs at Trent for outdoor educational purposes.

In conclusion, an arboretum, with nature trails, and a maze would complement, significantly, the appeal of a Nature / Environmental /Visitor Centre at Trent on the Lockington property.



## 8.6 Recreation

The provision of improved recreational facilities and infrastructure can only increase the attractiveness of TNAs for interpretive and teaching use. Recreation development initiatives could include:

- increased access to formal nature trails and trail grooming for winter users in the WSNNA,
- developing trails in the Canal Nature Area and on the South Drumlin for year-round use,
- creating a University hiking/nature trail for the whole Symonds Campus that would connect current formal trails into a proposed 15-km long University Trail to link together most of the TNAs (Figure 21) and the Rotary Greenway Trail,
- creation of a barrier free nature trail in the Promise Rock NA that would be accessible to mobility-impaired persons. This trail also would be accessible from the Rotary Greenway Trail. There are parking lots north of the Science Complex and at Lock 22,
- construction of a waterfowl viewing platform and associated boardwalks and trails near the Trent Canal in the Canal Nature Area, for teaching, research and interpretive uses as well as for recreational use. This could be a joint Trent-Severn Canal Waterway/University project that also likely would be of interest to the Peterborough Field Naturalists and Friends of the TSW.

## 8.7 A "Friends of Trent University Nature Areas" Association

As with the Beta Library, which receives support from a Friends association, TNAs could also be the recipient of support from a Friends association. In fact, a "Friends of Trent University Nature Areas" association (FOTUNA) should be organized immediately to harness public and University interest and participation in the TNAs. The steps needed to set up this association and draft by-laws have been prepared (Jones 1997) and were presented to the President's Executive Group (PEG) in 1998.

The Friends of Trent University Nature Areas would be an incorporated not-for-profit charitable association governed by a board of directors. The primary objective would be to bring together members of the Trent University community and the general public who would have an interest in TNAs and wish to augment the interpretive, educational and funding programmes.

Advantages of a FOTUNA organization to Trent University would include:

- the bringing together University faculty, staff and students with members of the community who have an interest in the use, maintenance and development of TNAs and nature in general
- an organization for community members who use TNAs on a regular basis and may have valuable contributions to make both in time and money
- the generation of funds, through membership fees and fundraising events, to assist with implementation of the Stewardship Plan and research studies in TNAs
- assistance from members of FOTUNA in seeking grants from various government, foundations and the private sector, especially from individuals, organizations and the private sector

in the Peterborough area for implementing the Stewardship Plan and for research studies in TNAs

- individuals would be willing to assist with the maintenance and development of the nature trail system in the TNAs and could check, on an ongoing basis, the condition of nature trails
- the possibility that there would be experienced individuals who could instruct and supervise volunteers willing to assist with maintenance and development of the nature trail system
- individuals who could be especially useful in helping with the design and implementation of interpretive programs using TNAs
- individuals who would assist with staffing and maintaining a Nature/Environmental Interpretation Centre

### 3.4 Partnerships with University and Non-university Organizations

Partnerships with student groups and non-university organizations should be promoted. Several years ago, for example, students in some of the colleges expressed interest in an "adopt a Nature Area" scheme to assist with trail maintenance and litter pick-up. This initiative by the students came to naught because there was no mechanism for organizing or maintaining such initiatives. An University Naturalist/NA Manager could seek partnerships and resurrect the student initiatives, co-ordinate and provide necessary continuity.

The University could seek also partnership arrangements with local service organisations and clubs. A partnership initiative by the Peterborough Field Naturalists, for example, to help maintain formal trails in the WENA was explored but because there was no organization or individual on an ongoing basis at Trent to maintain such a partnership, this initiative, too, collapsed.

The current partnership with the Federation of Ontario Naturalists offering international "Working for Wilderness" volunteer holidays in Trent TNAs is very tenuous without an experienced contact at Trent and is likely to end if the current ad hoc approach by the University to its TNAs continues.

Trent should continue to offer TNAs as a site for the FON to conduct conservation leadership courses. Part of a leadership course involves hands-on work in a nature area. In this way, some needed work can be accomplished in TNAs, as happened from 1999 to 2001.

For partnerships to succeed on an ongoing basis there has to be an individual, such as the proposed University Naturalist/NA Manager, with whom partners can liaise and who can provide the necessary continuity. Community and student volunteers become discouraged and give up if there is no one at Trent with whom they can deal and receive, on an ongoing basis, direction for their readily offered services.

### 3.5 Trent University "Conservation Working Holidays"

A one- or two-week Trent-organized "Conservation Working Holiday" for incoming first year and upper year students could be mounted annually to provide practical conservation training for participants and to accomplish some required ongoing maintenance of TNAs.



Figure 21. Proposed University Nature Trail to connect most Natural Areas on the Symons Campus, Trent University, Peterborough, Ontario.



Sufficient experience has been gained while organizing and hosting international STCY/PCN "Conservation Working Holidays" in TNAs that the same concept could be used to encourage Trent students to participate in a similar way for tremendous benefit to the university and to the student participants. A Trent organized "Conservation Working Holiday" would bring together students with interests in conservation issues, in the outdoors, in natural history, in outdoor education and recreation. It would also create a reservoir of student volunteers for assistance during the academic year to help with work in TNAs and, eventually provide a reservoir of alumni who may contribute financially for the operation of TNAs.

Student volunteers could arrive one or two weeks prior to Introductory Week, or perhaps at some other time during the summer months, stay in town-house style residences with meal preparation facilities (camping could even be an option if it is necessary to keep costs down). They would receive practical instruction on trail use and safety, on all aspects of trail maintenance and erosion, and other management and maintenance work in Trent TNAs. A first aid course and a conservation leadership training course by outside instructors could be included during a two-week "Conservation Working Holiday". In addition, a social program would be included, such as a day trip to Algonquin Park.

In the absence of an University Naturalist/NA Manager funds would have to be available to hire an experienced person to organize and run Trent conservation "Working Holidays". Additional assistance could come from students hired for summer to work in TNAs. There is also potential for local volunteers to work alongside the student participants (e.g. Home Depot Canada volunteers, Peterborough Field Naturalists, community and university volunteers).

An excellent supply of tools as a result of donations and purchases has already been accumulated during the past three years of international conservation working holidays at Trent. There may be funds from the "Beyond our Walls" campaign for capital expenditures or application could be made to TD Canada Trust for funds from their Working for the Environment Program, for example.

To help with funding, participants could be charged for part of the costs of organizing and running Trent "Conservation Working Holidays".

Trent University "Conservation Working Holidays" in the TNAs would provide a unique additional promotional tool for the University and may well encourage some high school students with interests in the environment, conservation, recreation and the outdoors to attend Trent. A "Conservation Working Holiday" would be a very practical way to obtain useful on-the-job skills which could well assist students in their career choice and at the same time contribute to the University.

#### **8.10 The creation of Co-op Programs with High Schools and Fleming College**

The possibility of local and area High Schools and Fleming College being involved with co-op programs to assist with implementation of the Stewardship Plan and ongoing management and maintenance of TNAs should be explored. This could work well if the University Naturalist/Nature Areas Manager were to be hired since a Co-op program would need, for its success, the ongoing attention of a single individual.

## 9. FINANCING THE STEWARDSHIP OF THE NATURE AREAS AT TRENT UNIVERSITY

### 9.1 Introduction

This section of the Stewardship Plan suggests two possible annual operating budgets for responsible stewardship of TNAs and a third one that mainly deals with limited issues, such as safety of users and some management and maintenance of TNAs. The last part of this section contains a variety of suggestions for the financing of TNAs.

#### 9.1.1 Operating Budget 1: \$117,000 per year

Operating Budget 1 is a budget for improved, sustainable stewardship of the TNAs. It will provide for both professional stewardship of TNAs and ecological and nature area management information and advice to the TNAs advisory committee. The model for Operating Budget 1 is based on the one used for the management of the arboretum and its nature trails, an interpretive centre, and an educational program at the University of Guelph. It provides for management and safety initiatives along with some development opportunities and significantly reduces the immediate burdens that will be placed on the Department of Physical Resources under Operating Budget Plan 2. However, for Operating Budget Plan 1 to work, a professional position, such as the proposed University Naturalist/NA Manager has to be staffed. Hiring this person will increase the academic and research potential of TNAs, both of which are currently under-exploited, and will alleviate the Department of Physical Resources of immediate responsibility for practically all aspects of the operation and management of TNAs. Furthermore, and very importantly, this budget will provide near and long term continuity for the management and development of TNAs.

The major expenditure in this budget is the salary of the proposed University Naturalist/NA Manager. This person will devote approximately 60% of his/her time on administration, management operations and initiating long-term objectives of the Plan, 10 to 15% to fundraising and the remainder on faculty duties (teaching). The teaching duties would be for a course on "Nature and Environmental Interpretation" in the Concurrent Education Program, or in a Departmental Program, and would help offset the cost of hiring this person. There is also the possibility of this course being offered to teachers and others during the summer as a Julian Blackburn College course. The course would be a half or full, "hands-on" course for students, and be designed to instruct students in the education program, in particular, on practical nature and environmental interpretation. It could also prepare students for summer jobs in Federal and Provincial Parks and with Conservation Authorities.

Fundraising for TNAs would be enhanced significantly by an administrative assistant committed to development and fundraising opportunities, particularly in Peterborough and the local area. Many smaller donations could be solicited which the Development Office does not have the time or personnel to pursue. In this way income and other revenues could be generated more rapidly along with development of an interpretive program for local and area schools. The assistant would be aided by hiring an extra QWSP student during the academic year and during summer.

A student funded by the QWSP during the academic year and a summer student would be needed by the Naturalist/Manager to assist with administrative and office duties, such as maintaining the TNAs website and preparing brochures and interpretive materials.

The duties of the University Naturalist/NA Manager will include:

## 1. General and Administrative Duties

- implementing the Stewardship Plan, with advice from the Nature Areas Stewardship Advisory Committee (NASAC)
- instituting, in co-operation with the Manager of Grounds in the Department of Physical Resources, the management guidelines described in Section 7 and the Operational Procedures described in Section 7.2, begin the management priorities set out in Section 7.3, particularly in regard to safety concerns in general and those (Section 7.3.2) concerned with formal trails
- preparing a plan to rescue anyone injured in TNAs and a plan to prevent and deal with a vegetation fire
- checking that the Plan is working, and proposing, as required, additions and/or changes to the Plan to the NASAC, the P&L, and ultimately to the Board of Governors
- preparing an annual report by September 30th for the NASAC and the Department of Physical Resources. Especial emphasis will be placed on academic aspects of use and impacts on the TNAs, or parts of them, in undergraduate course work and for research. Such information is of vital importance for the long-term sustainable use of these areas for the academic programs in Biology, Environmental and Resource Science/Studies and Geography
- providing every five years, a report on implementation of the Stewardship Plan, and recommending any changes to the NASAC
- organizing, at the time of the 5-yearly report on the implementation of the Plan, an open house for the public and university community to promote the TNAs and for seeking input on implementation of the Plan and stewardship of the TNAs and then bringing all suggestions to the NASAC for consideration
- receiving, and in consultation with the NASAC if necessary, approving or rejecting the following:
  - applications for collecting in TNAs
  - use of TNAs by non-University groups for interpretation, recreational or sporting activities
  - receiving applications for research in TNAs
- providing the NASAC an annual summary report of the above applications and uses
- being responsible for information management about the TNAs as described in Section 7.8, including the TNAs website. Publishing on the website the minutes of meetings, reports, summaries of field research, application forms, a calendar of events in TNAs, and other appropriate materials for educational and research use
- being in charge of the Nature/Environmental Interpretation Centre, if one is approved

- organizing an arboretum of native trees and shrubs, if one is approved

## ii. Funding

- administering the TNAs budget in consultation with the NASAC
- submitting a report to the TCSA on the use of levy funding for TNAs
- seeking and preparing applications for funding to employ students each summer and during the academic year seek funding from the Ontario Work Study Program
- undertaking fund-raising in conjunction with the Development Office, and preparing grant applications

## iii. Education and Interpretation

- teaching an undergraduate course on "Nature and Environmental Interpretation"
- consulting with the Conference Centre about use of TNAs by groups such as the Elder Hostel Association
- developing an interpretive program using TNAs
- producing printed materials about TNAs
- maintaining the TNAs website which will be the primary source of information about the University Nature Areas

## iv. Research and Monitoring

- within 18 months of appointment developing a plan to maintain habitat diversity in TNAs. Such a plan is crucial for the long-term use the TNAs for teaching and research
- promoting the TNAs as sites for research and seeking interested individuals and institutions for long-term studies of manipulating ecosystems for maintaining habitat and biodiversity using TNAs
- preparing a report on the impacts of long-term vegetation change in TNAs
- proposing studies to determine the current state of the vegetation resources in each Nature Area and identifying areas requiring special management
- expanding the knowledge base about use of, and users of, TNAs

## v. Volunteers

- organizing and supervising volunteers to assist with trail creation and maintenance, litter pick-up, the interpretation program, organizing the staffing of an interpretation centre
- ensuring that all volunteers and workers in TNAs are adequately trained in tool and machine use, and in first aid and safety procedures



- promoting and organizing international conservation working holidays with the Federation of Ontario Naturalists and the British Trust for Conservation Volunteers and other volunteer efforts in TNAs by the FON
- be the secretary of the Friends of Trent University Nature Areas organization

Because the University Naturalist/NA Manager would have so many wide ranging duties, it is recommended that he/she have an Administrative Assistant with special duties concerned with fundraising and developing an interpretation program.

#### Involvement of the Department of Physical Resources

- to give assistance in the management and operation of TNAs, provided that personnel are available and work schedules allow. The kind of assistance that may be occasionally sought would be the use of large machinery, (such as the back-hoe), or a specialized task, such as felling a tree, or removing branches for safety reasons, is necessary
- The Department may be asked to check projects in TNAs that may need to meet and comply with University safety standards
- To include students employed to work in the TNAs in the training course given to students who are employed for ground operations
- The Department shall maintain parking lots and collect garbage from such lots
- The Department shall provide building maintenance and repairs, if an Interpretation/Nature Centre is approved

#### INCOME

|                                                              |                |
|--------------------------------------------------------------|----------------|
| 1. Student levy*                                             | 7,500          |
| 2. OWSP funding for three students                           | 3,800          |
| 3. Donations box in WONA parking lot                         | 100            |
| 4. Government or other external funding for 1 summer student | 5,300          |
| 5. Base budget from Trent University operating budget**      | 6,300          |
| 6. John de Pencier Nature Areas Endowment Fund               | 4,000          |
|                                                              | <hr/>          |
|                                                              | TOTAL \$17,000 |

#### Assumptions:

\*That the student levy is not rescinded

\*\* The University/Naturalist would be an additional benefit to the University if this person also taught an undergraduate course on "Nature and Environmental Interpretation".

## EXPENDITURES

|                                                                                                                                                    |                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1. Three summer students for 18 weeks @ \$7.50 h plus vacation pay, etc.                                                                           | 15,700          |
| 2. One summer supervisor for 18 weeks @ \$12.00 h plus vacation pay etc.                                                                           | 8,500           |
| 3. Three CWSP students during the academic year                                                                                                    | 5,000           |
| 4. Office and computer supplies, printing brochures                                                                                                | 3,000           |
| 5. Funding to maintain the BTCV/PON "Working Holiday" program                                                                                      | 3,000           |
| 6. Field equipment, supplies                                                                                                                       | 3,000           |
| 7. University Naturalist/NA Manager salary plus benefits<br>(based on the opinion of the Director of the Arboretum at<br>the University of Guelph) | 59,500          |
| 8. Assistant to University Naturalist/NA Manager plus benefits                                                                                     | 16,800          |
| 9. Undergraduate and graduate research awards from Student levy                                                                                    | 1,500           |
| 10. Undergraduate participation in "Working for Wilderness Project"<br>from Student levy                                                           | 1,000           |
|                                                                                                                                                    | <hr/>           |
|                                                                                                                                                    | TOTAL \$117,000 |

An additional CWSP student and a summer student would be hired to aid the Assistant to the University Naturalist/NA Manager.

Two summer students would be employed to work on the trail system and two to begin monitoring the ecological condition in the TNAs.

### 9.1.2 Operating Budget 2: \$91,000 per year

The major expenditure in this budget will be the salary for the proposed University Naturalist/NA Manager whose duties are outlined in 9.1.1. This person would spend approximately 50% of the time on administration, management operations and initiating long-term objectives of the Plan, 20 to 25% of the time on fundraising and the remainder on faculty duties (teaching). The teaching duties envisaged are those described in Operating Budget 1.

This budget will also provide the advisory committee for TNAs with professional ecological and nature area management information and advice.

The difference between this Budget and Operating Budget 1 would be that an Administrative Assistant for the University Naturalist/NA Manager would not be hired. Consequently, fundraising and the establishment of some proposed developments may not be as efficient. Some of the maintenance and management concerns also may be delayed. It is anticipated that involvement of the Department of Physical Resources will be similar to that described for Operating Budget 1.

## INCOME:

|                                                                                                     |                |
|-----------------------------------------------------------------------------------------------------|----------------|
| 1. Student levy*                                                                                    | 7,500          |
| 2. OWSP funding for two students during the academic year, for trail maintenance and interpretation | 2,500          |
| 3. Donations box in WSNA parking lot                                                                | 100            |
| 5. Base budget from Operating budget Trent University**                                             | 76,900         |
| 6. John de Pender Nature Area Endowment Fund                                                        | 4,000          |
|                                                                                                     | <hr/>          |
|                                                                                                     | TOTAL \$91,000 |

## Assumptions:

\* That the student levy is not included

\*\* The University/Naturalist would be an additional benefit to the University if this person also taught an undergraduate course on "Nature and Environmental Interpretation".

## EXPENDITURES:

|                                                                                       |                |
|---------------------------------------------------------------------------------------|----------------|
| 1. University Naturalist/NA Manager                                                   | 59,500         |
| 2. Two summer students for 18 weeks @ \$7.50/h plus vacation pay, etc.                | 10,600         |
| 3. One summer supervisor for 18 weeks @ \$12.00 h plus vacation pay etc.              | 8,500          |
| 4. Two OWSP students during the academic year plus vacation pay etc.                  | 3,400          |
| 5. Office and computer supplies, printing brochures                                   | 2,000          |
| 6. Funding to mount a BTCV/FON "Working Holiday"                                      | 3,000          |
| 7. Field equipment, supplies                                                          | 1,500          |
| 8. Undergraduate and graduate research awards from Student levy                       | 1,500          |
| 9. Undergraduate participation in "Working for Wilderness Projects" from Student levy | 1,000          |
|                                                                                       | <hr/>          |
|                                                                                       | TOTAL \$91,000 |

## 5.1.3 Operating Budget 3: \$31,000 per year

Operating Budget 3 will merely address ongoing user safety and maintenance issues identified in the Stewardship Plan and provide some necessary information and data for the NASAC to partially fulfil the mandate given to this Committee. Many development initiatives and opportunities are unlikely to occur under this particular budget. This budget also will not address all of the

concerns expressed in Part A, Section 3 regarding the current operation and management of TNAs and many of the suggested new initiatives.

Under this Budget scenario, personnel from the Department of Physical Resources will be responsible for supervising and coordinating projects identified by the NASAC in TNAs that can be undertaken. In order for the NASAC to meet some of committee's mandate in a meaningful and professional manner, the representative of the Department will be required to maintain "institutional memory" for the NASAC by providing at the first meeting of each new Committee a written account of TNAs activities, management and maintenance work undertaken during the previous year.

The safety of users, which includes students using TNAs for class work and research, as well as the public and the University community who use TNAs for recreational purposes, is of concern and is a liability issue. The formal trails in TNAs need to be regularly patrolled to identify safety and maintenance issues and those issues immediately be addressed. Safety is of added significance since Trent University agreed that several TNAs could be designated by the City of Peterborough as public greenspace. These areas will likely receive increased use as the Rotary Greenway Trail becomes more popular, especially if Trent uses it to promote the University. Furthermore, the consolidation and expansion of the University on the Symons Campus and increasing undergraduate and graduate enrolment, probably also will lead to greater academic and recreational use of the TNAs. Because the proposed NASAC is an advisory committee (as is the current NAC), the year-round safety, management and maintenance work in TNAs will need to be undertaken by the Department of Physical Resources, with input from the advisory committee.

This budget will not address all ecological concerns expressed in the Stewardship Plan. For these concerns to be addressed, the NASAC will require ongoing professional information and studies of the ecological conditions in the TNAs. Examples of the kind of professional knowledge needed by the NAC to carry out its mandate include information and quantitative data about long-term vegetation change and the impact of such change on habitat and biodiversity in TNAs. This information is required because of the potential detrimental impacts on the undergraduate teaching program and on research in Biology, Ecology, Environmental & Resource Science/Studies and Geography of the loss of habitat and biodiversity in TNAs. Consequently, frequent funding will be needed to monitor the vegetation in TNAs to determine the extent and implications of vegetation change.

Furthermore, as the membership of the NASAC changes, using the annually changing composition of past NACs as a guide, there will tend to be minimal continuity of knowledge of previous committee activities and decisions and an almost total lack of professional knowledge and data about the TNAs for the committee to consider. New members, also, are unlikely to be familiar with the Stewardship Plan. The two persons with the most knowledge about TNAs, accumulated during the past 15 years, have retired. For the NASAC to carry out its mandate in a professional and efficient way, it will need the ongoing membership of an individual, such as the representative from the Department of Physical Resources, to provide continuity of committee memory. The Representative from the Department of Physical Resources should, in order to maintain continuity of institutional knowledge and for informed deliberation by the committee, have the responsibility to provide an annual written report at the first meeting of each new NASAC. This report should include NASAC deliberations for the past year, a report of maintenance and management work undertaken during the previous summer, and a proposal for fall and winter work in the TNAs. An annual written report to the NASAC is necessary because of the possibility that the person representing the Department of Physical Resources, too, may change, as has been the case in the past.

The Department of Physical Resources will need to:

- undertake the ongoing management and maintenance of formal trails (approximately 20 km)

in TNAs; this will involve maintenance of trail structures and signs, erecting new signs, clearing brush, dealing with poison ivy, ground leveling, removing stumps and creating new trails

- hire (in conjunction with the NASAC), train, and supervise students and QWSP students to carry out improvements and maintenance of formal nature trails and other management issues identified in the Plan
- undertake ecological management activities that will include removing European buckthorn and Eastern white cedars from priority sites
- for continuity purposes, liaise with partner organizations such as the STCV and PCN to propose and organise international and Ontario "Working for Nature" conservation projects that have accomplished so much in the upgrading of TNAs since 1988
- seek, organise and supervise local and University volunteers willing to assist with the management and maintenance of TNAs
- organise the collection of user information about TNAs so that the NASAC will have ongoing data base in order that it can make recommendations concerning possible overuse of any TNAs that may be causing environmental or ecological damage
- be the University contact for the public and University community and be the source for information about TNAs
- undertake any additional tasks for the stewardship of TNAs recommended by the NASAC.

In summary, Budget 3, requires that the Department of Physical Resources provide much greater resources and personnel time than in the past in the ongoing stewardship and management of TNAs. Not included in this budget are costs required for ongoing professional studies of the ecology of TNAs and for evaluating any detrimental effects of teaching, research and recreation on TNAs. These professional studies are required by the NASAC for it to provide advice on the short-term and long-term stewardship of the TNAs and for this Committee to assess if vegetation change is likely to impact the academic program. Professional ecological studies are essential also for the periodic review of the Stewardship Plan and for evaluating its implementation.

#### INCOME:

|                                                                                                        |                |
|--------------------------------------------------------------------------------------------------------|----------------|
| 1. Student levy*                                                                                       | 7,300          |
| 2. QWSP funding for two students during the academic year;<br>for trail maintenance and interpretation | 2,500          |
| 3. Donations box in WSNA parking lot                                                                   | 100            |
| 4. John de Pencier Nature Area Endowment Fund                                                          | 4,000          |
| 5. Base budget from University operating budget                                                        | 16,900         |
|                                                                                                        | <hr/>          |
|                                                                                                        | TOTAL \$31,000 |

#### Assumptions:

- \* that the Student levy will not be rescinded

#### EXPENDITURES:

|                                                                                      |                |
|--------------------------------------------------------------------------------------|----------------|
| 1. Two summer students for 18 weeks @ \$7.50 h plus vacation pay, etc.               | 10,600         |
| 2. One summer supervisor for 18 weeks @\$22.00 h plus vacation pay etc.              | 8,500          |
| 3. Two CWSF students during the academic year plus vacation pay etc.                 | 3,400          |
| 4. Office and computer supplies, printing brochures for the NAC, website maintenance | 1,500          |
| 5. Funding to mount BTCV/PCN "Working Holiday"                                       | 3,000          |
| 6. Field equipment, supplies                                                         | 1,500          |
| 7. Undergraduate and graduate research awards from Student levy                      | 1,500          |
| 8. Undergraduate participation in "Working for Nature" project from Student levy     | 1,000          |
|                                                                                      | <hr/>          |
|                                                                                      | TOTAL \$31,000 |

#### 9.2 Sources of Financing for the Stewardship of TNAs

Recent experiences by members of the NAC and by the Development Office in raising funds and in-kind donations for the "Beyond our Walls" fundraising campaign, international conservation volunteers projects from 1998 to 2001, for management and maintenance tasks, such as reconstructing old and construct new boardwalks and creating formal trails in TNAs, indicate that there are many willing sources, locally, provincially and federally, of funding for TNAs that need to be exploited in an organised and concerted way.

Suggestions for financing implementation of the Stewardship Plan, for operations and management and for development and capital projects in TNAs include:

- funds from the University budget to match the Student Levy
- a portion of the salary of the Naturalist could come from teaching a course on interpretation and natural history to students in the Queen's-Trent Concurrent Education program and others interested
- offering training courses in nature interpretation and management on a contract basis for agencies such as Parks Canada, Ontario Parks and Interpretation Canada
- charging for an interpretive program for local and area schools. Interpretation could be undertaken by the proposed University Naturalist/NA Manager, by volunteers and as a course requirement for students enrolled in a nature/environment interpretation course in the Queen's-Trent Concurrent Education program
- an ongoing fundraising effort, in conjunction with the Development Office, by the proposed University Naturalist/NA Manager

- bequests and sponsorships sought by the Development Office and by the proposed University Naturalist/NA Manager. These could include: the naming of fields in the TNAs for donors, sponsorship of formal trails or sections of trails, donors for funding interpretive signs could have their names on the signs
- funds generated by offering hikes and interpretation walks, workshops and short courses
- a donations box at other trailheads in addition to the one in the parking lot in the WONA
- the sale, as successfully done in the past, of TNA products such as caps, sweatshirts, trail guidebooks. These would be sold in the proposed Nature/Environment Interpretation Centre, by the Bookstore, on now, and on the web
- an ongoing alumni donation campaign
- income from memberships in a Friends of Trent University Nature Areas association (FOTUNA), a non-profit organization to assist the University with maintenance of the TNAs, help with interpretation programs in TNAs, seek donations, and assist with selling merchandise, and staffing the proposed Interpretation Centre
- funds from government employment programs designed for students to gain experience and training for their potential career choice
- organising an annual public lecture, with an admission charge, by a noted ecologist or naturalist (could be a combined Peterborough Field Naturalists (PFN)/Trent event). Such lectures have been used very successfully in the past by the PFN to raise funds
- organising a monthly fifty/fifty draw
- organising an annual silent auction and dinner at which time awards would be presented to volunteers
- profits from a store maintained by FOTUNA members or other volunteers in a Nature/Environment Centre
- a charge could be made for companies wishing to advertise or display environmental products in the Nature Centre and in nature area publications
- a sponsor for the TNAs website
- the use of outside fundraising agencies
- sponsors for individual trees in the arboretum
- foundations, such as the Shell Environmental Fund, the Richard Ivy Foundation, the Canadian Nature Federation, that fund environmental protection, management, and education projects

## 16. INSTITUTIONAL ARRANGEMENTS, IMPLEMENTATION OF THE STEWARDSHIP PLAN AND MANAGEMENT OF TNAs

### 16.1 Institutional Responsibility and Decision Making

While stewardship of the TNAs and responsibility for the TNAs ultimately lies with the Board of Governors and the Department of Physical Resources, effective stewardship of over half of the Symons Campus that makes up the University TNAs will be a complicated undertaking, involving many tasks, such as assembling information, managing and protecting the areas, monitoring use of the areas, monitoring the ecological condition of individual TNAs, training and supervising summer students and students during the academic year, seeking, training and supervising volunteers, as well as seeking and administering funds. It is recognized that at present, as in the past, the Department of Physical Resources has limited capabilities to provide the necessary expertise, labour, time, and funding to take on the kind of day-to-day and the long-term operation of and management of TNAs needed to implement the Stewardship Plan. For these reasons it is essential that a qualified individual (see "University Naturalist/NA Manager" below) be charged with the responsibility for implementing the Stewardship Plan and for the day-to-day operation and management of the TNAs with assistance, as necessary, from the Department of Physical Resources. To reiterate, the major reason for suggesting the appointment of an "University Naturalist/NA Manager" is that experience, first with the Wildlife Sanctuary and then after 1989 with the TNAs, of ad hoc and sporadic management of TNAs is not in the best interest of this University. It is clear, that unless a qualified person, with advice from a more permanent management committee, charged with responsibility for the Stewardship Plan, the implementation of the Stewardship Plan will be haphazard and ineffective.

There are many other reasons for recommending that an individual be charged with the ongoing operation and management of TNAs and implementing the Stewardship Plan. A committee such as the NAC cannot possibly carry out these responsibilities effectively. The NAC generally meets only four times per academic year, and not at all during 6 months of the year from May to October, the prime time for management activities in the TNAs. The composition of the NAC is ephemeral which results lack of continuity of knowledge and sustained interest in TNAs. The same topics tend to get rehearsed by the NAC year after year. Individual Committee members, given their primary duties of teaching and research or studies in the case of graduate and undergraduate members, do not have available the time required to devote to learning about, visiting or making themselves aware of the management of TNAs. The allotting of management tasks and splitting up implementation of the Plan to different members of an ephemeral committee is not a sensible or viable option.

The NAC, or in reality the Chair or committed individuals, have sporadically attempted to carry out at least some of its mandate, by promoting field and interpretive trips in TNAs. The same comments apply to management of the TNAs. But to reiterate, effective management of TNAs and implementation of the Stewardship Plan will require the full-time attention of a qualified individual on an ongoing basis and not some-one on a limited-term contract. This individual would receive guidance from a management committee, described below, with a more permanent membership. A committee with an ephemeral composition, such as the present NAC, is not capable of providing effective guidance to an individual charged with responsibility for management of TNAs and implementing the Plan.



### 10.1.1 Recommendations

It is recommended that:

- a new committee, a Nature Areas Stewardship Advisory Committee (NASAC) be created to oversee implementation of the Stewardship Plan and the ongoing management and operation of TNAs.
- the actual implementation of the Stewardship Plan and the ongoing operation of TNAs be by a qualified person with the title of "University Naturalist/NA Manager" who shall be advised by the NASAC.
- for administrative purposes of the position, that the position of University Naturalist/NA Manager be an appointment in an academic department. (Or a cross appointment between Physical Resources and an academic department, if this is possible).
- the position of University Naturalist/NA Manager requires appropriate practical ecological and operational nature area training or experience and have at least an M.Sc or equivalent, since the person may be expected to offer a half or full course in the Concurrent Education Program, or another program (see 10.2.1 below).

### 10.1.2 Nature Areas Stewardship Advisory Committee

The present NAC should be replaced by a smaller committee, named the Nature Areas Stewardship Advisory Committee (NASAC) with core members serving periods of not less than three years in order that there be continuity of effort and knowledge. The NASAC should hold meetings, at a minimum, every 3 months, including the summer months, and submit an annual report to the President, PEG, the Department of Physical Resources, and the Board of Governors. Every 5 years, the NASAC should review the Stewardship Plan in the light of previous years experience. The NASAC would oversee the budget for implementation of the Stewardship Plan and the operation and management of the TNAs. The NASAC should report to the President and Senate through the President's Executive Group (PEG).

It is recommended that the NASAC have a membership of 9 individuals as follows:

One faculty member from each of the Departments of Biology, Environmental and Resource Science, and Geography for a 3-year, renewable, term. The Chair of the Committee shall be appointed from one these faculty members and the Chair could rotate annually between these faculty members if the NASAC so desires. Initially the terms for the faculty members could be set at 1 year for one individual and 2 years for one other and 3 years for the third faculty member. All could be re-elected to the Committee. Staggered terms should help with continuity of experience and knowledge for the NASAC.

The University Naturalist/NA Manager, who shall be the secretary for the NASAC

The Manager of Security, Parking & Grounds Services or Director of Physical Resources, or delegate.

The Vice-President of Finance or delegate (ex officio)

An elected staff member

*An elected undergraduate student*

*An elected graduate student*

## **10.2 Implementation of the Stewardship Plan, Day-to-day Operation and Management of TNAs**

### **10.2.1 Implementation of the Stewardship Plan**

The effective implementation of the Stewardship Plan and ongoing responsibility for management and other duties associated with the TNAs, as set out in the Plan, needs to be the responsibility of a qualified, professional individual, the "University Naturalist/NA Manager", with advice from, and reporting to, the NASAC.

### **10.2.2 Duties of the University Naturalist/NA Manager**

The duties of the University Naturalist/NA Manager shall be to implement the Stewardship Plan and to undertake the duties described in Section 9.1.1.

### **10.2.3 The Role of the Department of Physical Resources**

The Department of Physical Resources shall, provided personnel are available and work schedules allow, give assistance to the NASAC in the management and operation of TNAs.

The Department shall check that projects in TNAs meet and comply with University safety standards.

Students employed to work in the TNAs should undertake training courses, as appropriate, concurrently with students employed for ground operations.

The Department shall maintain parking lots and collect garbage from such lots.

The Department shall provide maintenance for an Interpretation/Nature Centre, if one is created.

### **10.2.4 Role of Volunteers**

The assistance of volunteers shall be sought, as practicable, for all aspects connected with the management and operation of TNAs. It is important, though, that volunteers be qualified or be trained for the tasks to be performed. Safety and training must be emphasized for any maintenance activities in the TNAs. Volunteers must not go out alone to carry out maintenance activities. Volunteers must carry communication devices and a first aid kit. Safety boots, goggles and hard hats may be required for some tasks.

## 11. CONCLUSIONS AND KEY RECOMMENDATIONS FOR THE ACTIVE STEWARDSHIP OF TRENT UNIVERSITY NATURE AREAS

Conclusions with key recommendations for the active stewardship of Trent University Nature Areas (TNAs) are detailed below.

1. Trent University was blessed with a spectacular site of 590 ha (1450 acres) encompassing a superb array of landscapes and habitats, ranging from dry uplands and wetlands to a variety of woodlots, abandoned farm fields and working farms when the first undergraduate class was admitted in 1964. In 1989, the Board of Governors (BOG) and the Senate determined that 16 areas of the Nassau Campus, since renamed the Symons Campus, should be preserved as TNAs because of their natural heritage characteristics and functions and that these TNAs should be protected from development. As a result of the fieldwork undertaken for this Plan, some adjacent TNAs, for ecological reasons, have been combined and some have been increased in size by the addition of significant adjacent areas. The 16 TNAs designated in 1989 thus have been consolidated into 12 TNAs for this Stewardship Plan.

### Recommendation 1.

That the University, Board of Governors (BOG) and the Senate reaffirm their commitment to the lands on the Symons Campus designated as TNAs for their natural heritage values and functions and because of their importance for long-term educational and research purposes and that these lands be protected from development. Furthermore, that the University, the BOG and the Senate adopt the 12 TNAs identified in this Stewardship Plan, as shown in Figure 1, and confirm their boundaries, with appropriately wide buffer zones. Also, that the width of the respective buffer zone for each Nature Area will be carefully re-evaluated, if there is any change of use, or threat by development on, land adjacent to that particular Nature Area.

2. In the absence of a long-term management and use plan the default approach to management of TNAs has been to take ad hoc action when management issues involving the safety of users have become too serious to ignore. This ad hoc approach must be abandoned by immediately implementing the Stewardship Plan in order to ensure the protection and sustainable use of Trent's TNAs for the long-term teaching, research and safe recreational purposes of the University and the community.

Implementing the Stewardship Plan for the Symons Campus will be an exciting and worthy challenge for a University that extols its concern for the environment and promotes all aspects of environmental studies.

### Recommendation 2.

That the University immediately implements the Stewardship Plan to protect the natural heritage values and functions of its TNAs for teaching, research and for recreation uses by the current and future generations of students, faculty, staff and the public.

3. a). Effective and successful implementation of the Stewardship Plan, in all of its aspects, will require the services of a qualified professional coordinating and supervisory person. The current situation without clear responsibility for the undertaking of actions to ensure the safe use of, or management of TNAs must change. Furthermore, the continued ad hoc practice by the University for dealing with its TNAs will exacerbate the declining of access to many TNAs and continued loss of habitat diversity and biodiversity.

### Recommendation 3a.

That the University hires a qualified person as the University Naturalist/Nature Areas Manager with responsibility for implementing the Stewardship Plan and for managing and monitoring of TNAs. This will entail adopting Operating Budget 1, or at the very least, Operating Budget 2.

1. b). If Recommendation 3a is rejected, then the Department of Physical Resources should expand significantly its current role in the stewardship of TNAs by committing significant personnel time and funds to all of the operational aspects of TNAs management identified in the Stewardship Plan, particularly issues of safety affecting University and public users. University users are primarily undergraduate students in the academic program and involves, in particular, students in Biology, Geography and ERS undergraduate courses (750 to 1000 course enrolments annually) that use TNAs for practical class work and training. Furthermore, based on some visitor surveys of both University and community recreational users, there are 10,000 – 15,000 day users per year of the Wildlife Sanctuary NA, alone.

The Department of Physical Resources will also need to control the unabated spread of European buckthorn and the excessive spread of Eastern white cedars, both of which are threatening habitat diversity and biodiversity in TNAs and reducing recreational appeal by encroaching into nature trails. Also the Department of Physical Resources, with advice from the NAC (or replacement Committee) will need to arrange for monitoring of the ecological conditions in the TNAs, so that any detrimental impacts of changes in biodiversity and habitat diversity in TNAs can be addressed. An example of detrimental change, due to the lack of monitoring, is the loss of open field habitats to stands of Eastern white cedar and the spread, all over the Symons campus, of European buckthorn.

### Recommendation 3b.

That if the University does not hire a University Naturalist/NA Manager then the operational management issues identified in the Stewardship Plan should be addressed by the Department of Physical Resources, under policy direction by the NAC or its replacement, the Nature Areas Stewardship Advisory Committee (NASAC). The University also will need to provide the Department of Physical Resources with funds for the contract monitoring of the ecological conditions of its TNAs so that the NAC, or its replacement committee, will be able to fulfill the advisory role assigned to it.

4. There is much evidence of interest and goodwill towards TNAs, both inside and outside the University. This goodwill has been demonstrated by recent national corporate and local business financial donations such as \$25,000 from Home Depot Canada, \$50,000 from the Canadian Pacific Foundation, and \$12,500 in total from the Mountain Equipment Co-op, Canada Trust Friends of the Environment and the Peterborough Field Naturalists. There has also been the creation of a \$100,000 "John de Percier Trent Nature Areas Endowment Fund". The student body at Trent have been donating, since 1988, via an annual levy \$7,500 per year, to the NAC for use with maintaining and creating nature trails, maintaining a website, for NAC office work and for student research projects in TNAs. In-kind donations to the University have included half the cost of a computer, printer and software by Peterborough Computers for Stewardship Plan preparation and for NAC office work, GIS software from ESRI Canada to assist with Plan preparation, tools from the Peterborough stores of Canadian Tire and the Home Depot store, free transportation by Century Airline Services from, and back to, Pearson International Airport for British conservation volunteers, prizes donated by

Sooters and Quinte Photographic for NAC photographic competitions, free snowshoe use by B&B Surplus for winter events in TNAs. This extensive interest and goodwill needs to be effectively tapped on an ongoing basis to assist with the stewardship of the TNAs. The continuity provided an individual contact/organizer at Trent or from the community is imperative to keep this going.

#### **Recommendation 4.**

That an ongoing campaign, organized and coordinated by the Development Office, commence immediately to raise funds for implementation of the Stewardship Plan. The raising of funds, in conjunction with the Development Office, will be an important task for the University Naturalist/NA Manager. Also that a campaign seeking goodwill donations be the responsibility, on an ongoing basis, of an individual at Trent or from the community.

3. A University committee, such as the NAC, whose membership, in large part, changes annually, does not have sufficient expertise, continuity of experience, knowledge about TNAs, information or resources, or time available to advise effectively the University on the responsible stewardship of its TNAs. This Committee also does not receive the professional information (and has never been provided with the resources to obtain such information and advice) necessary to advise effectively the University about conditions in, and use of, the TNAs that may be detrimental to the academic program.

#### **Recommendation 5.**

That the current NAC be replaced by a 9-member advisory committee, the "Nature Areas Stewardship Advisory Committee" or NASAC. Three core members, one from each of the Departments of Biology, Geography, and Environmental and Resource Science / Studies, would each serve for at least 3-year terms on the Committee. Other members would be the Manager of Security, Parking & Grounds Services or Director of Physical Resources, the Vice-President of Finance or delegate (ex officio), an elected staff member, an elected undergraduate student and an elected graduate student. The University Naturalist/NA Manager would provide professional advice to the Committee and could also be the secretary for the NASAC.

It is suggested that the NASAC reports to the President, the BOG and the Senate through the President's Executive Group (PEG).

6. Because vegetation change and ecological processes are not static, but are ongoing, and the use of TNAs may change, it is necessary that the Stewardship Plan be reviewed at least every 5 years.

#### **Recommendation 6.**

That the Stewardship Plan and the condition of the TNAs be reviewed at least every 5 years by the NASAC in the light of previous years experience.

7. The lack of permanent office facilities for the NAC for archiving information and records has resulted in the loss of much irreplaceable data and information about TNAs. Chairs of the NAC have not always passed information on to their successors and minutes and other material do not get sent to the University archives. This has led to inefficiency and lack of knowledge about TNAs and decisions made by successive NACs. Since 1996, as a temporary mea-

ure, desk space for the NAC computer and printer, and a filing cabinet was provided in the Trail Studies Unit (TSU) office in the Environmental Sciences building. However, a temporary arrangement of office space for the NAC is not a viable or responsible way to undertake work associated with, or to maintain records and other materials about TNAs. Undoubtedly, without permanent office space, records of the many activities related to the TNAs, and student research reports collected during the past 8 years will be lost, and there will be continued lack of continuity of effort and efficiency by the NAC. There are now too many important documents, information and maps of TNAs available in the Trail Studies Unit for use by students and others for these materials to be stored and managed by the Chair of the NAC, or NASAC, or by the Chair's secretary. Furthermore, an office is needed so that students can go there to use the resources related to the TNAs for their course work and for research projects.

#### **Recommendation 7:**

That permanent office space be allocated to the NAC, or NASAC, for maintaining records and for office work associated with TNAs so that continuity of effort and efficiency by the advisory committee can be improved. Ideally, such space would be part of a Nature / Environmental Interpretation Centre.

8. The willingness in recent years of community, including Home Depot store employees, Peterborough Field Naturalists, and University volunteers to work alongside international (British) and provincial (Federation of Ontario Naturalists) conservation volunteers in TNAs indicates that there is a reservoir of individuals committed to volunteering to help maintain and create nature trails in TNAs. Local volunteer assistance in the management of TNAs should be encouraged. Recent years experience has also demonstrated that large groups (10 to 15 persons) of volunteers can accomplish much work in TNAs so visits by groups of volunteers should continue to be promoted. However, for effective tapping of volunteer assistance it is necessary that a Trent or community individual be responsible for seeking volunteers.

#### **Recommendation 8:**

That local volunteer assistance be encouraged in the stewardship of TNAs. For safety and liability reasons volunteers should be trained and directed. It is also recommended that the recent practice of hosting international and provincial "Conservation Working Holidays" in TNAs should continue and that partnerships with conservation organizations, such as the Federation of Ontario Naturalists, be promoted.

9. Many parks are assisted financially and in other ways by Friends groups. There is interest in such a group at Trent. The participation of the public and Trent individuals interested in nature and the University Nature Areas should be encouraged by the formation of a Friends of Trent University Nature Areas Association (FOTUNA).

#### **Recommendation 9:**

That a Friends of Trent University Nature Areas Association (FOTUNA) be established to help financially and assist with the stewardship of TNAs.

10. The University has not exploited the value and immense potential for educational and interpretive purposes of the TNAs on the Symons Campus, especially for their use by area schools, for research, for recreational use by the University and Peterborough communities.

These environmental assets (the TNAs), could be of tremendous value for promoting the University and for fundraising purposes. Promotional and fundraising activities would be greatly enhanced by a Nature and Environmental Interpretation Centre which, preferably, could be situated on the unused Lockington Property on Pioneer Road. This property, adjacent to the Wildlife Sanctuary Nature Area, is only a 5 to 10 minute walk from the Symons Campus core. The abandoned house on this site easily could be renovated, using skilled volunteers, as a community project (interest has been expressed to undertake this). Furthermore, a University Visitor Centre could be part of an Interpretation Centre at this site, thus assisting with staffing and operating costs. A parking lot around this multi-use Centre would enhance security for the TNAs and make it unnecessary to maintain the parking lot for the Wildlife Sanctuary Nature Area on University Road.

It is suggested that an arboretum of native shrubs and trees, along with a cedar-hedge maze for environmental interpretation, located in adjacent fields, would be excellent innovations for the use of TNAs for environmental education and interpretation by schools. The arboretum, if it became a repository of a wide selection of shrubs and trees native to this area and Ontario, would be of much use for teaching and research at Trent. Collections of area and native trees and shrubs with a wide DNA base could be maintained at the University for breeding and for research purposes. Such a collection could be of much interest to the Ontario Ministry of Natural Resources, and for forestry, land rehabilitation and landscaping purposes. An arboretum, using sponsorship for the trees and shrubs, could add significant financial resources for the ongoing implementation of the Stewardship Plan. Furthermore, the establishment of an arboretum at Trent would be an excellent attraction and promotion for the University since one does not exist in this part of central Ontario. An arboretum with nature trails and a maze would complement, significantly, the appeal of a Nature/Environmental /Visitor Centre on the Lockington property.

#### Recommendation 10.

- a. That the University promote the use of TNAs for outdoor and environmental educational use by area schools.
- b. That a Nature / Environmental Interpretation Centre / University Visitor Centre be created in the house on the Lockington property, on Pioneer Road, adjacent to the north-west corner of the Wildlife Sanctuary Nature Area. Renovation of the house could be greatly assisted by skilled volunteers who have expressed interest in such a project.
- c. That, an arboretum of native tree and shrub species, along with a cedar-hedge maze for use in environmental education, interpretation and research, be created in fields adjacent to the Lockington Property.
- d. That, if the Interpretation/Visitor Centre is established, consideration be given to closing the parking lot in the Wildlife Sanctuary Nature Areas on University Road and that it be replaced by a more secure one serving the proposed Nature / Environmental / Visitor Centre.

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# PART C

## APPENDICES

**TERMS OF REFERENCE FOR PREPARING A STEWARDSHIP PLAN FOR THE  
TRENT UNIVERSITY NATURE CONSERVATION AREAS  
April 25, 1996**

**1. Issues**

For several decades, the Trent University Nature Areas, which comprise about half the Symons Campus, and which are intended to protect natural values while providing opportunities for education, research and recreation, have failed to achieve their potential because of various problems, some of which are now critical, including:

- Lack of institutional commitment to nature areas
- Lack of information on the biophysical character, processes and use of the areas.
- No mission statement for them
- No detailed policy statement to guide management
- Confusion regarding responsibility for them
- No plan or budget for their practical protection
- Inadequate maintenance
- Lack of visitor management despite considerable public use, and safety liability concerns
- Loss of biodiversity which will reduce potential future benefits of the areas
- Confused and inadequate response to exotic, invasive and noxious species
- Vulnerability of areas to impacts of activities on adjacent lands, for which there is also no plan
- No funding to prepare, staff, and implement a Stewardship Plan

Given that the University has this very valuable resource and a responsibility to manage it, as well as a reputation for environmental studies, and an attractive campus, it is essential that a Stewardship Plan for the nature areas be prepared, along with a strategy for implementing it, immediately.

**2. Contents of a Stewardship Plan**

**(a) History and Background of Nature Areas**

- Statement on original establishment and purpose of nature areas
- Overview of landscape and vegetation change in nature areas since Trent acquired the lands
- Review of the institutional arrangements, decision-making and management for the areas

- Overview the present condition of the nature areas environment including how they are being used
- The current policies (university, municipal, provincial and federal) that affect management and development of nature areas
- The regional context of the nature areas, on campus, in city, in local bioregion

(b) Inventory

- Completion of existing information on the areas, identification of information gaps, and collection of any additional necessary information
- Establishment of a central, accessible data base of information on the areas
- Compilation and updating of a list of species
- Development and application of a habitat classification system
- Continue development of a G.I.S. for mapping and data information on each area
- Map of vegetation communities in each area
- Identification of significant biotic and abiotic features
- Identification of areas sensitive to human impact
- Information and map of historical and cultural features
- Information and map of recreational facilities
- Information on potential additions or deletions to nature areas

(c) Mission, Policy and Management Guidelines

(i) Mission Statement - to be developed by synthesizing:

- Current nature areas policy
- University policy re campus and nature areas
- University mission statement
- Viewpoints of key individuals using areas for teaching and research
- Results of Management and Use Survey of January - March, 1995
- Results of Visitor Survey of summer 1995

The Mission statement will be prepared in consultation with the University and local community. This will enable the provision of a variety of Mission statements to discuss to reach a consensus on a final one

(f) Policy and Management Guidelines

- Develop policy and general management guidelines for the whole nature area system, relating to protection, education, research, and recreation - consistent with Mission Statement
- Develop guidelines for natural resource management for each nature area, covering geomorphology, hydrology, vegetation, wildlife, historical resources
- Develop guidelines for human use management for each nature area, covering research, education, recreation, safety

(d) Implications of/for Adjacent Lands

- Identify existing or potential impacts of nature areas on surrounding lands and their potential use
- Identify existing or potential impacts of the use, and potential development, of lands surrounding the nature areas, on the integrity of the nature areas
- Suggest means for management of lands surrounding nature areas to assist in maintaining integrity of nature areas.
- Review boundaries of nature areas to identify potential additions or deletions

(e) Institutional Arrangements

- Review existing institutional arrangement for nature areas, including roles of:
  - Property Committee of the Board of Governors
  - Nature Areas Committee
  - Physical Resources
  - Student workers
  - Volunteers
- Review strengths and weaknesses of existing arrangements
- Suggest alternative institutional arrangements for discussion, to reach consensus on optimal long-term institutional arrangements and responsibilities
- Consider feasibility, and means of establishing and operating a Friends of the Nature Areas Association

(f) Implementation Strategy

- Prepare implementation strategy for the management of the whole system of nature areas
- Prepare implementation strategy for management of each nature area
- Consistent with the above, identify projects, priorities, responsibilities, and funding needs for various time periods, e.g. 1 year, 3 years, 10 years
- Provide a strategy for enforcement of policy
- Provide a procedure for monitoring, evaluating, and review of plans for the system and each area

(g) Financing

(i) Capital and Operating Costs

- Identify essential and desirable capital expenditures on nature areas for various time periods, e.g. 2 yrs, 5 yrs, 10 yrs
- Identify ongoing maintenance costs, consistent with achieving management objectives
- Identify other ongoing operational costs
- Identify financial implications of having staff, various institutional arrangements to manage the areas

(ii) Revenue and Funding Sources

- Document sources and amounts of funding that have been available for nature areas, and Nature Areas Committee in past five years
- With active support of the Development Office identify sources of funding to cover essential and desirable capital expenditures
- Identify sources of funding to cover essential and desirable maintenance and operating expenses
- Consider, in particular: University contribution, University campaign, government grants, corporate grants, foundations, student levy, alumni contribution, fees from interpretation programs, user fees, Friends Association, merchandising, public donations, special lectures

(h) Comparative Information

- Obtain information on the existence, aims, management, effectiveness, and funding of nature areas at other universities, e.g. Guelph, Queen's, Cornell, UBC
- Obtain information from relevant agencies, e.g. Wye Marsh, conservation authorities, parks, on measures for addressing the management issues, e.g. invasive species, public use, funding, faced by Trent's nature areas.

3. Strategy for Preparing the Plan(a) Study Leadership and Team(i) Leadership

The study will be lead throughout by Trent Faculty members, as follows:

May - August, 1996: R. Jones, M. Fox, J. Marsh  
 September - December, 1996: R. Jones  
 January - June, 1997: J. Marsh  
 July - December, 1997: M. Fox

(f) Study Team

The study team will comprise:

Faculty: M. Fox, R. Jones, J. Marsh  
 Physical Resources: S. Dantzer  
 Research Assistants: Those appointed  
 Community: D. Sadler

(ii) Resource People

The study team will make use wherever possible of resource people such as:

- faculty
- staff
- students
- Physical Resources staff
- local conservation area managers
- members of Peterborough Field Naturalists Club
- interested community members



(b) Schedule of Tasks

| <u>Time</u>          | <u>Task</u>                           |
|----------------------|---------------------------------------|
| 5/96-12/97           | Initiation and Coordination of study  |
| 5/96-6/96            | History and Background                |
| 5/96-10/96           | Comparative Information               |
| 5/96-8/97            | Inventory                             |
| 9/96-12/96           | Mission                               |
| 9/96-2/97            | General Policy                        |
| 11/96                | University and Community Consultation |
| 1/97-6/97            | Management Guidelines                 |
| 5/97-8/97            | Adjacent Lands                        |
| 5/96-6/96, 7-8/97    | Institutional Arrangements            |
| 3/97                 | University and Community Consultation |
| 3/97-7/97            | Implementation Strategy               |
| 6-7/97               | Financing                             |
| 5/96-6/96, 4/97-6/97 | Funding Sources                       |
| 9/97-10/97           | Present Draft Plan to University      |
| 11/97-12/97          | Prepare Final Plan                    |

(c) Budget(i) Expenses

|                                                                                             |                    |
|---------------------------------------------------------------------------------------------|--------------------|
| - Faculty - 1 course release<br>(Sept. 1996 - Dec. 1997)                                    | \$12,000.00        |
| - Research Assistants (2)<br>\$12/h x 7 h/day x 22 days/month<br>x 24 months x 15% benefits | \$45,017.28        |
| - Materials, photocopying, typing, etc.                                                     | <u>\$ 2,000.00</u> |
| <b>TOTAL</b>                                                                                | <b>\$59,017.28</b> |

(ii) Revenue

|                                    |                    |
|------------------------------------|--------------------|
| - University                       | \$30,000.00        |
| - External Grants                  | \$20,000.00        |
| - Employment subsidies, CWSP, etc. | <u>\$10,000.00</u> |
| <b>TOTAL</b>                       | <b>\$60,000.00</b> |

#### 4. Reporting

(a) The study team (see 3 (a)) will:

Report to: (a) Nature Areas Committee - monthly  
 (b) Presidential Ad Hoc Advisory Committee on the Nature Areas - every 3 months or at critical points in the planning process  
 (c) Senate - Fall 1996, Fall 1997

Inform Regularly: (a) Property Committee  
 (b) Physical Resources  
 (c) Presidential Environmental Advisory Committee  
 (c) Others, as deemed appropriate

#### (b) Reports

- (i) An Interim report will be submitted by 31 March 1997 to the Ad Hoc Presidential Advisory Committee on the Nature Areas. This report will contain a draft of the text of the following sections of the Stewardship Plan: History and Background, Mission, General Policies for the Nature Areas.
- (ii) A second Interim Report will be submitted by 31 August, 1997 to the Ad Hoc Presidential Advisory Committee on the Nature Areas. This will comprise a draft of the complete text of the Stewardship Plan.
- (iii) A Final report will be submitted to relevant committees of the University in September 1997, with view to approval of the plan by December 1997, and its implementation beginning January 1998.

John Marsh, April 25, 1996

**APPENDIX B: Vegetation Communities Occurring in the Nature Areas on the Symons Campus, Trent University, Peterborough, Ontario.**

| Table 3. A brief description of the vegetation communities occurring in the Nature Areas on the Symons Campus, Trent University, Peterborough, Ontario. |                                                                                                       |                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Vegetation Community                                                                                                                                    | Vegetation Characteristics                                                                            | Environmental Characteristics                                                                                                   |
| <b>WETLAND COMMUNITIES</b>                                                                                                                              | - vegetation cover composed of at least 50% wetland spp.                                              | General characteristics:<br>- hydric soils<br>- waterable above or near soil surface for at least part of the growing season    |
| Mash Meadow                                                                                                                                             | Tree and shrub cover < 25%; dominated by hydrophytic emergent macrophytes (i.e. >50% wetland species) | - open wetland, waterable seasonally drops to or below the substrate surface<br>- at or near the wetland-terrestrial transition |
| Shallow Marsh                                                                                                                                           | Tree and shrub cover < 25%; hydrophytic emergent macrophyte cover 75-100%                             | - water up to 1 m deep, standing water usually year-round                                                                       |
| Shrub Marsh                                                                                                                                             | Tree and shrub cover < 25%; low shrubs cover (< 1 m) > 25%                                            | - waterable seasonally drops to or below the substrate surface                                                                  |
| <b>SWAMP COMMUNITIES</b>                                                                                                                                | Tree or shrub cover > 25%<br>Dominated by hydrophytic shrub and tree species                          | - variable flooding regimes<br>- water depth < 2m<br>standing water or vernal ponding > 30% of ground coverage                  |
| Thicket Swamp                                                                                                                                           | Tree cover < 25; hydrophytic shrubs > 25%                                                             |                                                                                                                                 |
| Deciduous Swamp                                                                                                                                         | Tree cover > 25% of which deciduous component > 75% of total tree cover                               |                                                                                                                                 |
| Mixed Swamp                                                                                                                                             | Tree cover > 25% of which coniferous and deciduous components contribute > 25% of total cover         |                                                                                                                                 |
| Coniferous Swamp                                                                                                                                        | Tree cover > 25% of which coniferous component > 75% of total tree cover                              |                                                                                                                                 |
| <b>TERRESTRIAL COMMUNITIES</b>                                                                                                                          |                                                                                                       |                                                                                                                                 |
| <b>FOREST</b>                                                                                                                                           | Tree cover > 60% Tree dominate inventory                                                              | - site conditions and substrate types variable                                                                                  |
| Deciduous Forest                                                                                                                                        | deciduous tree composition > 75% of total tree cover                                                  |                                                                                                                                 |
| Mixed Forest                                                                                                                                            | Mixed deciduous-coniferous composition; neither less than 25% of total tree cover                     |                                                                                                                                 |
| Coniferous Forest                                                                                                                                       | conifer tree composition > 75% of total tree cover                                                    |                                                                                                                                 |

| Vegetation Community       | Vegetation Characteristics                                                                                    | Environmental Characteristics                                                                                                                |
|----------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| WOODLAND                   |                                                                                                               | - successional following natural disturbance                                                                                                 |
| Deciduous Woodland         | deciduous tree cover 25-60%                                                                                   |                                                                                                                                              |
| Coniferous Woodland        | conifer tree cover 25-60%                                                                                     |                                                                                                                                              |
| Mixed Woodland             | Mixed deciduous-coniferous composition; height less than 20% of total tree cover                              |                                                                                                                                              |
| Sparse Deciduous Woodland  | Deciduous tree cover 10-25%; shrub and herb cover any %                                                       |                                                                                                                                              |
| Sparse Coniferous Woodland | Coniferous tree cover 10-25%; shrub and herb cover any %                                                      |                                                                                                                                              |
| Sparse Mixed Woodland      | Deciduous-coniferous tree cover 10-25%; neither less than 15% of total tree cover; shrub and herb cover any % |                                                                                                                                              |
| PLANTATION FOREST          | Tree cover > 60%                                                                                              | - site conditions and substrate types variable<br>- community resulting from, or maintained by, cultural or anthropogenic-based disturbances |
| Deciduous Plantation       | Deciduous tree species > 75% of canopy                                                                        |                                                                                                                                              |
| Conifer Plantation         | Coniferous tree species > 75% of canopy cover                                                                 |                                                                                                                                              |
| CULTURAL MEADOW            | Tree cover $\leq$ 15%; shrub cover $\leq$ 25%                                                                 | - site conditions and substrate types variable<br>- community resulting from, or maintained by, cultural or anthropogenic-based disturbances |
| Old Field                  | Tree Cover < 10% grassland and forb dominated                                                                 |                                                                                                                                              |
| Old Field Thicket          | Tree Cover < 10%; small tree and shrub cover > 25%                                                            |                                                                                                                                              |
| Old Field -Successional    | Immature trees (1.5-5 m) 25-100%                                                                              |                                                                                                                                              |
| Cultural                   | Vegetated areas which are periodically manipulated to maintain site conditions eg. lawn                       |                                                                                                                                              |
| Agricultural               | Land currently used for agricultural purposes, includes pasture, cropland and hayfield                        |                                                                                                                                              |

Table 10. Vegetation communities in each of the Nature Areas on the Symons Campus, Trent University, Peterborough, Ontario

| VEGETATION<br>COMMUNITY        | NATURE AREA |         |          |           |            |           |           |          |          |          |           |           |
|--------------------------------|-------------|---------|----------|-----------|------------|-----------|-----------|----------|----------|----------|-----------|-----------|
|                                | BN<br>NA    | C<br>NA | SD<br>NA | LPC<br>NA | SDRW<br>NA | TLF<br>NA | LJL<br>NA | RL<br>NA | PR<br>NA | WC<br>NA | ACM<br>NA | OCW<br>NA |
| <b>WETLAND COMMUNITIES</b>     |             |         |          |           |            |           |           |          |          |          |           |           |
| Marsh Meadow                   | x           |         |          | x         |            | x         | x         | x        |          | x        | x         | x         |
| Shallow Marsh                  |             |         |          | x         |            |           | x         | x        |          | x        | x         |           |
| <b>SWAMP COMMUNITIES</b>       |             |         |          |           |            |           |           |          |          |          |           |           |
| Thicket Swamp                  | x           | x       |          | x         |            | x         | x         |          |          | x        |           | x         |
| Deciduous Swamp                | x           | x       |          | x         |            | x         | x         |          |          |          |           |           |
| Mixed Wood Swamp               |             |         |          |           |            | x         | x         |          | x        | x        |           |           |
| Coniferous Swamp               |             |         |          |           |            | x         | x         |          |          | x        |           |           |
| <b>TERRESTRIAL COMMUNITIES</b> |             |         |          |           |            |           |           |          |          |          |           |           |
| Deciduous Forest               | x           |         | x        | x         | x          | x         | x         |          |          |          |           |           |
| Mixed Forest                   | x           | x       |          |           |            |           |           |          |          |          |           |           |
| Coniferous Forest              |             | x       |          |           |            |           |           |          | x        |          | x         |           |
| Deciduous Woodland             |             | x       | x        | x         | x          | x         |           |          |          |          |           |           |
| Coniferous Woodland            |             | x       |          |           |            |           | x         | x        |          |          |           |           |
| Mixed Woodland                 | x           | x       |          |           |            | x         | x         |          |          | x        |           |           |
| Sparse Deciduous<br>Woodland   | x           | x       | x        |           |            |           |           | x        |          |          |           |           |
| Sparse Coniferous<br>Woodland  | x           |         |          |           |            |           |           |          |          |          | x         |           |
| Sparse Mixed<br>Woodland       |             |         | x        |           |            |           |           |          |          |          |           |           |
| Conifer Plantation             | x           |         |          | x         |            | x         |           |          |          |          |           |           |
| Old Field                      | x           | x       | x        | x         |            | x         | x         |          | x        | x        |           | x         |
| Old Field Thicket              | x           | x       |          | x         |            |           | x         |          |          |          |           |           |
| Old Field -<br>Successional    | x           | x       |          |           |            |           |           |          |          |          |           |           |
| Agricultural                   | x           |         |          |           |            |           |           | x        |          |          |           |           |

**APPENDIX C: Maps Showing the Distribution of Vegetation Communities in the 12 Trent University Nature Areas on the Symons Campus, Trent University, Peterborough, Ontario.**

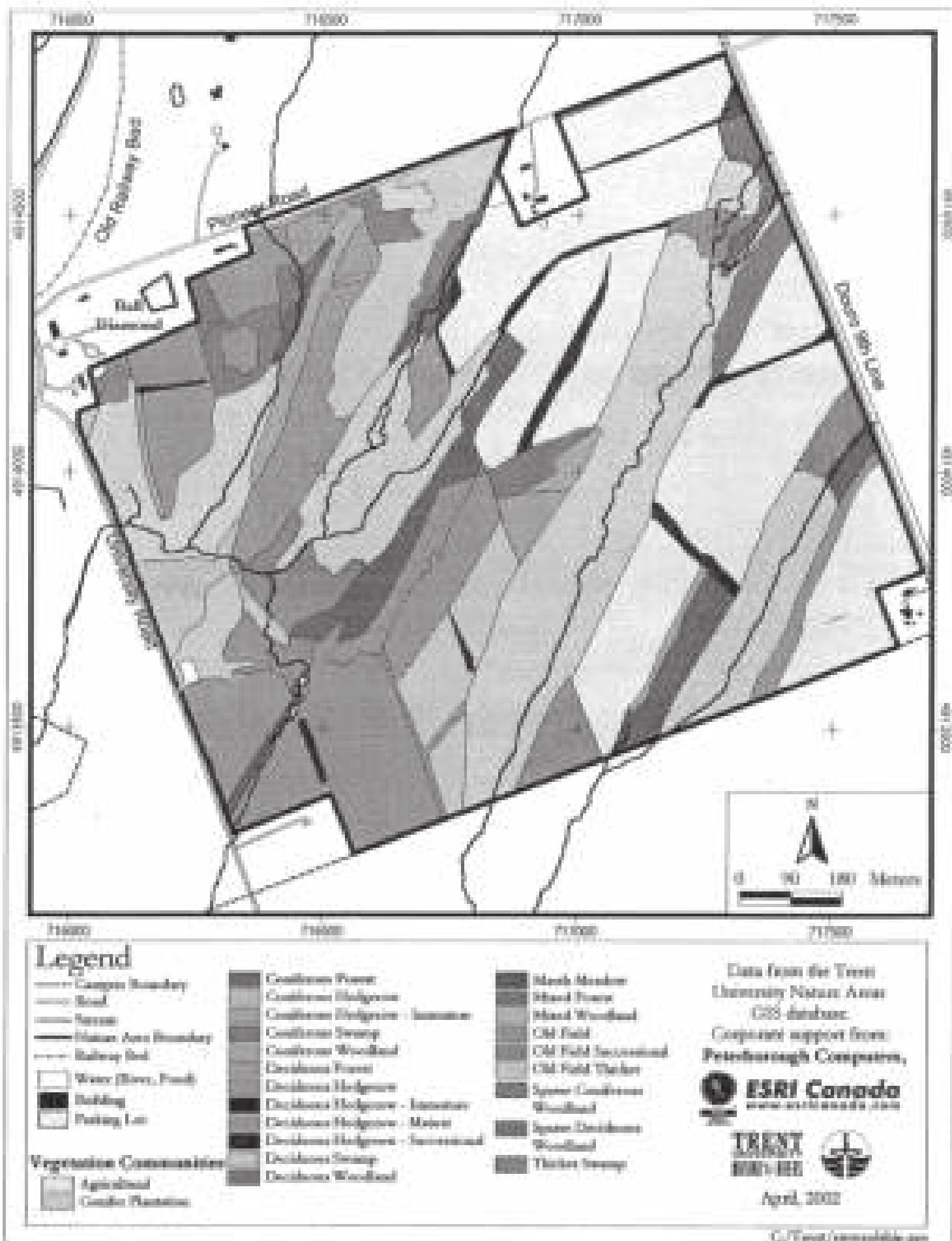


Figure 1-3. Vegetation Communities in the Wildlife Sanctuary Nature Area, Symons Campus, Trent University, Peterborough, Ontario





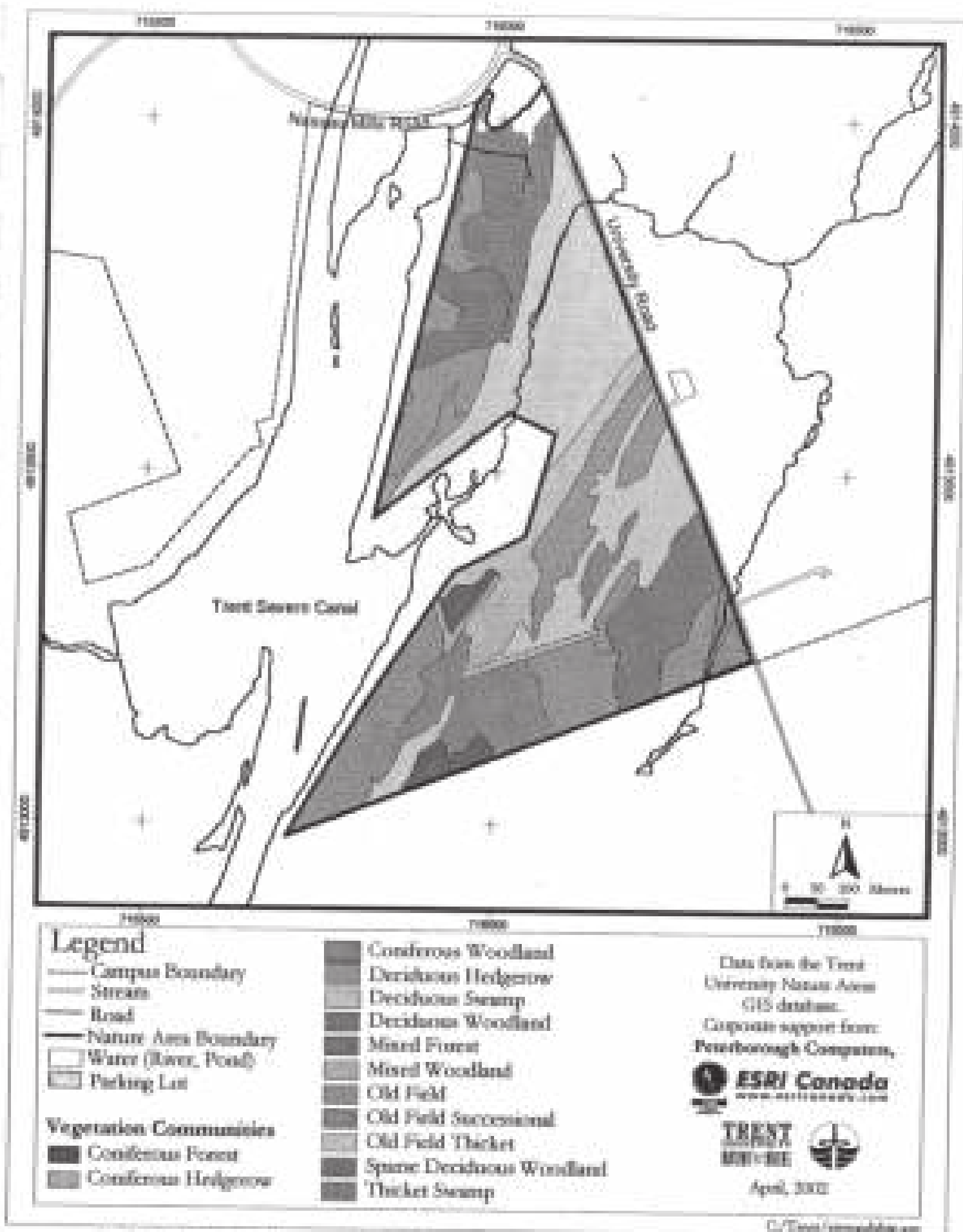
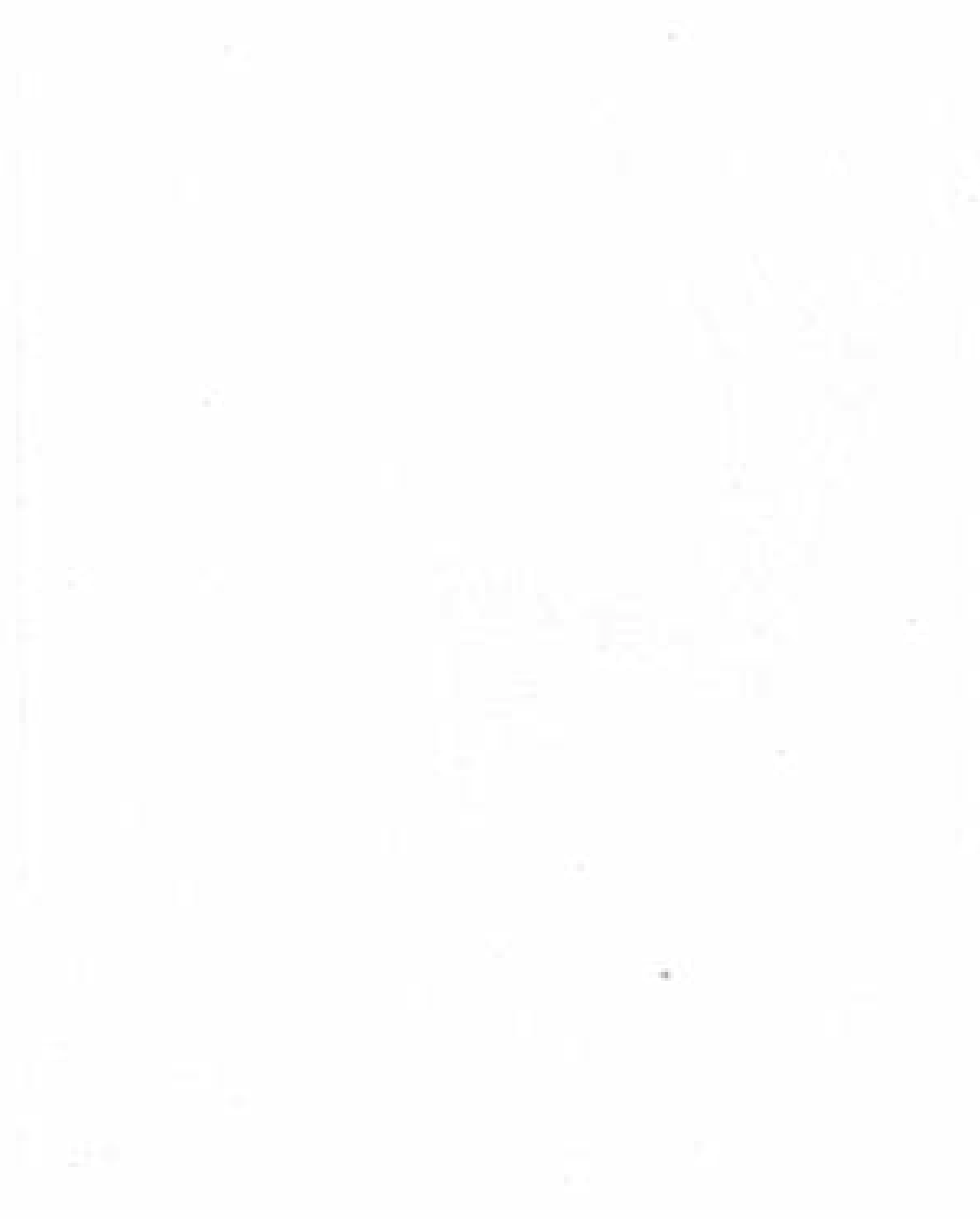


Figure 3-3. Vegetation Communities in the Canal Nature Area, Symons Campus, Trent University, Peterborough, Ontario.

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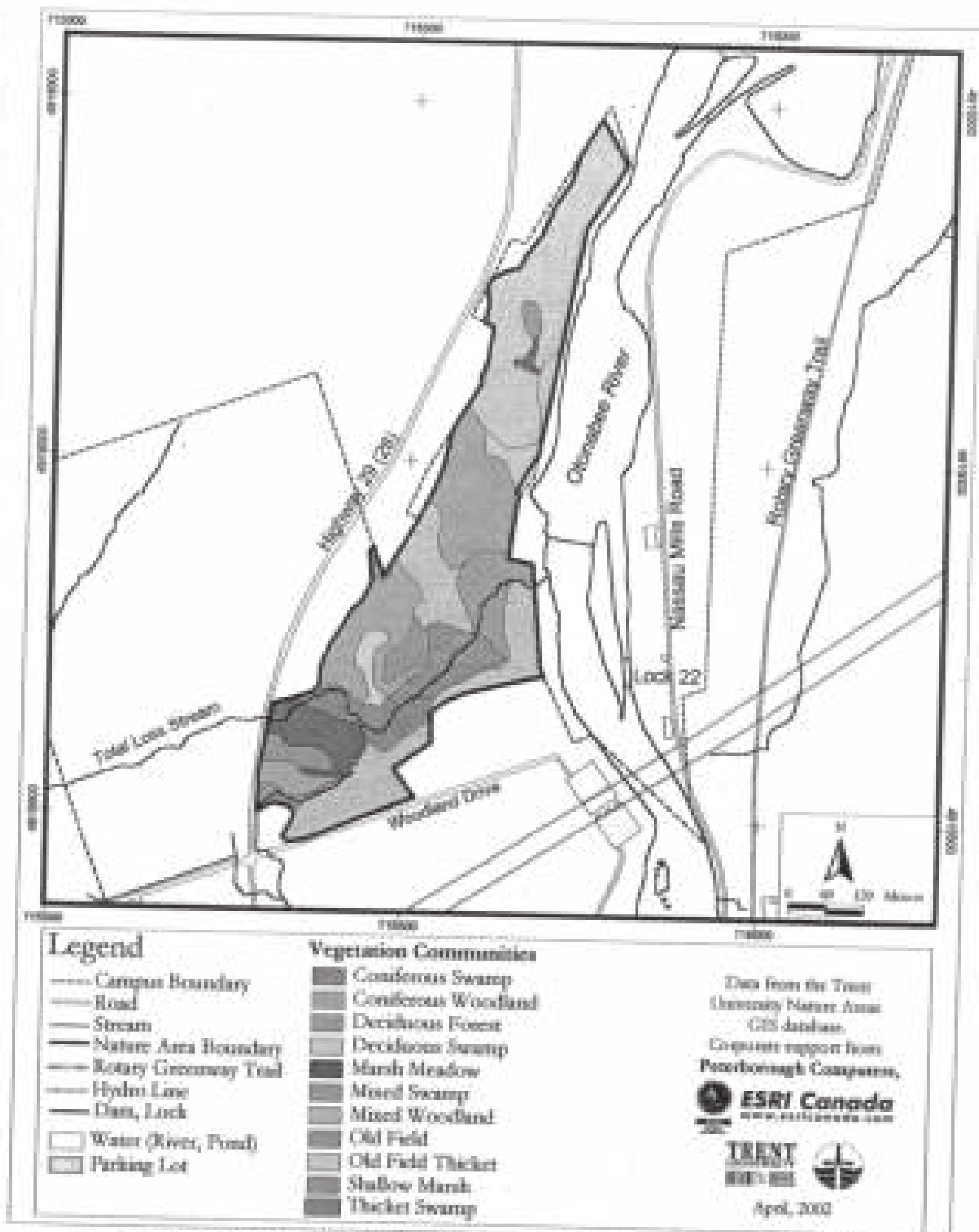


Figure 7-3. Vegetative Communities in the Lock 22 Nature Area, Symons Campus, Trent University, Peterborough, Ontario.



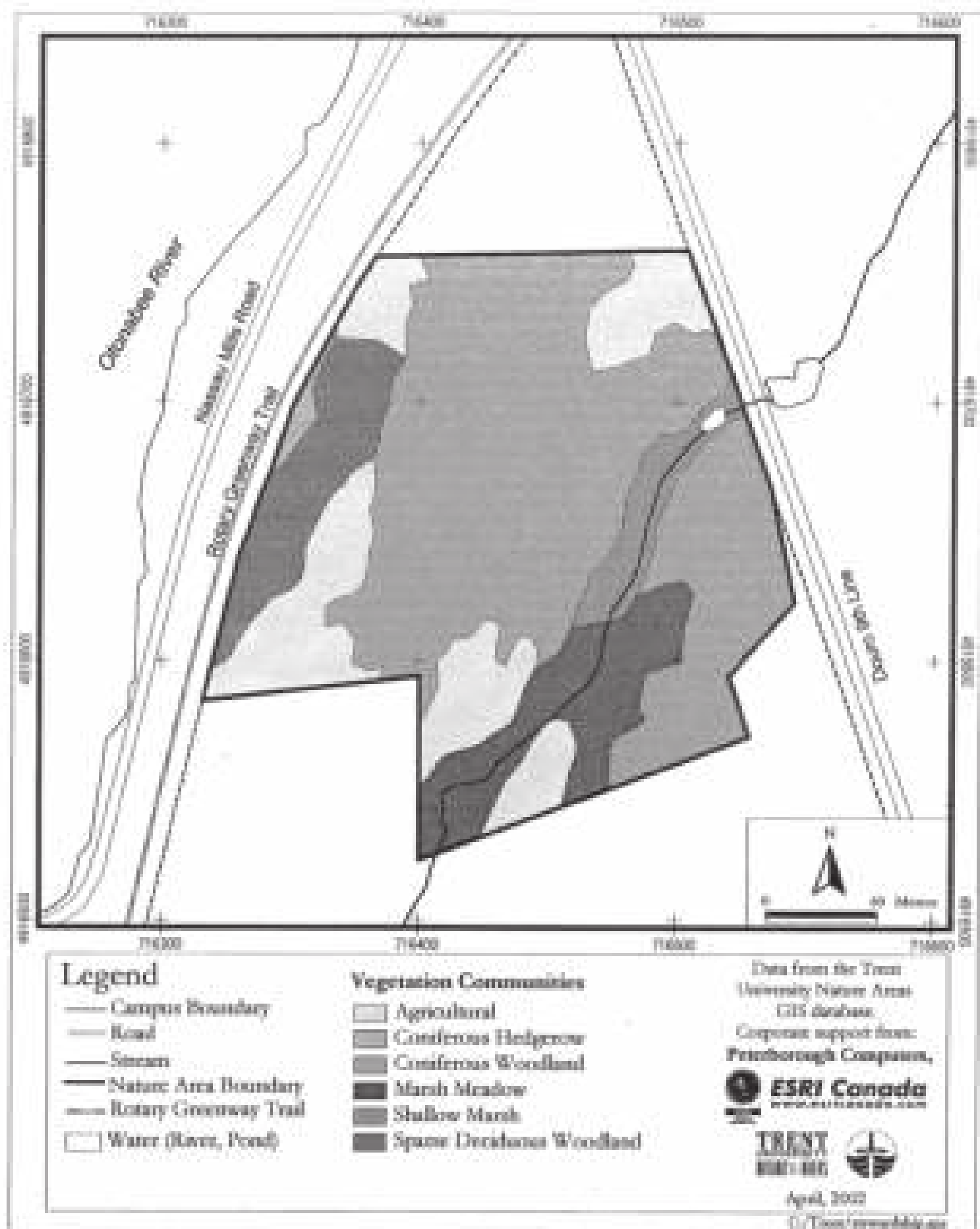


Figure 8-3. Vegetation Communities in the Ninth Line Nature Area, Symons Campus, Trent University, Peterborough, Ontario



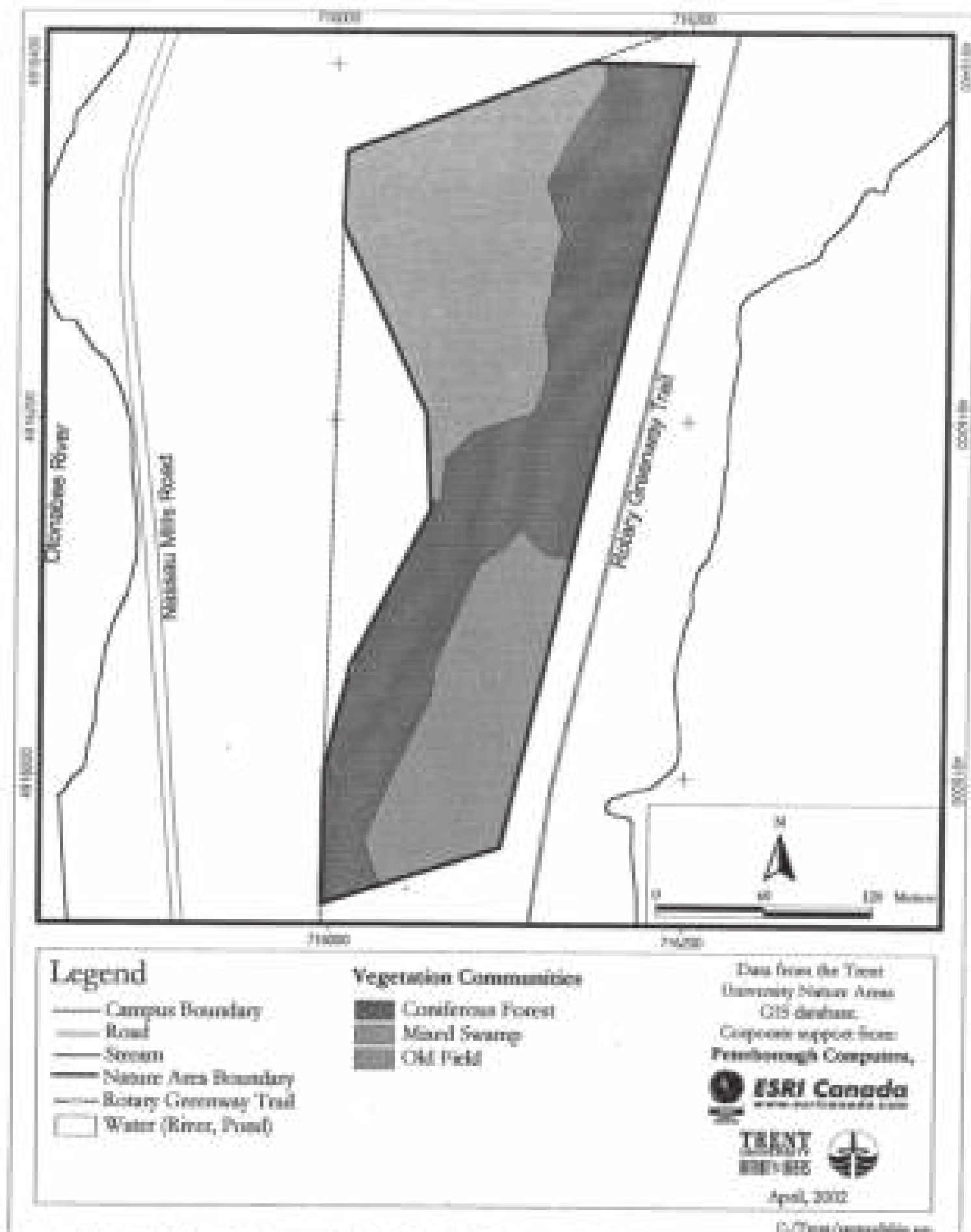


Figure 9-3. Vegetation Communities in the Premier Rock Nature Area, Symons Campus, Trent University, Peterborough, Ontario.





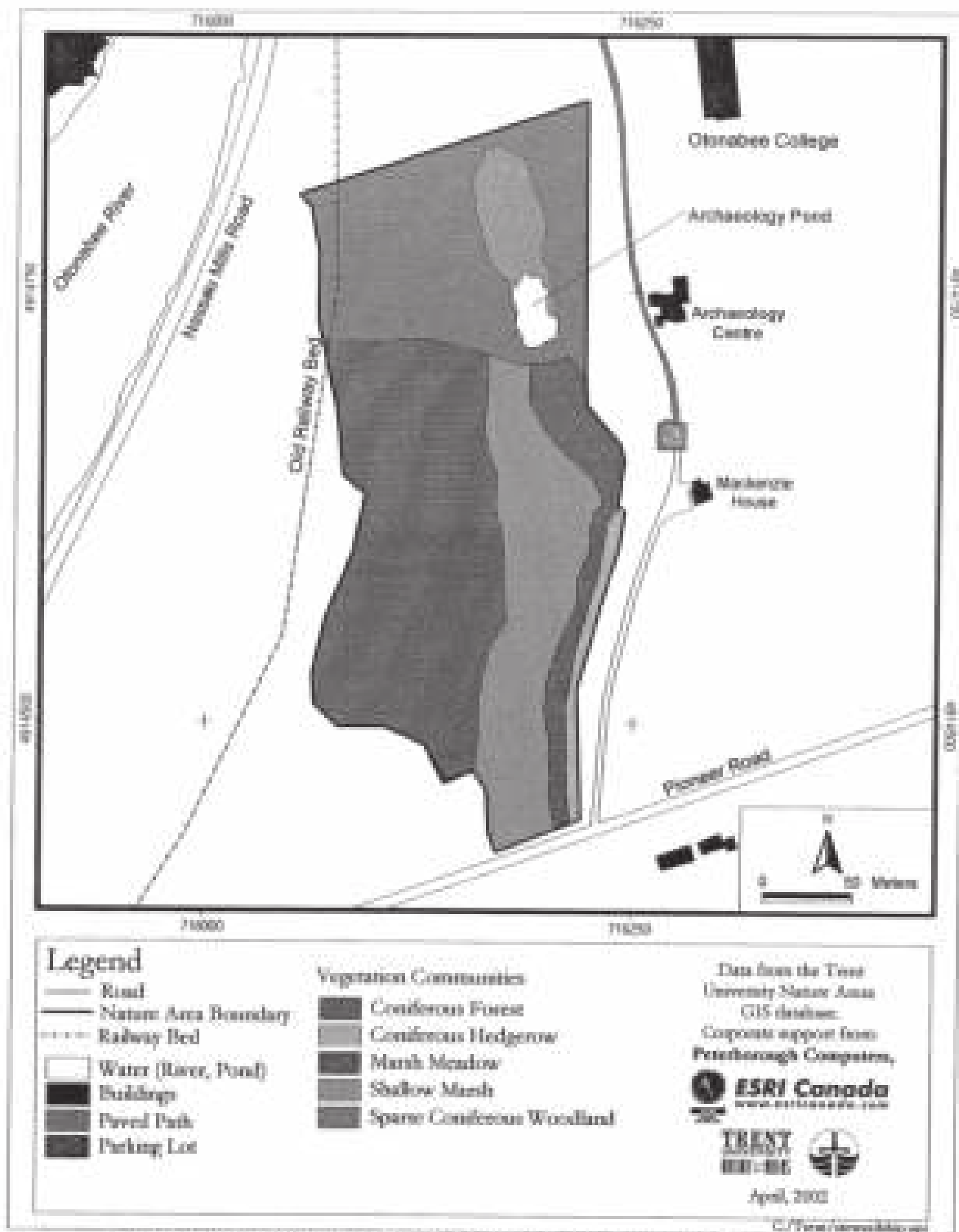


Figure 11-3: Vegetation Communities in the Archaeology Centre Wetland Nature Area, Sykes Campus, Trent University, Peterborough, Ontario.



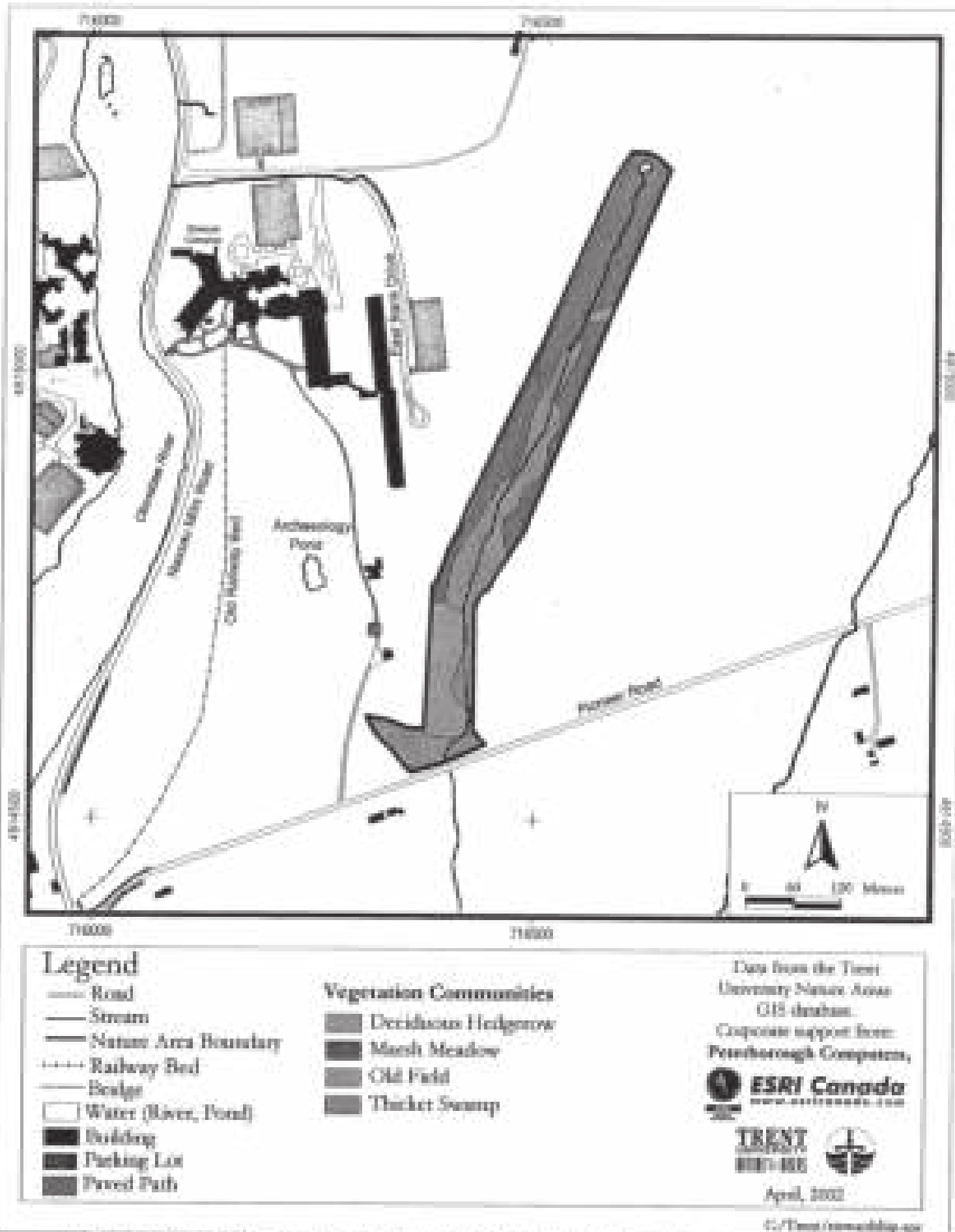


Figure 12.3. Vegetation Communities in the Otonabee College Wetland Nature Area, Simon Fraser University, Peterborough, Ontario.



**APPENDIX D: A Summary Description of Each of the 12 Nature Areas on the Symons Campus, Trent University, Peterborough, Ontario.**

Appendix D contains a brief description of the topography, hydrology, vegetation and wildlife, historical features, significant features, land-use, adjacent land-use, and management issues for each of the 12 Nature Areas.

## WILDLIFE SANCTUARY NATURE AREA (WSNA)

Nature Area Number: 1

Nature Area Classification: B

### Introduction:

The Wildlife Sanctuary NA covers an area of 164 ha and is located in the southeast corner of the Symons Campus, south of Pioneer Road and east of University Road (Figure 1-1). The WSNA is the largest and most extensively visited nature area on the Symons Campus, being used for teaching and outdoor recreation by the University community and the public. It is estimated that there are between 10,000 to 20,000 person visits per year. The WSNA is used for walking, jogging, cross-country skiing, snow shoeing, and nature walks. In addition, it is used for undergraduate teaching and some local school classes visit for recreation and nature interpretation.

### Topography and Soils:

The WSNA is situated in rolling terrain typical of the Peterborough Drumlin Field. The topography consists of four NE to SW parallel wetlands, separated by indistinct drumlins, the highest of which rises some 17 m above the wetlands. Glacial erratics occur in some parts of the WSNA.

Soils of the uplands and a few small lowland areas belong to the Otonabee Series which have a medium texture, are moderately stony and good to excessively drained. Lowland soils are primarily classified as Foxboro Series, having a coarse texture, are stone free and have poor to very poor drainage.

### Hydrology:

The WSNA has three relatively large, separate wetlands. The northern-most wetland receives intermittent inflow from several drainage sources north of Pioneer Road, including the Archaeological Centre Wetland, the Otonabee College Wetland, and a stream which flows through agricultural fields. Intermittent inflow also comes from a wetland adjacent to the Canal NA to the southwest. Outflow is via an intermittent stream draining west through the Canal NA and then into the Trent Canal.

A central, seasonally flooded wetland is situated in a broad, flat lowland dominated by silver maple. Seasonal inflow into the eastern part of the WSNA comes through culverts under County Road 6 that drains the upper reaches of this wetland. There are several small semi-permanent pools in the wetlands. Flow through these wetlands occurs after heavy precipitation.

The topography and hydrology of the southern-most seasonally flooded wetland is similar to that of the central wetland, except the inflow is not as substantial. Water drains from this wetland and the central wetland into a large wetland on neighbouring land to the southwest. These wetlands are the headwaters for Curtis Creek.

### Vegetation:

Vegetation types in the WSNA are shown in Figure 2-1. Upland fields are undergoing secondary succession with old-field communities composed of grasses, perennial herbs, and a light to moderate cover of shrubs and young trees. The lower areas of some fields, and areas adjacent to

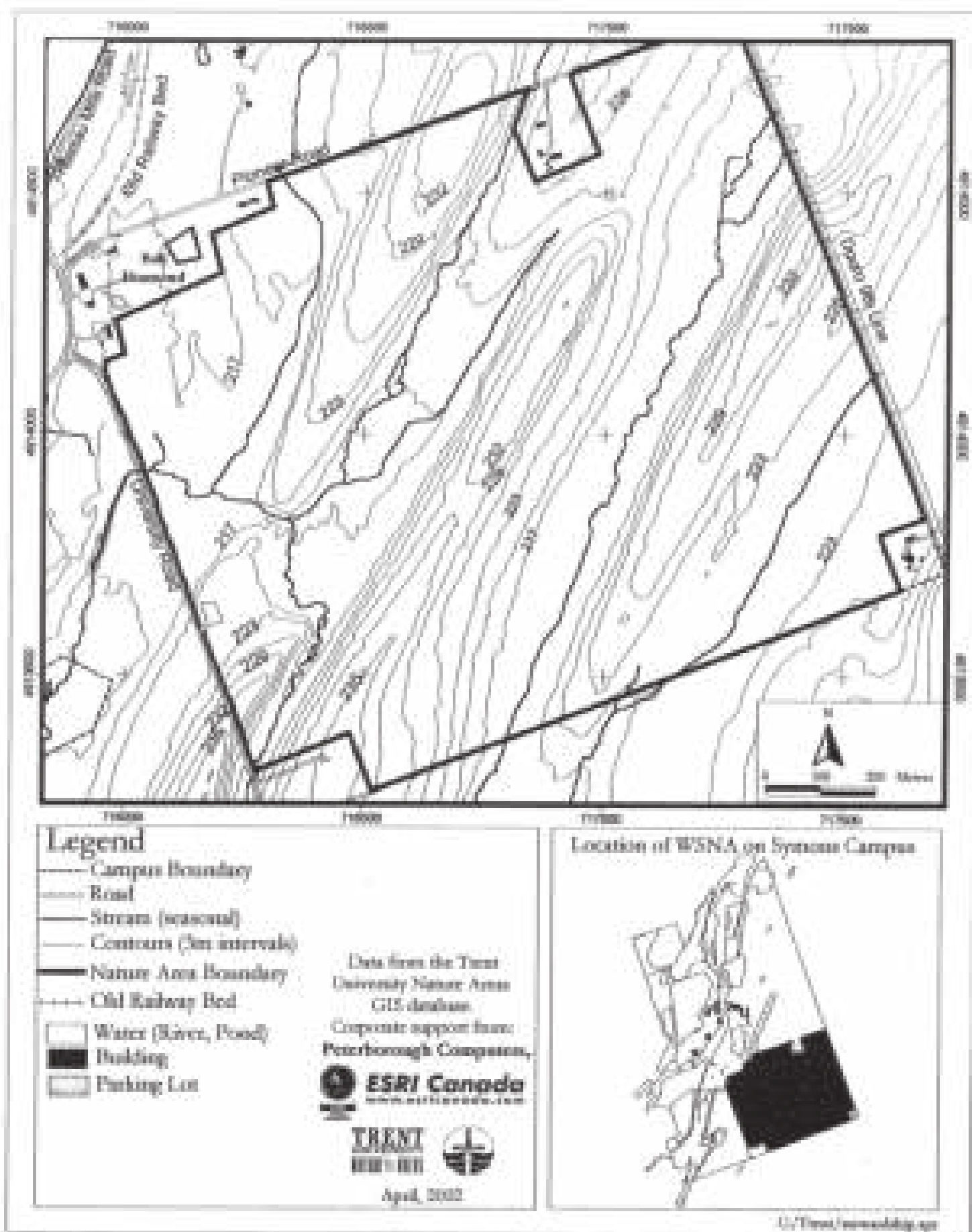


Figure 1-1. Contour Map of the Wildlife Sanctuary Nature Area, Symons Campus, Trent University, Peterborough, Ontario.





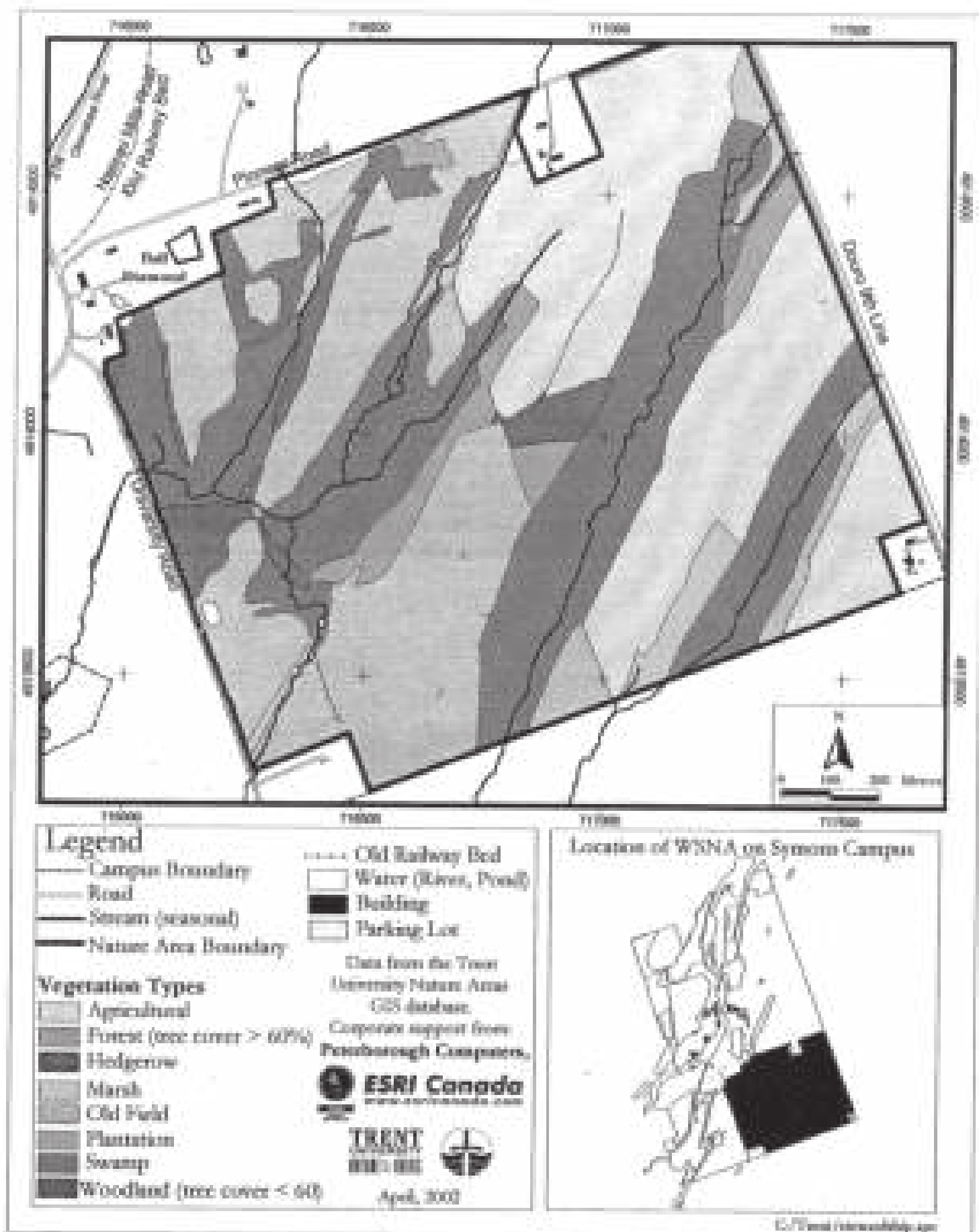


Figure 1-2. Vegetation Types in the Wildlife Sanctuary Nature Area, Symons Campus, Trent University, Peterborough, Ontario.



fence-rows often have a moderate to dense border of tree seedlings, such as White cedar and deciduous tree saplings, such as Trembling aspen. Young trees are establishing so quickly that they may soon dominate the upland vegetation, eliminating open field habitats and thus reducing biodiversity. White cedar is the dominant species; it forms dense stands of tens of thousands of young trees per hectare (e.g. in Fields 152, 154 and 114, see Appendix B). White ash and American elm are also common, but occur at much lower densities than cedar.

The seasonally flooded wetland vegetation consists primarily of deciduous trees or a mixture of deciduous trees and herbaceous species. The dominant tree species are silver maple, red ash, white cedar, and trembling aspen, while small patches of open wetland support a mix of graminoids and herbs. The seasonally flooded areas were undoubtedly grazed by stock animals and trees killed for firewood.

### **Wildlife**

The large size of the WSNA and its diversity of geomorphological features and habitats are favourable for wildlife. White-tailed deer are particularly abundant on the eastern side, having been observed frequently in this area for many years. Deer tracks, bedding sites and scats are common. Cool, shaded thickets and deciduous wetlands provide daytime shade for deer from the summer heat. Uplands provide good sources of food such as forbs, grasses and volunteer alfalfa. Stands of white cedar provide winter cover and browse. This area is fairly isolated, does not have established walking trails and so is relatively undisturbed by unleashed running dogs. Raccoons, grey squirrels, red fox, and eastern cottontails may be seen in the WSNA. Some evidence of beaver and muskrat has been noted in the wetland north of the parking lot on University Road. Weasel tracks have been observed in snow in the northeast quarter of the WSNA. Black bears may be occasional visitors.

Shallow pools in the wetlands support a variety of aquatic life. For example, pools in the central deciduous swamp contain schools of small fish, wood frogs, frog tadpoles, diving beetles, and many other aquatic insects. Several of the other wetlands provide reproductive habitat for amphibians.

Among the many bird species to be seen in the WSNA, are the great horned owl, red-tailed hawk, American woodcock, and common raven. A cooper's hawk and fledged young were observed in the central deciduous swamp in late July, 1996. Other forest-dwelling birds noted in the same area included a warbling vireo with young, the red-eyed vireo, and great-crowned flycatcher. Ruffed grouse are fairly common along the upland edges of the wetlands, and migratory flocks of hermit thrush and warblers have been seen. Open areas in fields provide habitat for a host of different bird species, including upland sandpiper, bobolink, American goldfinch, field sparrow, savannah sparrow, Baltimore oriole, northern cardinal, northern flicker and rose-breasted grosbeak.

### **Historical Features**

A number of cultural features occur in this Nature Areas that are related to past agricultural activities. These include:

- abandoned agricultural fields in various stages of succession
- abandoned agricultural cedar rail fences, rock fences, posts, tracks, wood piles, dumps, field drains and rock piles in fields and along fence rows.
- abandoned agricultural building site

- abandoned wells
- invasive species from abandoned garden (e.g. lilacs, pettiwinkle)
- current agricultural fields (storage and hay crops)
- evidence of logging for firewood and lumber
- conifer plantation

### Significant Features

A significant feature of this nature area is the mature silver maple trees growing in the seasonally flooded central wetland. Of importance, too is the fact that the wetlands are the headwaters of Curtis Creek. The WSNA, particularly the eastern half and other areas where trails have not been made, provides significant habitat for white-tailed deer. In addition, the mature canopy of the wetlands and the many secluded areas provide nesting habitat for birds such as the uncommon Cooper's Hawk.

Another significant feature is the variety of habitats created by secondary succession in the abandoned upland fields during the past 30 years. A deciduous woodlot near the centre of the nature area contains lady slipper orchids and wild lilies, uncommon plants in this municipality.

### Land Use

#### Teaching and Research

Because of the closeness of the WSNA to the Environmental Sciences building and the diversity of habitats and landforms, this nature area is used as an outdoor classroom for undergraduate teaching in Biology, Geography, Environmental Sciences. The Department of Native Studies, in recent years, erected a sweat-lodge in the WSNA. Faculty, graduate, honours and undergraduate students and classes use the WSNA for research in a variety of disciplines, including hydrology, soil studies, vegetation succession, forest ecology, small mammal and recreation studies.

#### Recreation

The WSNA has excellent recreational potential as a result of its size, habitat diversity and excellent viewscapes. There is a system of interconnected, formal trails (Figure 10), with a combined length of approximately 12 km through the western half of the nature area. The trail system, with several looped trails, can be accessed from a trailhead at the edge of the parking lot off University Road and from the central campus area by the path running by the Archaeology Centre onto Pioneer Road and then by using the trail through the hall and over a bridge, constructed in August 1999 by British Trust for Conservation Volunteers and local conservation volunteers. This bridge crosses a seasonally flooded wetland to allow for year-round access to the trail system without having to use University Road. The two longest trails, 2.5 km and 3 km, respectively, pass mainly through open or semi-open upland fields, although several wetlands are spanned by bridges or boardwalks. The shortest (red trail) is located mainly in a lowland bordering the edge of a wetland.

The WSNA is also used by non-Trent groups and organizations such local schools for nature studies and recreational activities such as orienteering and cross-country skiing. Fleming College uses the area for non-credit courses. The Peterborough Field Naturalists organize nature walks for members and the general public.

## Agriculture

About one-quarter of the eastern half of the WSNNA is actively farmed. The primary crops are hay and corn and there is some pasture.

## Adjacent Land Use

Some of the lands to the south and east of the WSNNA are used for cultivation and pasturing while other lands are old fields and a deciduous swamp. Trent owns the lands on the north side of Pioneer Road, which include leased cultivated land, abandoned fields and two wetland nature areas, the Archaeology Wetland NA and the Otonabee College Wetland NA. On the west side of University Road is the Canal NA.

## Management Issues

### Ecological Integrity

There is concern that:

- habitat and biodiversity in the WSNNA are in decline. The variety of habitats in the WSNNA and associated biota are under threat by overabundance of Eastern white cedar and the alien species, European buckthorn. Open-field habitat and associated species are disappearing at a rapid rate, and in some fields are being replaced by monocultures of impenetrable White cedar stands. White cedar saplings and young trees, for example, have formed such dense stands in some of the upland fields (e.g. Fields 152, 154, and 114) that the establishment of deciduous trees is being inhibited. It is possible that cedars will dominate these areas for many decades. From a recreational use and wildlife habitat standpoint, deciduous or mixed woodlands are a more desirable cover than impenetrable cedar forest. If white cedar stands are not too dense they can provide cover for white-tailed deer.

European buckthorn, *Rhamnus cathartica*, is very common in the WSNNA along fence-lines, at the edges of woodlots and in areas of woodlots where there are gaps in the tree canopy. This species can shade out native species. Buckthorn is a prolific producer of fruits which are eaten by birds so that seeds are widely dispersed in bird droppings.

- there is a local problem in some parts of the WSNNA that are being invaded by some other native and alien shrub and tree species. Lilac (*Syringa vulgaris*) an invasive alien shrub, and black locust (a native tree species) are spreading in Fields 127, 128 and 135 (Appendix J) near a former farmhouse and garden site. Unless controlled these species will continue to spread, displacing native species. Black locust is also advancing on the upland south of the parking area in Field 123 (Appendix J). While these invasive species are fairly intolerant of shade and may eventually be displaced, their displacement will take many decades.
- tree felling for firewood has occurred.
- the release into the WSNNA in the area of the parking lot of native species of animals and pets trapped in the city is of concern, and should be banned as this may disrupt indigenous animal populations.

## Safety

It is of concern that:

- because the WSNA is the most heavily used of TNAs that a rescue plan has not been developed to remove injured users.
- a fire fighting and prevention plan has not been developed for the WSNA.

## Teaching and Research

It is of concern that:

- due to lack of information it is not known how extensively schools, or other organizations or groups, for that matter, use the WSNA – use of the WSNA usually comes to the attention of the NAC by chance. The WSNA area has been used by some school classes for winter activities. Lakeland College School runs orienteering events in this nature area.

## Recreation

It is of concern that:

- formal nature trails are not being maintained on a sustained, systematic basis to defined standards to minimize impacts, ensure user safety and enjoyable recreation. Sensitive sections of trails in wet areas and on slopes are showing signs of damage and erosion.
- ATV use occurs on several trails across wetlands in the east part of the WSNA.
- that mountain biking occurs causing rutting the soil in wet areas of trails and erosion. This activity occurs despite the main sign in the parking lot on University Road stating that mountain biking is prohibited in the WSNA.
- dogs are disrupting wildlife in the WSNA. For example, dogs may be disrupting birds nesting near trails and be scaring away small mammals. These kinds of disruptions reduce opportunities to view wildlife.

This Nature Area was originally intended to be refuge for wildlife and an area for teaching and research, hence its name the "Wildlife Sanctuary". In the mid-1970s, as a protection for wildlife from feral dogs, a wire fence, some 6 ft high and with barbed wire strands along its top, was erected along the north and south boundaries of the Wildlife Sanctuary but was not completed along the east and south boundaries. In the absence of a Stewardship Plan for the Wildlife Sanctuary, dog walking, without the sanction of the Wildlife Sanctuary or its successor the Nature Areas Committee, has, by default, become a common activity in the Wildlife Sanctuary. Furthermore, because Nature Area policies have not been enforced, many dog owners simply ignore a notice posted on the sign in the parking lot to remind dog owners that the Peterborough City By-law 91-115 requires dogs be leashed at all times. Many dog owners seem unconcerned that they are in a wildlife sanctuary and allow their dogs to run free. Unleashed dogs, and even leashed dogs for that matter, are probably disrupting wildlife. White-tailed deer may be seen in the adjacent Canal NA and in parts of the WSNA not frequently visited by people and their dogs, and probably would be observed more often from formal trails in the WSNA if dogs were not allowed in this Nature Area.

- many dog owners do not pick up their dog's faeces, as required under Peterborough City By-law 91-115. Dog faeces are malodorous and unsightly and that they can be a hazard to human health. Walkers on formal trails must be constantly vigilant to avoid dog faeces. Dog faeces are particularly common in and around the parking lot. In winter, dog faeces on trails interfere with the enjoyment of cross-country skiers.
- large, unleashed dogs can be very intimidating to walkers and to families with small children, particularly when such dogs are encountered running, unleashed, ahead of their owners. Because of such encounters, some visitors decline to re-visit the WSNLA.

## CANAL NATURE AREA (CNA)

|                             |                                    |
|-----------------------------|------------------------------------|
| Nature Area Number:         | 2                                  |
| Former Nature Area Name:    | Scrub and Biological Research Area |
| Former Nature Area Numbers: | 2a and 2b                          |
| Nature Area Classification: | B                                  |

### Introduction:

The Canal NA, 37 ha in size (Figure 2-1), extends from the west side of University Road to the east bank of the Trent Severn Canal. A main access trail begins at an entrance gate almost opposite the Wildlife Sanctuary NA parking lot. A narrow trail enters the north part of the CNA from the Nassau Mills Road, just east of the bridge in the Trent Canal.

### Topography and Soils

The topography throughout much of this area is gently sloping. A small, low drumlin, elevation 226 m, is situated east of the canal in the northern part of this nature area and part of a larger drumlin occupies the southeastern corner. A broad lowland is located in the north-central part of the nature area. Upland soils are primarily Chonaboo Series, having a medium texture, are moderately stony and have good drainage while lowland soils belong to the Foshorn Series which have a coarse texture, are stone free and have poor to very poor drainage. The wetland in the extreme northeastern corner of the nature area contains undifferentiated organic soil.

### Hydrology

There are 3 separate wetlands in this nature area (Figure 2-2). The first is a shallow marsh situated in the extreme southeastern portion at the western edge of University Road and drains under the road into the Wildlife Sanctuary NA. This wetland contains a small, permanent, open water pond bordered by shrubby thickets and receives water, regulated by a dam and berm, from a larger wetland on neighbouring property to the southwest. The water level in the wetland above the dam is approximately 0.5 m higher than in the University wetland.

The second wetland is the central wetland, a narrow patch of deciduous swamp and thicket lining part of the southwestern base of the large drumlin. This wetland probably receives drainage from adjacent upland areas, drains onto neighbouring land to the south and eventually into the Trent Canal.

The third wetland is the most northerly one, a mixed swamp which appears to be permanently flooded. An intermittent stream flows in from the Wildlife Sanctuary and runs along the northern edge of this swamp into the Trent Canal. Beaver dams and fallen trees obstruct flow in this stream.

### Vegetation

The vegetation types in this nature area are illustrated in Figure 2-2. The vegetation of much of this nature area is in various stages of secondary succession, consisting of a mixture of old-field, sparse woodlands, stands of saplings, and treed swamps. Impenetrable stands of young white



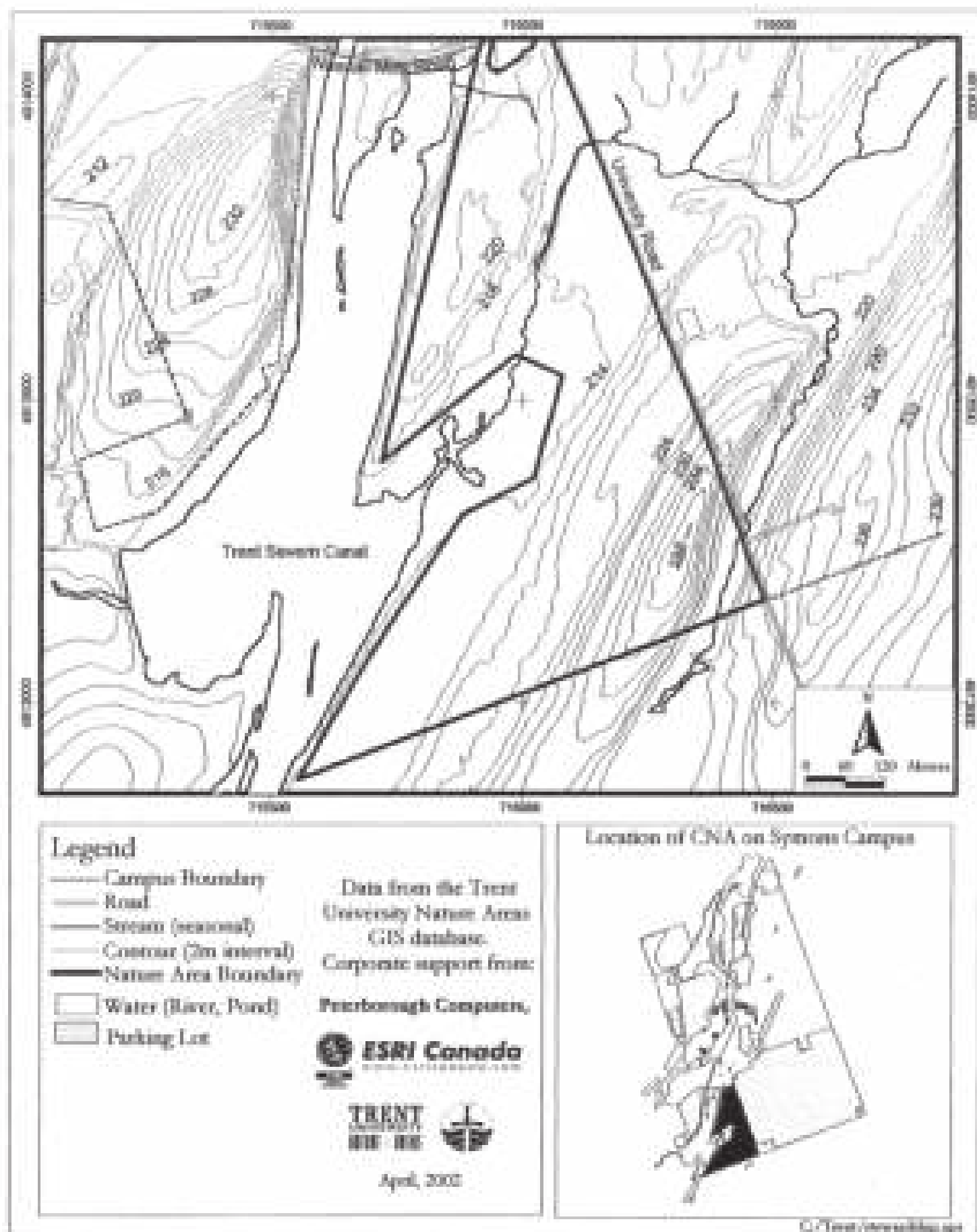


Figure 3-1. Contour Map of the Canal Nature Area, Syriens Campus, Trent University, Peterborough, Ontario.



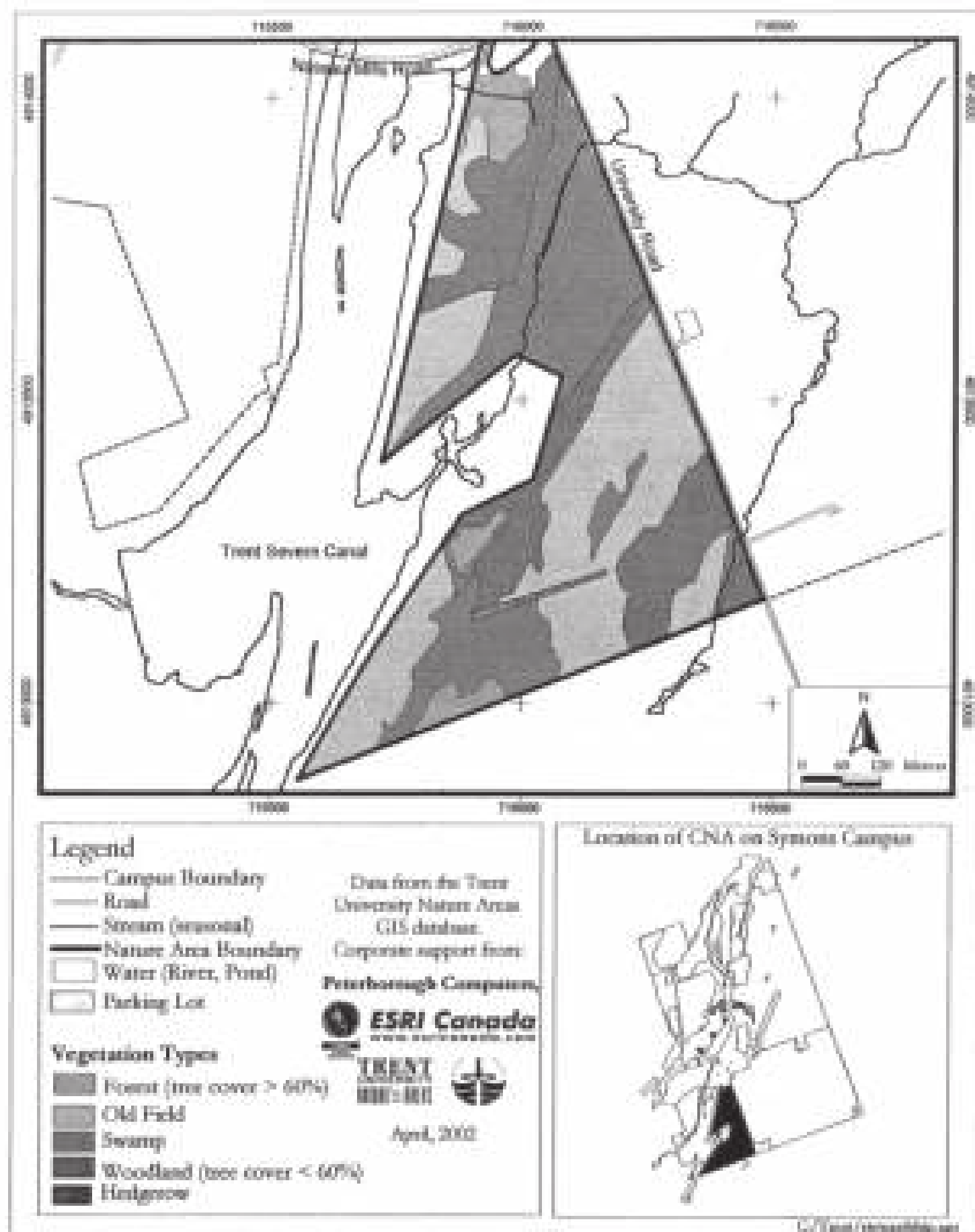


Figure 3-2. Vegetation Types in the Canal Nature Area, Symons Campus, Trent University, Peterborough, Ontario.

cedar (2.5 – 6 m in height) cover a substantial area of the south west part (fields 63, 64, 68 and 69) of this nature area. Cedars are also colonizing open areas adjacent to existing cedar stands (field 67, in particular). Black locust is the dominant tree cover on the east of the large drainlin in Fields 64 and 65 and is advancing north into these field.

Vegetation of the wetlands is generally composed of a moderately open cover of small trees, with the dominant species being trembling aspen, balsam poplar, red ash, and black ash. White cedar is common in the understory. The trees are small and fairly short-lived, probably because of flooding. The herbaceous layer in these wet areas is quite abundant and fairly diverse.

Tree cover in the northern part of the nature area is very patchy, but these trees are generally more mature than those of the southern part. Open areas are intermixed with small stands of trembling aspen, white ash, and white cedar. Several fence rows and forest remnants contain a few large, old American beech, white ash, red oak, and burr oak trees.

The vegetation along the canal bank provides excellent habitat for many kinds of birds and other wildlife. Ospreys frequently hunt along the shore, using tall trees to perch and feed. Belted kingfishers, wood ducks, mallards, sandpipers, great blue herons and green herons have all been seen feeding in the most southern wetland (Field 66). Beaver, muskrat, and mink also inhabit the canal shoreline and the mixed swamp.

#### **Wildlife:**

Wetlands within the nature area provide good habitat for a variety of nesting and migratory birds. Mixed flocks of warblers, veery and scarlet tanagers have been seen in the deciduous swamp. Areas of thicket swamp attract species such as the brown thrasher, northern cardinal, song sparrow, swamp sparrow, gray catbird, eastern kingbird, yellow warbler and common yellowthroat. The water depth of the shallow marsh is sufficient to support overwintering green frog tadpoles. Deer frequent this nature area.

#### **Historical Features:**

The largest cultural feature is the Trent Canal, through which water flows south along the western side of the area. This Nature Area also has much evidence of previous agricultural activity such as an old orchard, a laneway, farmhouse and barn foundations, and a garden site are present on the drainlin in the north-west corner of this nature area. Additional features include:

- abandoned agricultural fields in various stages of succession
- abandoned agricultural cedar rail fences, rock fences, posts, tracks, wood piles, dumps, field drains and rock piles in fields and along fence rows.

Field 67 was the original site of the University weather station until it was moved in 1970s to Field 73.

#### **Significant Features:**

This area is significant because of the diversity of biological communities. The wetlands and canal bank provide viewing areas for waterfowl migration. Wetland areas within and adjoining the Canal Nature Area are significant habitat for a large number of bird species including the osprey, green-backed heron and great blue heron. As well, there is good white-tailed deer habitat in the southern section of the property. Regionally rare/uncommon plants are also found on the

property – such as blue beech, leatherbush, Indian hemp and blue-eyed grass. It also contains the best example of a beaver dam on campus.

The building foundations and associated garden have interpretive potential. There are also good views from this old farm site across the Otonabee River valley.

#### Land Use

##### Teaching and Research

Open areas on the drumlin slope in the south section (Field 67) have been used by Geography students for soil studies and for plant ecology studies in BI 100 (Introductory Biology). The wooded areas in the north section are used for forest ecology studies (ERS 320 – Forest Ecology). Long-term climatological data formerly were collected in this Nature Area.

##### Recreational Use

This Nature Area has excellent recreational potential because of access to the Trent Severn Canal. There are several long, informal, recreational trails that cross the north and south sections of the CNA (Figure 13). These trails are not used as extensively as those of the Wildlife Sanctuary. Several parts of the trails in the south section cross wetlands and are used primarily in winter for cross-country skiing. Outside of the ski season, most people walking in the south section enter and return along one short stretch of the main trail. The canal edge is not easily reached during spring and summer because of wet soil conditions at one point on the trail. Two ski trails connecting the north and south sections of this Nature Area are also flooded for most of the year. The informal trails are kept open mainly as a result of snowmobile use in winter. In summer 2000, a trail from the gate on University Road and running down to and along the Canal edge was formalized. A 30-m long boardwalk was constructed where the trail crossed a seasonally flooded wetland.

##### Adjacent Land Use

The western edge of the CNA abuts the canal bank of the Trent Severn Waterway. South of the CNA are privately-owned croplands and hay-fields, interspersed by small woodlands, marshes, and swamps. To the east is the Wildlife Sanctuary Nature Area.

##### Management Issues:

##### Ecological Integrity

There is concern that:

- habitat diversity is being reduced by the uncontrolled spread of white cedars, particularly, in fields 65, 66 and 67 (Appendix J). Sapling densities are so high as to make some cedar stands impenetrable to humans and large animals, such as deer. The continued colonization of open habitats by white cedars will likely have an increasingly detrimental effect on the value of this nature area for wildlife
- invasive species are spreading in field 66 since much of the tree and shrub vegetation on the upper part of the southern drumlin (old house site) in this field consists primarily of introduced species. Black locust trees colonizing the open northern slope are obscuring the excel-

land views to the north and west.

- some ornamental species, such as lilac, at the old garden site are invasive and have created large patches very large patches.
- a patch of goshweed (an invasive garden plant) located in the lowland at the edge of University Road near the beginning of a ski trail (field 67) is encroaching into adjacent woodland.
- European buckthorn, *Rhamnus cathartica*, is very common in the WSNAs along fence-rows, at the edges of woodlands and in areas of woodlots where there are gaps in the tree canopy. This species can shade out native species. Buckthorn is a prolific producer of fruits which are eaten by birds so that seeds are widely dispersed in bird droppings.

### Safety

It is of concern that:

- because of extensive use of the CNA that a safety plan has not been developed to remove an injured user.
- a fire fighting and prevention plan has not been developed for the CNA.

### Recreation

- the formal nature trail developed in 2001 be maintained and others developed.

## **SOUTH DRUMLIN NATURE AREA (SDNA)**

**Nature Area Number:** 3

**Nature Area Classification:** B

### **Introduction:**

The South Drumlin Nature Area covers an area of 14 ha, is Adjacent to the Nassau Mills Road, and extends close to the western edge of the Trent Canal (Figure 3-1). There are a number of informal trails leading to the drumlin from Nassau Mills Road, from the Rotary Greenway Trail and from the canal edge.

### **Topography and Soils:**

The primary topographic feature of this nature area is a 600 m long, distinctively-shaped drumlin, rising some 15 to 20 m from the canal. The stee (north) slope and sides are steep, and the lee (south) slope is gently inclining. A narrow band of flat land separates the drumlin and Trent Canal. The west side of the drumlin is also bordered by flat terrain. A gentle slope extends south from the drumlin to the Thompson Creek lowland. Soils belong to the Emly Series and are characterised by being medium textured, moderately stony and are imperfectly drained.

### **Hydrology:**

While this Nature Area has no streams, it is well drained, except for a few small, ephemeral pools on the steep slope.

### **Vegetation:**

The vegetation types are illustrated in Figure 3-2. The SDNA supports a mixture of wooded and partially wooded habitats. A large area is covered by deciduous forest, dominated by sugar maple and white ash, while in more disturbed areas there are openings with patches of tree, sapling, and shrub cover. Of particular interest are mature black cherry trees and large sumacs.

### **Wildlife:**

The mixture of open and wooded habitat attracts a variety of bird species. Woodland-dwelling birds, such as pileated woodpeckers, inhabit this area as well as adjacent woods in the Canal Nature Area. The shoreline adjacent to the woodland provides good habitat for amphibians, birds, mammals and aquatic insects. Ospreys and belted kingfishers perch in the trees and feed along the canal edge. Mink forage along the shoreline.

### **Historical Features:**

Cedar rail and barbed wire fencing and the degraded herbaceous flora in the woodland suggest livestock grazing in the past.

A number of cottage sites, abandoned in the early 1970s, are situated near the base of the slope adjacent to the canal (McLean 1998). Associated with these sites is a can and bottle dump and scattered metal debris on the mid-to lower parts of the adjacent drumlin slope. There is also an abandoned bottle dump in the northeastern portion of this Nature Area.

## Significant Features:

This drumlin is a distinctive landmark with a closed canopy forest of high aesthetic value, having a particularly attractive display of fall colours. On the top of the drumlin the gentle slope and lack of under-story allow for easy walking through most of the forest.

## Land Use

### Teaching and Research

Forestry Management and Plant Ecology classes use SDNA for field studies. A control plot as part of the EMAN Project program has been set up in the woodland on top of the drumlin.

### Recreational Use

The SDNA contains a network of informal trails which are heavily used for walking and cycling. The main trail traverses the top of the drumlin in a north-south direction. There are numerous access trails ascending the drumlin and a trail along the canal edge. Significant viewpoints to the northwest occur along the top of the drumlin. Walking trails through the mature hardwoods down to the canal could be constructed since there is the potential for travel along the canal to continue into the city.

### Adjacent Land Use

The SDNA is flanked on the east side by Trent Severn Waterway lands along the Trent Canal. Old field uplands occur to the south and west of the SDNA and the Rotary Greenway Trail passes close to its western edge.

## Management Issues

### Ecological Integrity

There is concern that:

- while invasive European Buckthorn is a minor component of the deciduous forest, it is quite common in the less mature wooded and open communities.
- coring of mature trees has occurred and some large American beech trees have been damaged because bore holes were not sealed after cones were removed. Unsealed coring holes harbor insects and fungi that may be detrimental to the tree.

### Safety

There is concern that:

- sections of the informal, unplanned, trail system on steep slopes, which receive heavy multi-use, are undergoing significant erosion as the result of many years of use and water run-off.



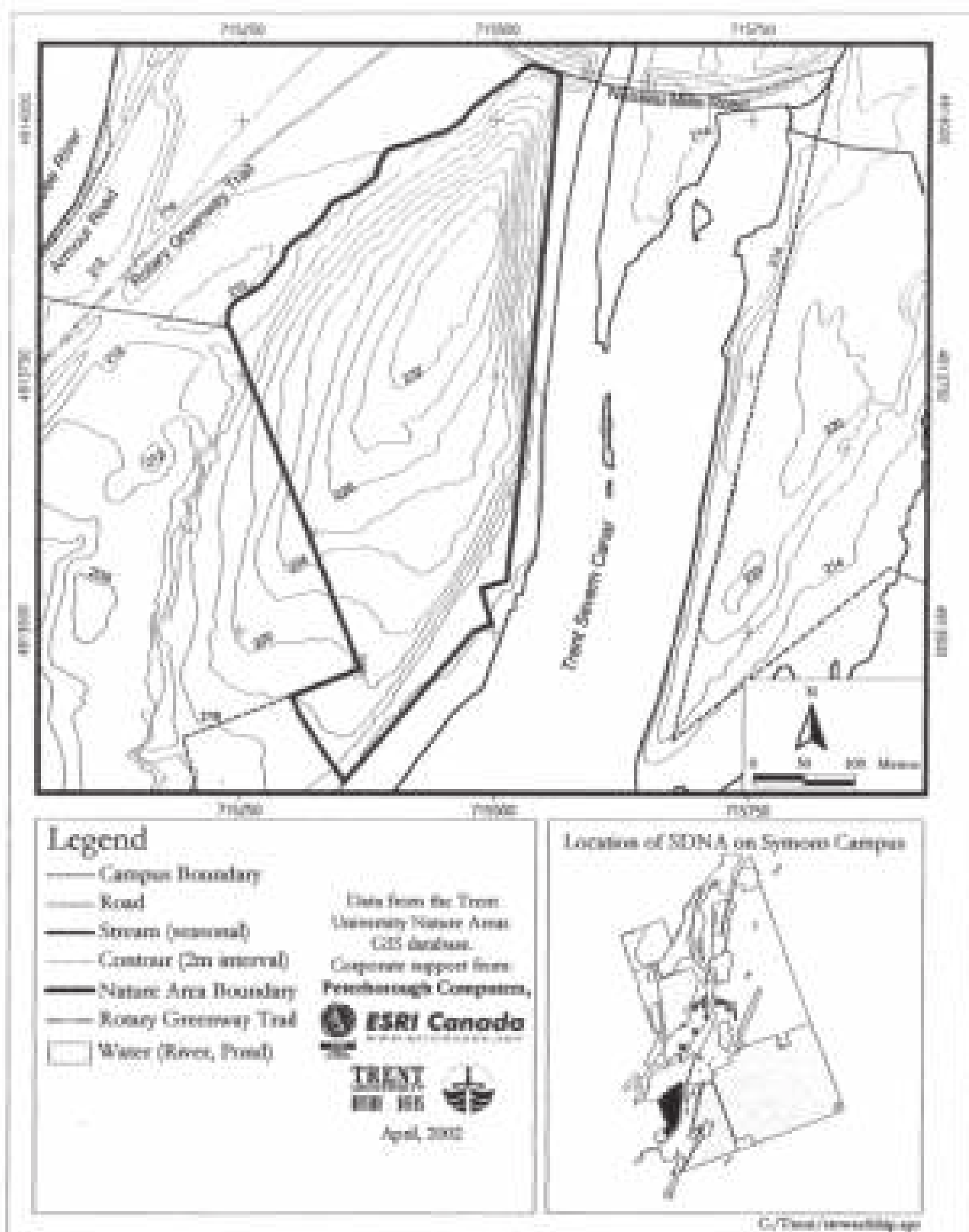


Figure 3-1. Contour Map of the South Drumlín Nature Area, Symons Campus, Trent University, Peterborough, Ontario.



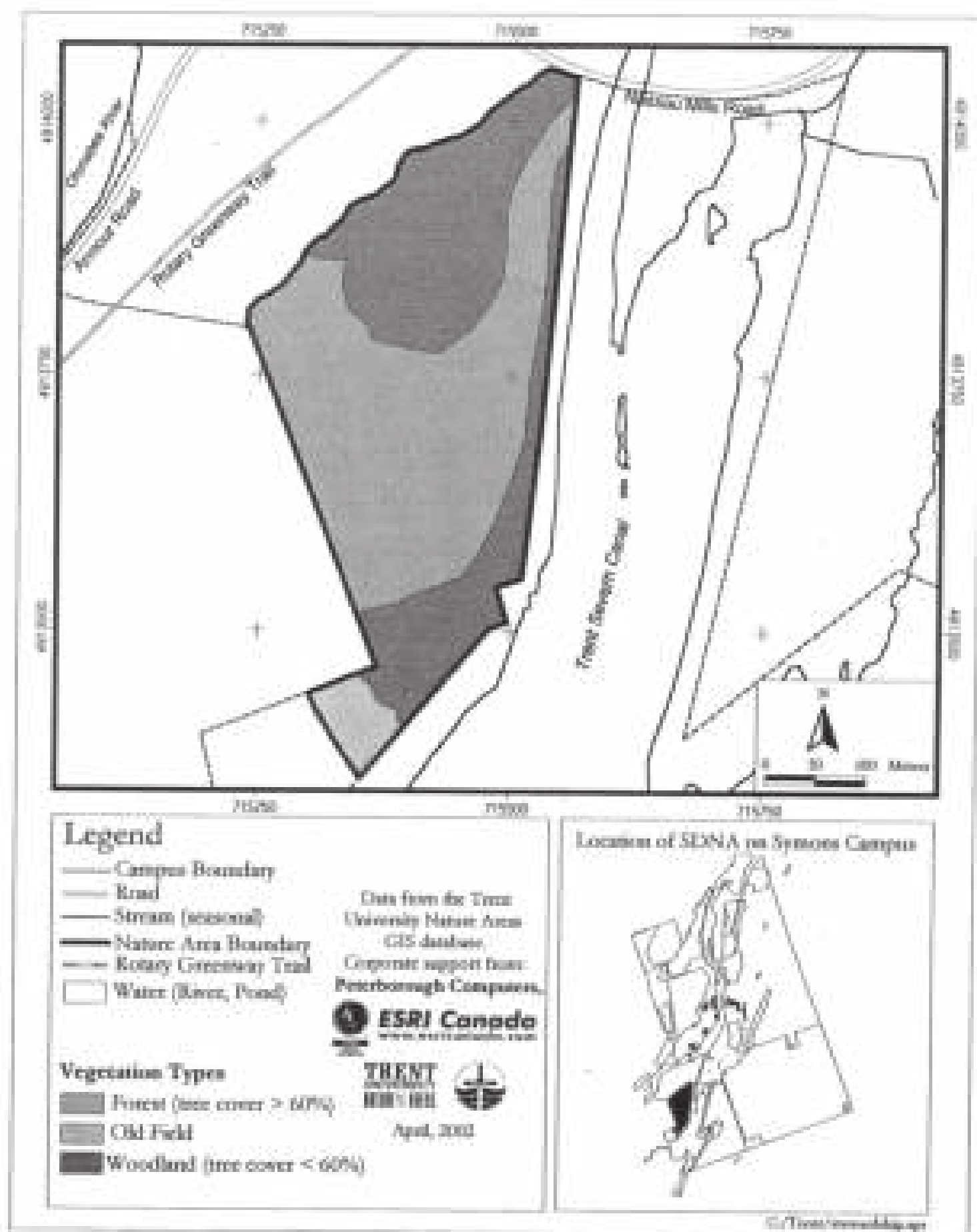


Figure 3-2. Vegetation Types in the South Dracena Native Area, Symons Campus, Trent University, Peterborough, Ontario.



## Recreation

There is concern that:

- sections of trails are obscured by encroaching vegetation.
- there may be conflict between users because trails are used by both cyclists and walkers.

## LADY EATON DRUMLIN NATURE AREA (LEDNA)

|                                        |                                                                                                     |
|----------------------------------------|-----------------------------------------------------------------------------------------------------|
| Nature Area Number:                    | 4                                                                                                   |
| Consolidated from Former Nature Areas: | Lady Eaton Drumlin Nature Area,<br>Highway 28 Wetland Nature Area and<br>Lowland Forest Nature Area |
| Former Nature Area Numbers:            | 6, 7 and 9                                                                                          |
| Nature Area Classification:            | B                                                                                                   |

### Introduction:

The Lady Eaton Drumlin NA, situated between Highway 28 and the main campus road, covers an area of 31 ha (Figure 4-1). The LEDNA is a consolidation of three Nature Areas originally designated in 1989, the Lady Eaton College NA, the Highway 28 Wetland NA and the Lowland Forest NA. The northern boundary of the LEDNA is Woodland Drive, and the most southerly part extends beyond the end of the drumlin. Several informal trails access the top of the drumlin from the main campus road, from Woodland Drive or from the north parking lot. The lowland forest can be accessed from Woodland Drive and the north parking lot. A hydro right-of-way separates the lowland woodlot from the drumlin woodlot (Figure 4-1).

### Topography and Soils:

The dominant topographic feature of this Nature Area, and of the Symons Campus, is the 800 m-long, 37 m-high Lady Eaton Drumlin, one of the taller drumlins in the Peterborough drumlin field. The drumlin's southeast and stoss (northeast) slopes are unusually steep, compared to respective slopes on other local drumlins, and are a fine example of the erosional effects of water flow in post-glacial drainage channels. The land adjacent to the drumlin is flat to gently sloping, with a seasonally flooded wetland along the west side, bordering Highway 28, from Woodland Drive to south of the drumlin which drains to the Otonabee River.

The upland soils are belong to the Otonabee Series. They are well-drained, composed of stony, glacial till, with occasional limestone and granite rocks scattered on the surface. Wetland soils belong to the Foxboro Series which have a coarse texture, are stone free and have poor to very poor drainage.

### Hydrology:

The wetland on the west side of the LEDNA, drains from north to south, and is fed by roadside ditches and runoff from surrounding slopes. Inflow also comes from springs debouching into the hydro right-of-way from the northwestern slope of the drumlin. The wetland soils have a few small, shallow water pockets. Drainage along part of the west side of the drumlin has been channelized to prevent flooding of the highway.

### Vegetation:

The distribution of the vegetation types is illustrated in Figure 4-2. Old field thicket, deciduous woodlands and conifer plantations are the dominant vegetation cover in the LEDNA. The north-western portion of the drumlin supports a deciduous forest with a varied native flora. Trees

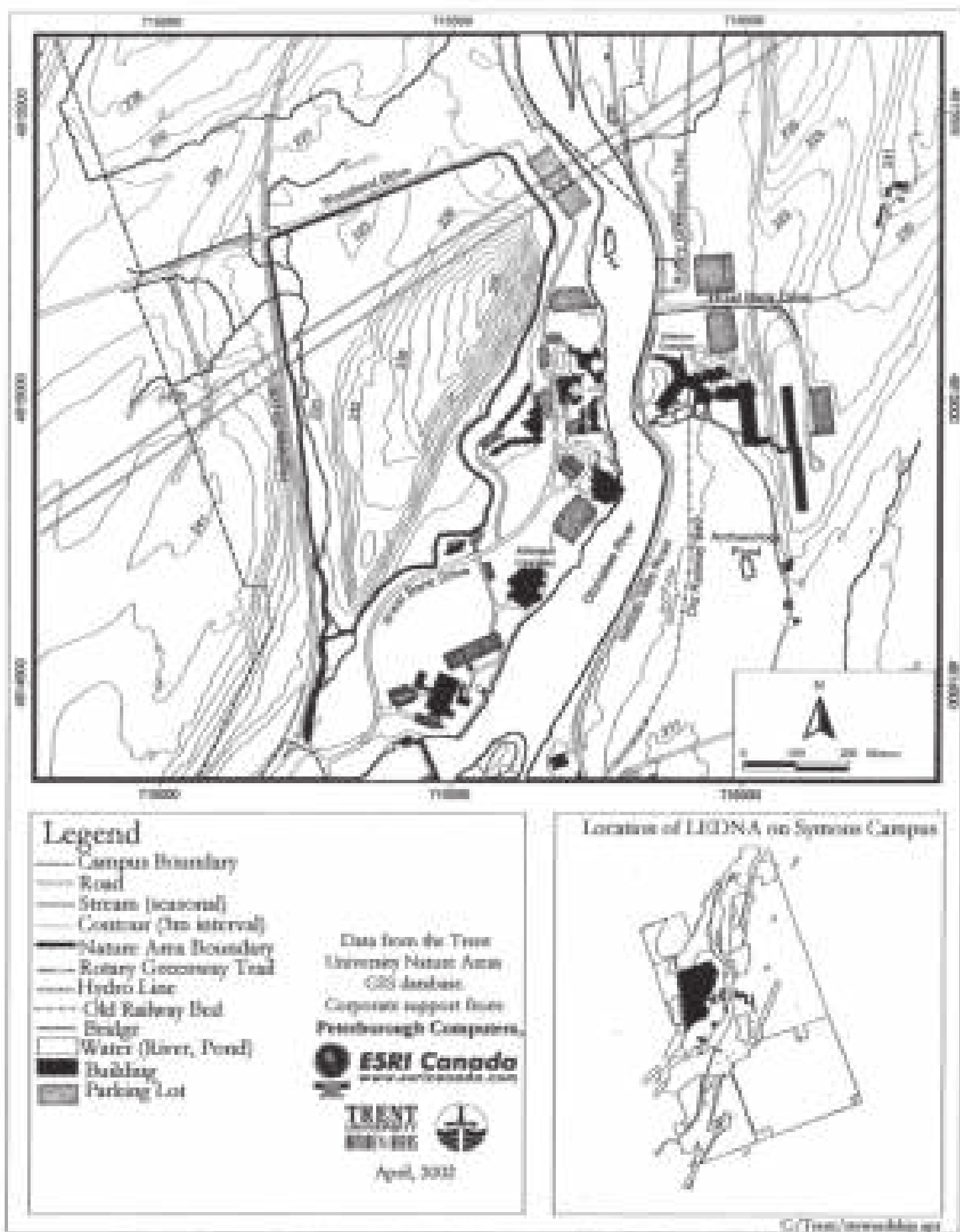
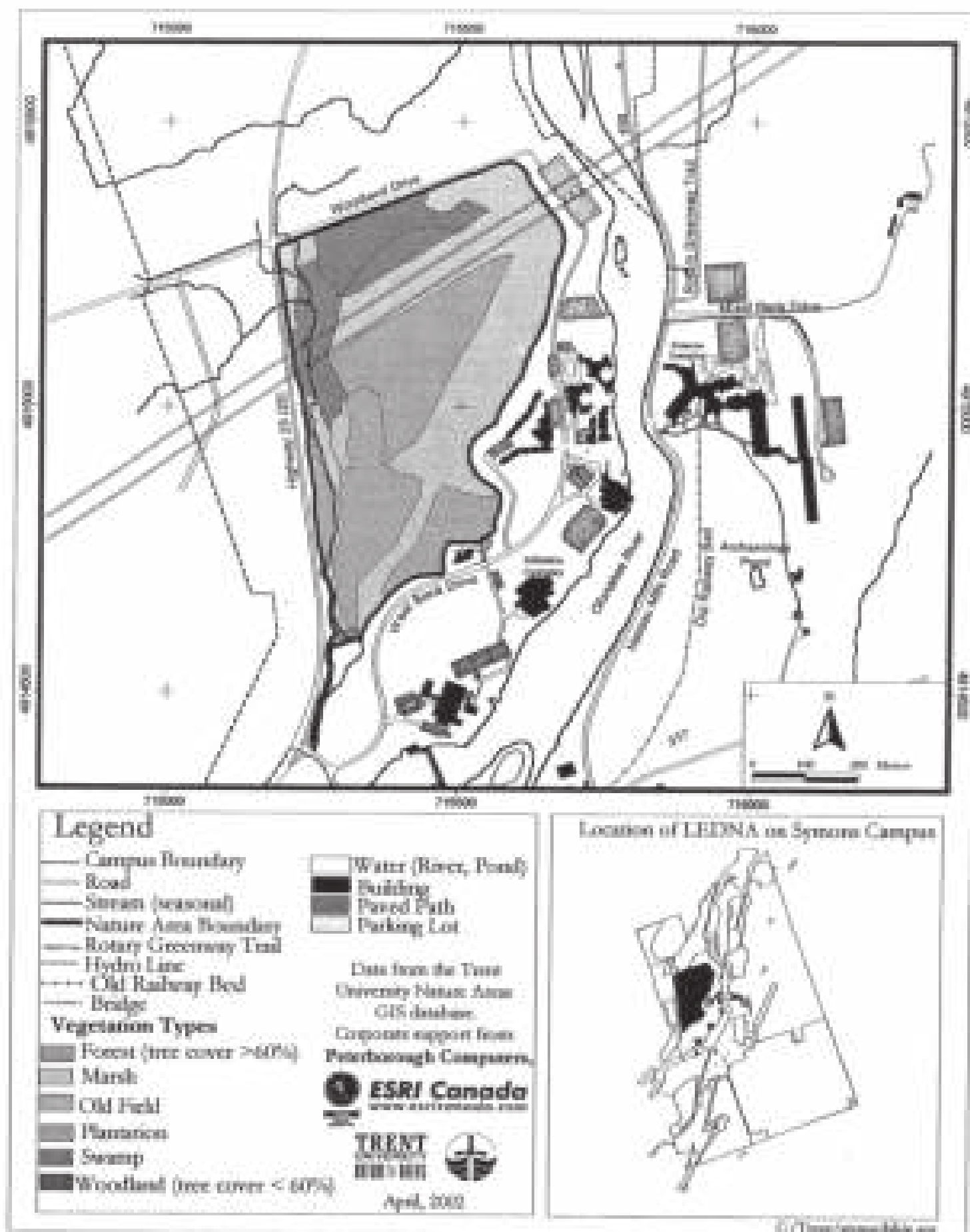


Figure 4-1. Contour Map of the Lady Eaton Druidin Nature Area, Symmes Campus, Trent University, Peterborough, Ontario.









include species such as sugar maple, American beech, blue beech, ironwood, white birch, basswood and bitternut hickory. Shrubs include leatherwood, riverbank grape, Virginia creeper and false honeysuckle. European buckthorn is a serious invader of the forest margin. Coniferous plantations on the drumlin are composed primarily of red pine. Sapling and herbaceous growth is sparse in these plantations. Scattered trees and a dense thickets of saplings and shrubs cover the eastern slope of the drumlin.

Immature deciduous trees form the primary cover of the lowland woods north of the hydro-corridor. White ash is dominant although the canopy is quite varied, consisting of 16 species of native trees, including butternut. The spring herbaceous vegetation is low in species composition but does include wild ginger, wild leek, bellwort, columbine and toothwort.

The seasonally flooded wetland vegetation consists mainly of open cattail stands and sparsely wooded deciduous wetland. At the base of the drumlin along the wetland margin may be found species typical of marsh meadows and wet woods (e.g. Joe-pye-weed, sensitive fern, and rudel minnow). The wetland next to the south end of the drumlin supports shrubs such as nannyberry, shrubby willow and dogwood.

#### Wildlife

Birds observed in forested areas include woodcock-nesting species, such as the ovenbird and red-eyed vireo as well as other species such as northern cardinal, blue jay and white-breasted nuthatch. Red squirrels in the pine plantation attract raptors. The wetland provides nesting habitat for red-winged blackbirds and common yellowthroats. A barned owl and a common yellowthroat were noted in the area during a Christmas bird count.

Western chorus frogs breed in the wetland shallow marsh community. Flying squirrels have been observed in the deciduous woods on the western slope of the drumlin. Evidence of white-tailed deer in the hydro corridor and wetlands has been observed.

The four Nature Areas, LEONA, Highway 28 Woods NA, Total Loss Farm NA and Lock 22 NA, in the northern part of the campus and on the west bank of the Otonabee River, while being separated from one another by Highway 28 and Woodland Drive, form essentially contiguous habitats for birds and mammals.

#### Historical Features

The most obvious cultural feature on the southern part of the Lady Eaton Drumlin is the red pine plantation, which was planted in 1952 by the Keweenaw Club. On the north-eastern edge of the drumlin facilities were provided in the 1930s for ski jumping in the 1930s. In the 1940s, on the north slope, a ski-tow was constructed for downhill skiing at this was abandoned in the 1970s for safety reasons. A hydro corridor, with two electrical transmission lines, runs across the northern slope of the drumlin and through the wetland. Adjacent to highway 28, scars on maple trees indicate that sap for maple syrup production was once collected.

The stone piles on the drumlin summit attest to clearance for agricultural use and the depauperate herbaceous flora in the forest is indicative of grazing by farm animals.

### Significant Features:

The drumlin is a distinctive landmark that provides magnificent panoramic views, to the north and southwest, now partly obscured by sumach and European buckthorn. The eastern slope is an attractive backdrop, particularly in the Fall, to Lady Eaton College, and is a major scenic asset on the Symons Campus. The spring wildflower display in the deciduous forest is the best of any forest on campus. The lowland woods, with their rich moist soils, contain a large number of tree species, including uncommon species such as hatternut. Most other deciduous woods on the Symons campus occur on drier uplands (e.g. South Drumlín NA and Highway 28 Woods NA).

### Land Use

#### Teaching and Research

Classes in Biology, Environmental and Resource Studies and Geography use this Nature Area for field studies and research.

#### Recreational Use

Several informal trails on the Lady Eaton Drumlín are used by walkers and joggers as well as for fitness training by students participating in team sports. Bicycle riders traveling at high speed are a hazard to walkers. While these trails have become narrowed by growth of European buckthorn and sumach and are severely eroded in places, sections of trails never-the-less great potential as accessible nature/walking trails.

In 1999 the NAC, in recognition of the recreational, interpretation potential and the need for undergraduate classes to have use of a safe nature trail to the woodlot on the drumlin summit, approved a proposal for its construction. The nature trail was included as a "Working for Wilderness" project in 2000 by the Federation of Ontario Naturalists (FON) and the British Trust for Conservation Volunteers (BTCV). Subsequently, 10 UK volunteers, 4 FON and local created the trail in August of that year and also installed 4 benches at panoramic viewpoints along the drumlin summit that overlook the Ottawa River (Figure 12). The new trail, which can be accessed up the centre part of the east side of the drumlin from the Lady Eaton College Parking Lot, runs in a north direction along the drumlin crest while passing through part of the pine plantation and forest before descending the north slope to the North Parking Lot. A loop trail from the main trail, circles through the forest back to the trail which descends the north slope. An extension to the trail for ascending the south end of the drumlin was created in summer 2002.

The north slope of the drumlin was once an excellent site for family and community tobogganing during the 1970s and early 1980s until shrubs became established.

#### Adjacent Land Use

The wetland, comprising the western part of the LEDNA, is bounded by Highway 28 (29) and across the road is the Highway 28 Woods NA. Beyond the east and south boundaries, at the base of the Lady Eaton drumlin, is the campus core. The southern boundary is a continuation of the wetland running down the east side of Highway 28. The northern boundary is Woodland Drive and Adjacent to this road is the Lock 22 NA.

## Management Issues:

### Ecological Integrity

There is concern that:

- European buckthorn has invaded the old field community on the east drumlin slope, the drumlin summit, the pine plantation and woodlots where light conditions are favourable.
- the pine and spruce plantations on the drumlin have not been evaluated by a forester and about the amount of European buckthorn growing beneath the pine trees.
- tapping may be detrimental to the of mature sugar maple trees.

### Recreation

There is concern that:

- the condition of the informal trail ascending the south slope is so eroded as to be dangerous to all users. The condition of this trail is an example of how lack of planning and neglect leads to serious erosion by runoff. A deep gully with many loose stones and rocks has been created and is in desperate need of attention.
- the trails leading straight up the east and north slopes of the drumlin are unsafe and are causing vegetation damage which will lead to erosion caused by run-off.

## HIGHWAY 28 WOODS NATURE AREA (H28WNA)

|                             |   |
|-----------------------------|---|
| Nature Area Number:         | 5 |
| Former Nature Area Number:  | 8 |
| Nature Area Classification: | A |

### Introduction:

The Highway 28 Woods NA (area 4 ha), is located (Figure 5-1) along the west side of Highway 28 and south of the hydro transmission corridor, to the north of the Lady Eaton Drainin. Access is from Highway 28, particularly at the southwestern edge of the woods, where the engineered slope from the road is most gradual.

### Topography and Soils:

The woods occupy a steep, easterly-facing slope and upland plateau, and exhibit a pit and mound micro-topography. Soils belong to the Otterbee Series which have a medium texture, are moderately stony and have good to excessive drainage.

### Hydrology:

No springs or streams are evident in this Nature Area.

### Vegetation:

A mature deciduous forest community occupies the southern two-thirds of this area (Fig.5-2). This is one of the finest examples of mature, upland, deciduous forest on the campus, displaying, to some degree, the principle characteristics of old-growth: mature trees, a variable age structure of trees, gaps in the canopy, standing and fallen dead wood, and a pit and mound micro-topography. The canopy is dominated by large and mid-sized sugar maple trees with lesser associations of mature white ash and ironwood. A small stand of American beech in the southeastern corner contains some of the largest beech trees to be found on campus. The herb layer is fairly diverse. In late summer it is dominated by enchanters' nighshade, poison ivy, side-flowered aster and zig-zag goldenrod. In spring may be found flowering herbaceous species, such as trillium, liverleaf, blue cohosh, which are characteristic of this type of deciduous forest.

The deciduous canopy in the northern third of this area illustrates an earlier successional stage, being composed of a mix of mature, even-aged trembling aspen and small white ash and sugar maple trees. Less common species such as black cherry, bitternut hickory and butternut are also present.

### Wildlife

The mature canopy and availability of deadfalls and snags in the sugar maple community offer good habitat for wildlife. The four Nature Areas, H28WNA, Lady Eaton Drainin NA, Trout Lows Farm NA and the Lock 22 NA, in the northern part of the campus and on the west bank of the Otterbee River, while being separated from one another by Highway 28 and Woodland Drive, comprise essentially contiguous habitats for birds and mammals.

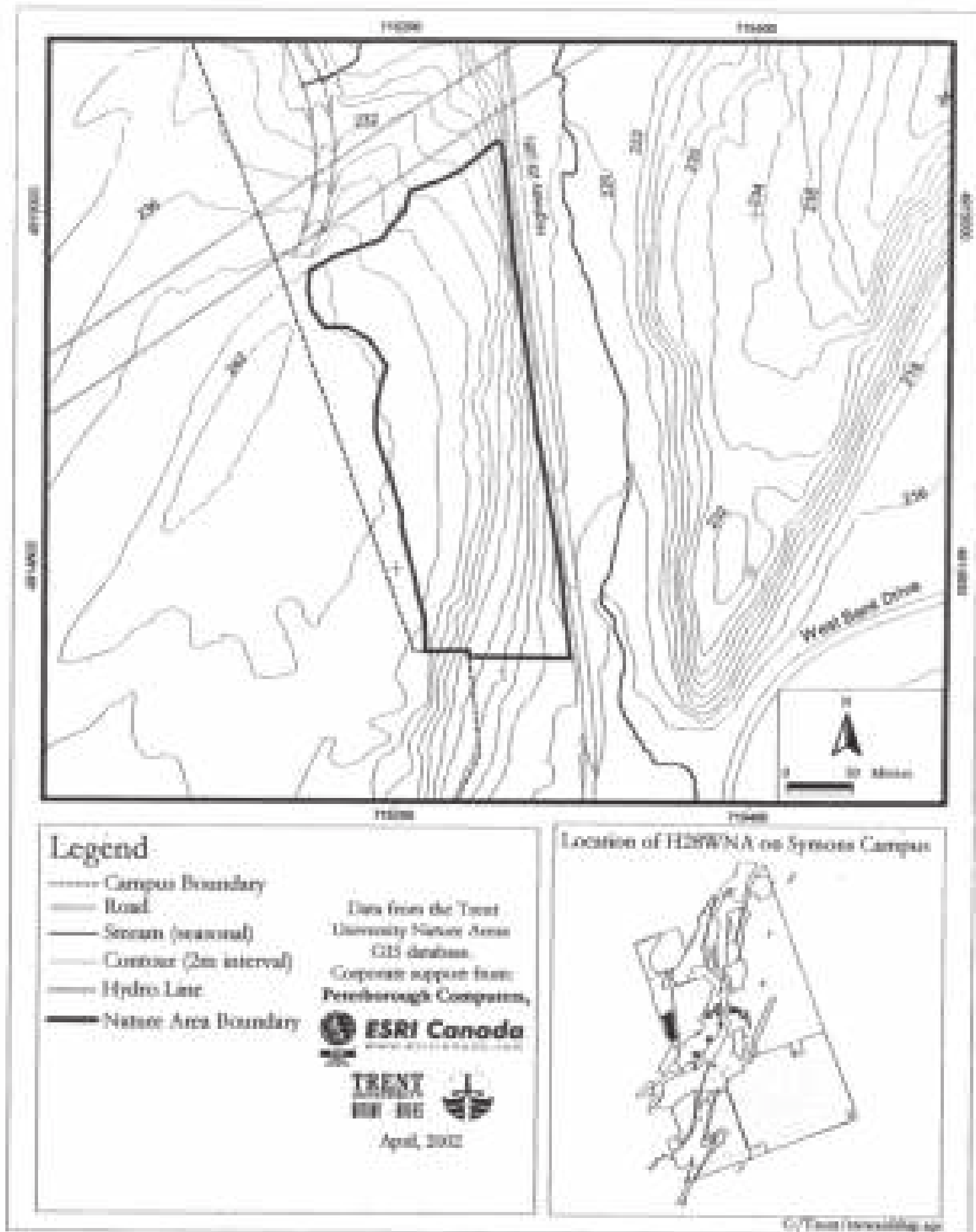


Figure 5-1. Contour Map of the Highway 28 Woods Nature Area, Syrioux Campus, Trent University, Peterborough, Ontario.





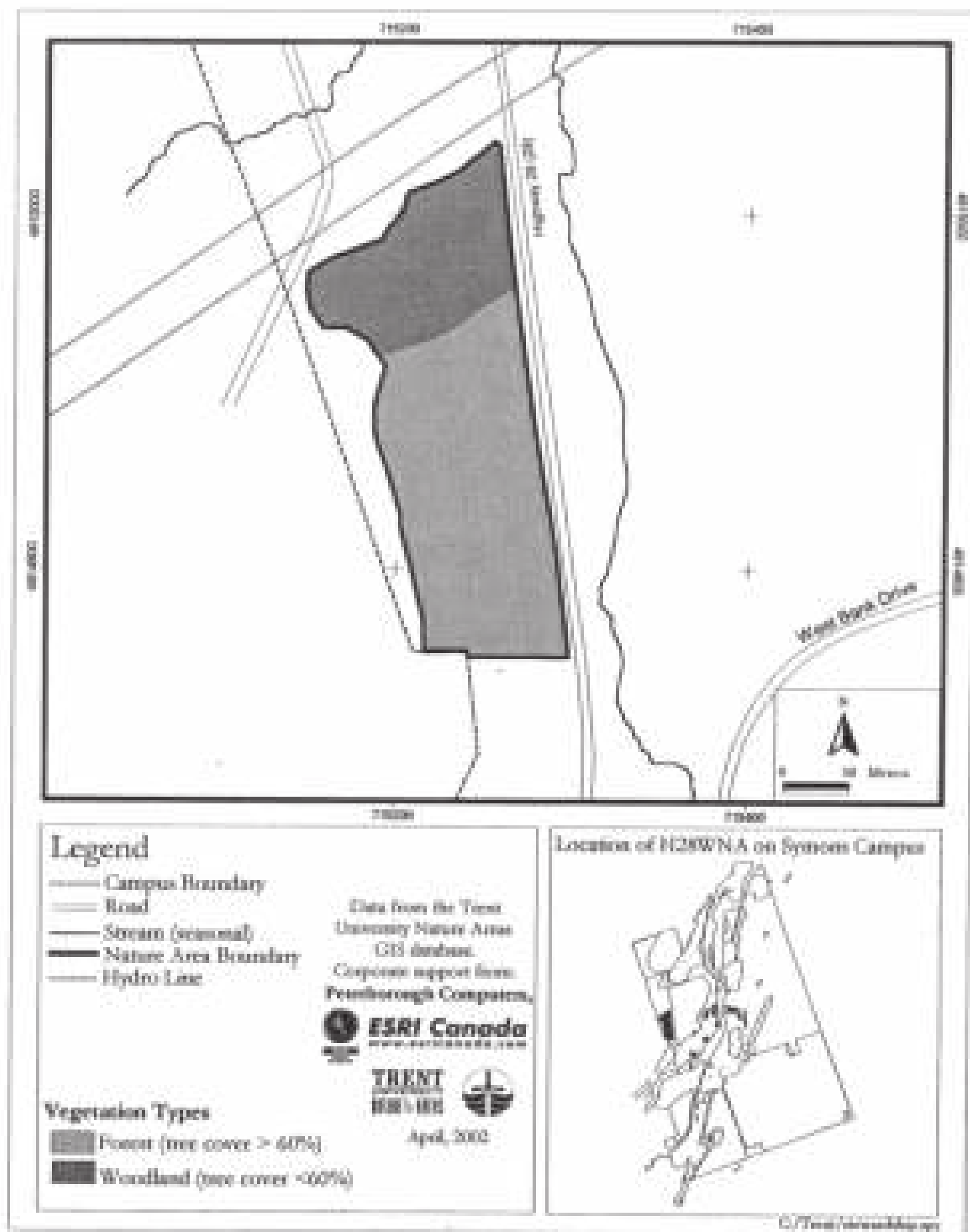


Figure 3-3. Vegetation Types in the Highway 28 Woods Natural Area, Syromon Campus, Trent University, Peterborough, Ontario



### Historical Features:

A feature of note in this area are scars on sugar maple trees indicating tapping in the past for maple syrup production. It appears that this Nature Area was once part of a farm woodlot and was selectively logged.

### Significant Features:

The southern part of this woods is one of the oldest and least disturbed deciduous forest communities on campus. The community supports a number of large sugar maple and American beech trees which are estimated to be over 100 years old.

### Land Use:

#### Teaching and Research

This Nature Area is used for fieldwork by ecology and forest management classes. The woods are occasionally visited by individuals or small groups for nature walks.

#### Adjacent Land Use:

The south and west boundaries are abut residential backyards. The east boundary is Highway 28 (29) and on the other side of this highway is the LEEDNA. Beyond northern boundary is an electrical transmission (hydro) corridor.

#### Recreational Use

Because of the location of this Nature Area on the west side of Highway 28 it does not receive many visitors except that because the western edge of the forest abuts the backyards of residences in the University Heights subdivision it appears that residents walk in the woods.

### Management Issues:

#### Ecological Integrity

There is concern that:

- European buckthorn may be invading the woodlot edge.
- the western property boundary between Trent land and residential yards is not appropriately signed. Some living sugar maple trees in the past, apparently in the Nature Area, have been felled and the wood removed.

## TOTAL LOSS FARM NATURE AREA (TLFNA)

|                             |                               |
|-----------------------------|-------------------------------|
| Nature Area Number:         | 6                             |
| Former Nature Area Name:    | Total Loss Stream Nature Area |
| Former Nature Area Number:  | 10                            |
| Nature Area Classification: | A                             |

### Introduction

The Total Loss Farm NA, covers an area of 10 ha, is situated in the northwestern part of the Symons Campus (Figure 6-1), west of Highway 28 and north of Woodland Drive and contains the highest ground on campus. This Nature Area consists of two separate parts of an abandoned farm. There are several informal trails leading into this Nature Area, from Woodland Drive and from Highway 28.

### Topography and Soils

The northern section of this Nature Area (Figure 6-1) occupies the southeastern slope of a long ridge, and the remainder is in a narrow lowland at the bottom of the slope. The southern part occupies a the floodplain of the stream which eventually runs under Highway 28 into the Lock 22 NA. The north and south sections are connected by gently sloping upland.

Soils of the upland parts of the TLFNA belong to the Otumabee Series which have a medium texture, are moderately stony and have good to excessive drainage. Foxboro Series soils which have a coarse texture, are stone free and have poor to very poor drainage occur in the north section wetlands. Along the western boundary is a small area of Waspoos Series soils which are fine textured, slightly stony and have good drainage.

### Hydrology

A stream runs along the base of the slope through the north section Nature Area into an adjacent field and then re-enters the Nature Area approximately 190 m to the south (Fig 6-1). The stream appears to originate from springs and seeps on the neighbouring property and this section of the stream apparently runs year round. Seepage from a series of springs also originates from the slope above the stream to create a strip of very wet soils between the springs and stream. The stream flows east, under Highway 28, and provides water for the plants and animals in the Lock 22 NA.

Northwest of the intersection of Highway 28 and Woodland Drive, is a small thicket wetland maintained by surface drainage from ditches. Runoff in these ditches can be substantial as indicated by deposits of roadside gravel swept into the low area adjacent to the wetland.

### Vegetation

The vegetation of the north section (Fig. 6-2) varies according to topography and degree of disturbance. The upper slope in the northwest corner supports a semi-mature red pine plantation. South of the plantation are communities of cedar swamp and trembling aspen swamp. The cedar swamp supports two species of *Sphagnum* which are distributed in small patches. Other uncom-





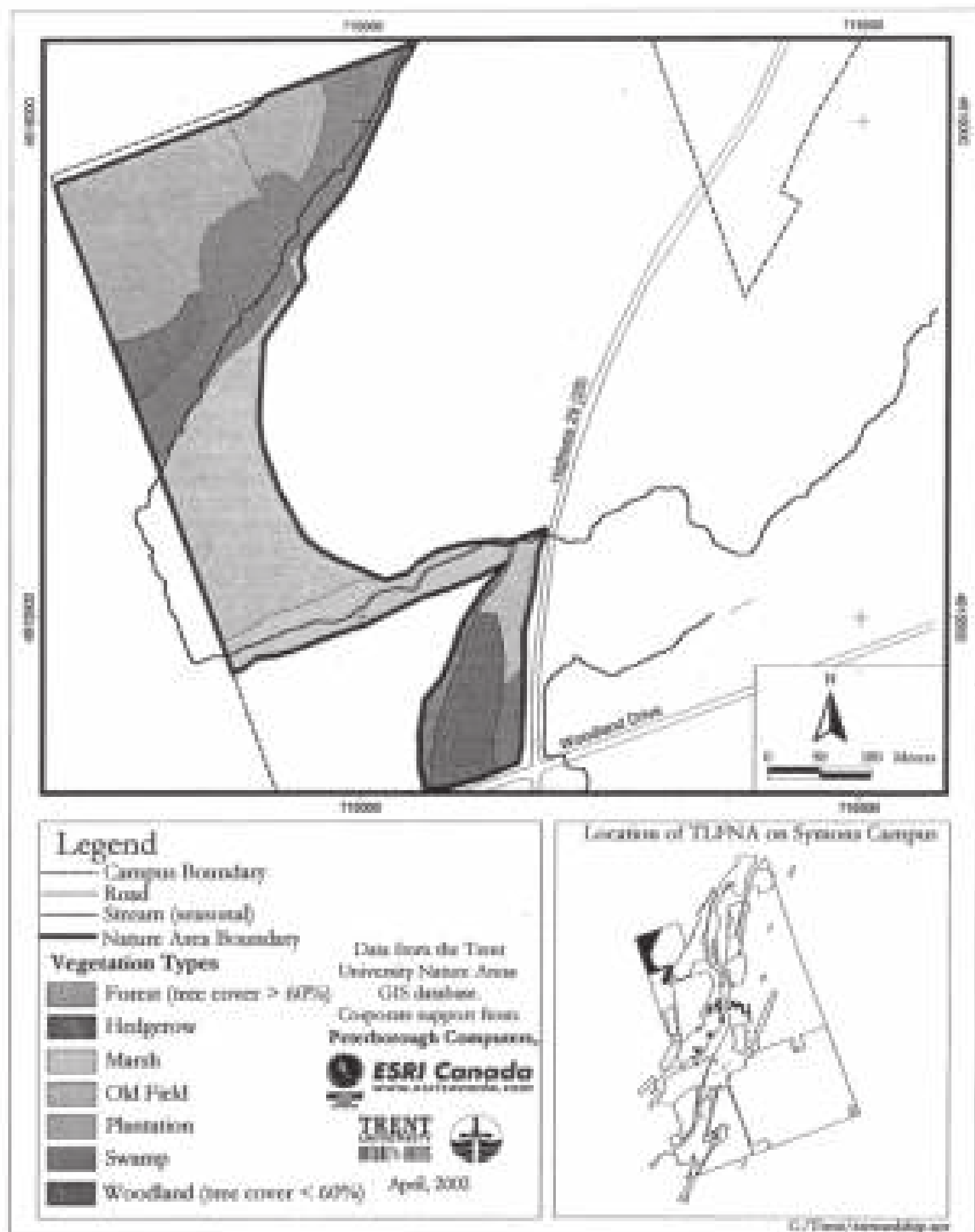


Figure 3-2. Vegetation Types in the Highway 28 Woods Nature Area, Syntex Campus, Trent University, Peachborough, Ontario.





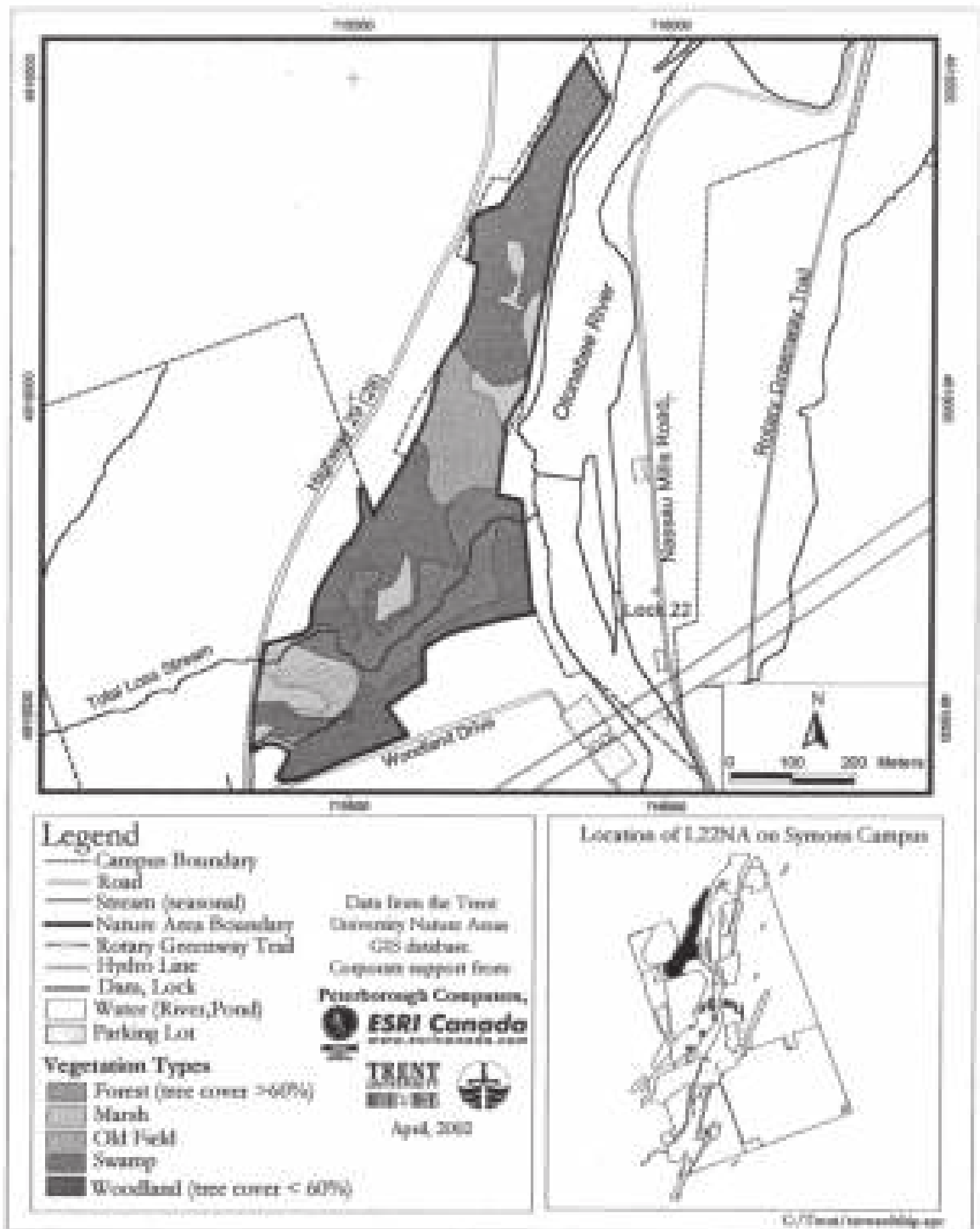


Figure 7-2. Vegetation Types in the Lock 22 Nature Area, Symons Campus, Trent University, Peterborough, Ontario.



### Significant Features:

This Nature Area is important because of the great diversity of habitats, vegetation communities and associated wildlife. The many stags, dying trees, and the wooded part of the wetland provides very good bird habitat. Several locally uncommon plant species, (e.g. royal fern and *Syllagnum* spp.) occur in the wetland. The cool, acidic type of wetland in which these plants grow is no longer common in the municipality. The deciduous forest stand is one of the older forest communities on campus, containing trees estimated to be at least one hundred years old. The only significant stand of black cherry trees on campus occurs in this area. This is the only campus location where bloodroot, a relatively uncommon woodland herb, was observed.

### Land Use:

#### Teaching and Research

Parts of the wetland have been used by the Biology Department for teaching plant identification and ecology of lowland vegetation. ERS students use the deciduous woodlands for forest management studies. Upland areas are used for guided nature walks.

#### Recreational Use

Some of the residents of the adjoining properties on the western edge of this Nature Area use informal trails in the woods for recreation and many people use the trail along the river, parking being readily available in the North Parking Lot.

#### Recreational Potential

There are several informal trails in the drier parts of this Nature Area. A main trail follows the river bank from Woodland Drive, near the north parking lot, to Trent's northern boundary beyond the dam at Lock 22. This trail provides excellent views of the river, and is much used by walkers, cyclists, and cross country skiers. A branch from the riverside trail begins just north of the Lock 22 dam and runs through the woods parallel to the western boundary of the L22NA and eventually leads to Highway 28.

The excellent views of the river and its east bank, along with the deciduous woods, and the closeness of the north parking lot, are excellent reasons to create formal nature and walking trails in this Nature Area which could continue on to Lock 23. The trails could be linked also to the formal trail in the Lady Eaton Deurnlin NA and, via the Lock 22 dam, to trails in the Promise Rock NA and to the Rotary Greenway Trail on the east bank of the Otonabee. Eventually, all of these trails could be linked into the University trail which is proposed to connect most of the nature areas on the Symons Campus.

#### Adjacent Land Use

Situated across the western boundary of the L22NA is the Total Loss Farm NA from which a stream runs under Highway 28 into the wetland part of the L22NA and then into the Otonabee River. This stream is very important to the hydrology and biology of the L22NA wetland. Adjacent to the northern boundary of L22NA are residential and commercial properties. The southern boundary is Woodland Drive with the LEDNA across this road while beyond the eastern boundary is the Otonabee River.

## Management Issues

### Ecological Integrity

There is concern that:

- the hydrological regime, and hence the wetland vegetation communities in this Nature Area, may be negatively impacted by activities, such as engineering work along Highway 28 (20), which could interfere with the flow of water from the Total Loss Farm NA.
- interference with the stream in the Total Loss Farm NA may have detrimental effects on the hydrology, and, consequently, on the vegetation and wildlife of the Lock 23 NA.
- the boundary of the L22NA is not posted.
- trees along the western boundary impeding views of the Otumabee River have been felled or girdled. Two large beech trees, one still alive, located near the property boundary in community 12-1 were felled and the wood removed.

### Debris and garbage

There is concern that:

- debris and house-hold debris near former dwelling sites be removed except where micro-habitats for invertebrates have been created.

## NINTH LINE NATURE AREA (NLNA)

|                                        |                                                                             |
|----------------------------------------|-----------------------------------------------------------------------------|
| Nature Area Number:                    | 8                                                                           |
| Consolidated from Former Nature Areas: | Ninth Line Pond Nature Area and<br>Ninth Line Maple-Beech Grove Nature Area |
| Former Nature Areas Numbers:           | 13 and 16                                                                   |
| Nature Area Classification:            | A                                                                           |

### Introduction:

The Ninth Line NA covers an area of 8 ha and is located in the northeastern part of the Trent University campus (Fig. 8-1). The southern end of a grove of mature American beech and sugar maple trees is located approximately 20 m east of the Rotary Greenway Trail and 280 m north of the Premise Rock NA. A wire fence surrounds the field in which the grove and wetland are located. The wetland can be accessed from the Ninth Line.

### Topography and Soils

The topography of this area is flat or slightly rolling. The wetland occupies a long, shallow depression. Soils belong to the Foxboro Series which have a coarse texture, are stone free and have poor to very poor drainage. Upland soils belong to the Dummer Series, have a medium texture, are stony and have good drainage.

### Hydrology

A small marsh in the southeastern corner of this Nature Area consists of permanently or semi-permanently flooded shallow marsh that grades into drier meadow marsh. Within the marsh is a small (15 m x 12.5 m, 0.75-1.0 m deep) open-water pond. Intermittent inflow drains into this marsh from neighbouring property on the east side of the Ninth Line Road. There is no surface outflow but the topography suggests that there may be subsurface drainage into the Wetland Complex NA.

### Vegetation

There are only three vegetation types in the NLNA (Fig. 8-2). An American-beech-sugar maple grove, composed of approximately 28 very large sugar maple and American beech trees, occurs in the south-west part of this Nature Area. The trees are widely-spaced, have broad crowns and short trunks, which are indicative of maturation in an open habitat rather than a forest setting. Since young beech and sugar maple normally develop under a heavy canopy, these trees are probably remnants of a woodland or forest. The general health of these trees is good, though a few of the trees have sustained storm damage or are showing symptoms of decline. The understory of the grove is disturbed with little or no deciduous tree regeneration. Herbaceous woodland species are scarce. *Carex spicata*, a coarse sedge is the main ground cover. Lack of deciduous tree regeneration may be related to grazing and trampling by cattle and/or the dense sedge layer.

Vegetation of the marsh is primarily a mix of graminoids. The eastern and western ends of the pond are bordered by species of low stature such as creeping bent grass and *Gallium* sp. Further west are small patches of taller emergents, such as bulrush and cattail. Small thickets of willow

and young elm trees border the marsh. The drier meadow marsh is vegetated by sedges such as *S. strictus*, *S. angustatus* and *C. rugosus*. The pond is sparsely vegetated, the perimeter being lined with water-plantain, broad-reed and other emergents. Stands of cedar buffer the deciduous grove and wetland. Large ironwood and sugar maple trees occur singly in the cedar stands.

#### Wildlife

Small mammals seen in this Nature Area include porcupine, gray squirrel, eastern chipmunk and meadow vole. The mature trees produce copious quantities of seeds which are attractive to mammals and birds. In the past, the area comprised part of the nesting territory of a pair of great-horned owls.

The marsh contains a rich assemblage of aquatic life. It provides reproductive habitat for seven species of amphibians, including one unidentified species of salamander. Many kinds of aquatic invertebrates were noted at the wetland including several types of damselflies, dragonflies and snails. Great blue herons and a variety of small songbirds such as common yellowthroat are commonly observed in this area.

#### Historical Features

The Rail Trail runs along the western edge of the area.

#### Significant Features

The mature American beech and sugar maple trees are of impressive size. Groves of large trees in a natural setting are uncommon in this municipality. The wetland supports a variety of wetland plants, some of which may be uncommon in Peterborough County, for example *Alopecurus aquatilis*. Aquatic animal life in the shallow marsh appears more abundant and diverse than in other similar campus wetlands.

#### Land Use

##### Farming

The NLNA and fields surrounding this Nature Area are leased for farming and are used for pasturing cattle. That cattle pasturing has occurred for many years is suggested by the cropping of the lower branches of cedar trees. Cedar trees were selectively harvested from the coniferous woodland until recently.

##### Teaching and Research

Distance from the campus core is probably the reason this area is little used for teaching. The beech-maple grove is used as a field site by students in EES for forestry management studies.

The pond is used for amphibian research by Masters and Doctoral students. The woodland could be used for studies of the impact of grazing on such habitat.

##### Recreational Use

There are no trails in this area which is visited only by occasional walkers. A wire fence separates this Nature Area from the Rail Trail.

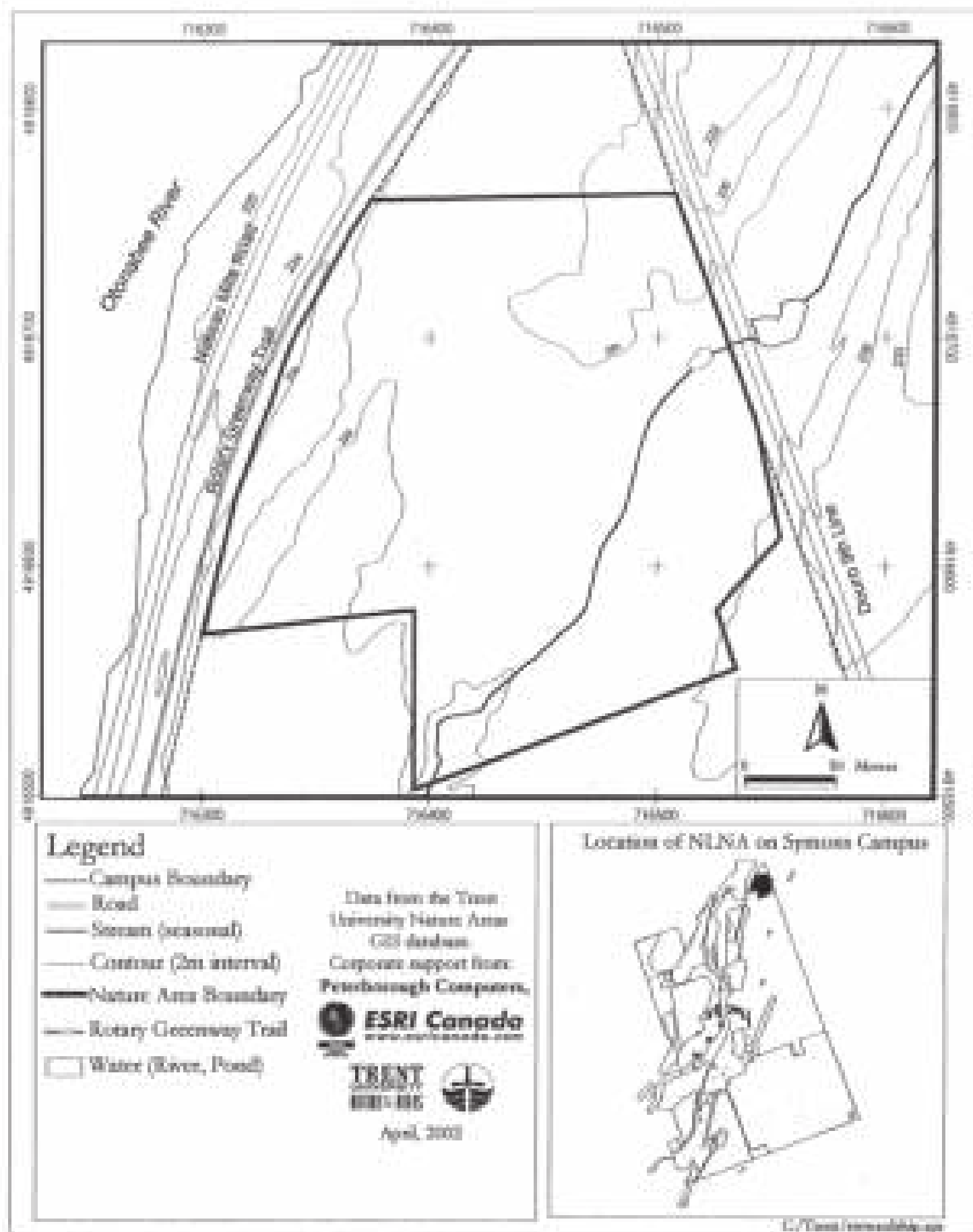


Figure 8-1. Contour Map of the Ninth Line Nature Area, Symons Campus, Trent University, Peterborough, Ontario.





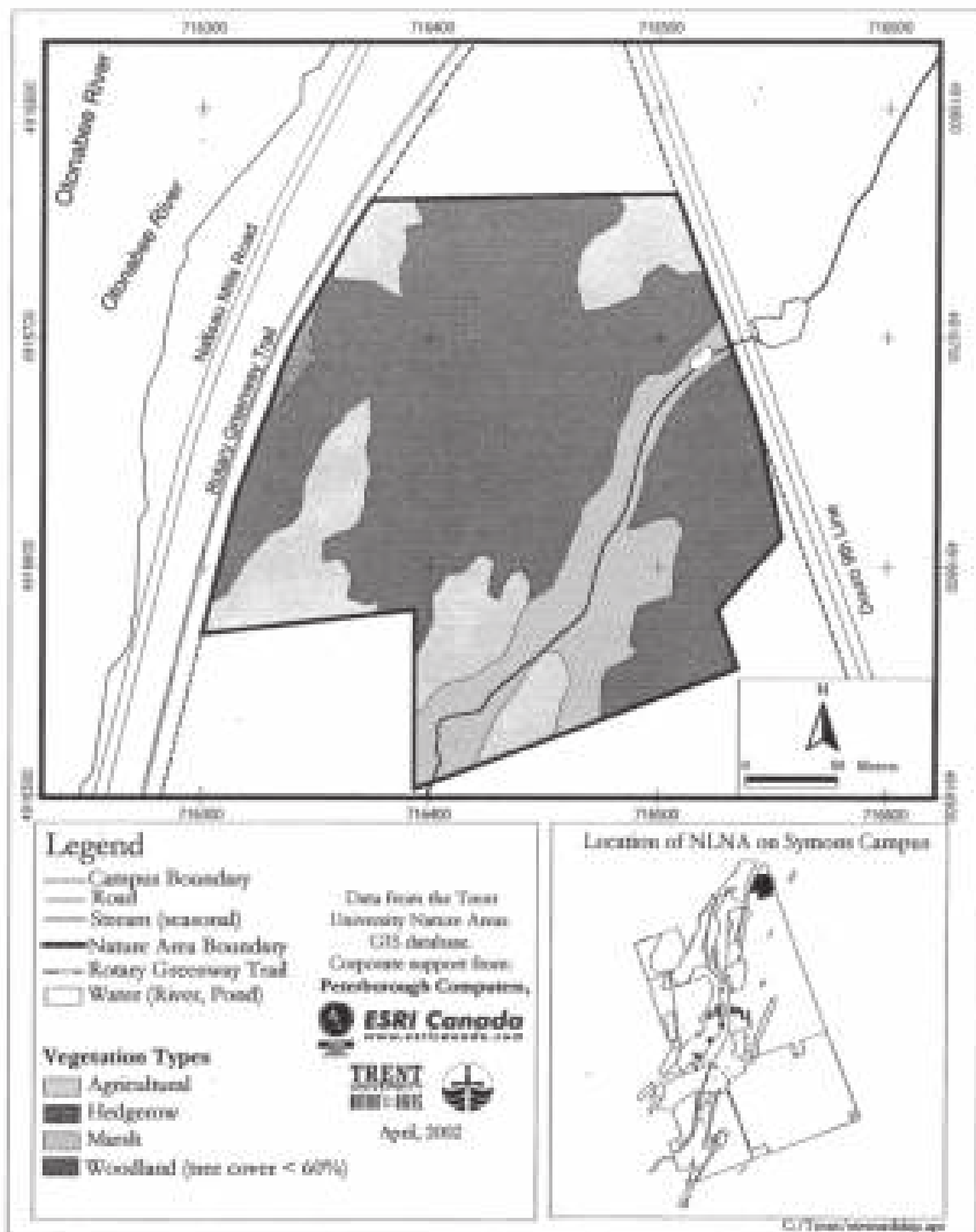


Figure 8-2. Vegetation Types in the Ninth Line Nature Area, Symons Campus, Trent University, Peterborough, Ontario.



### **Recreational Potential**

This Nature Area has recreational potential for walking and cross country skiing.

### **Adjacent Land Use**

Cultivated fields border the eastern and southern parts of this Nature Area.

To the west is the Rotary Greenway Trail bounds the Promise Rock NA and the Otonabee River.

### **Management Issues:**

#### **Ecological Integrity**

There is concern that:

- that trampling by cattle in and around the pond causes damage, such soil compaction and rutting, bank erosion, to vegetation by trampling and increase nutrient levels in the pond. Cattle, however, are preventing invasion of these areas by white cedars.
- the large American beech and maple trees are susceptible to wind damage during storms.

## PROMISE ROCK NATURE AREA (PRNA)

Nature Area Number: 9

Former Nature Area Number: 14

Nature Area Classification: A

### Introduction:

The Promise Rock NA covers an area of 6 ha and borders the west side of the Rail Trail (Figure 9-1), some 500 m north of the Environmental Sciences building. The southern end of the PRNA is accessed from the Rail Trail via a farm track and the northern part via a formal trail which passes by the Promise Rock. Access from Nassau Mills Road, opposite the Lock 22 picnic area, also is via the farm track.

### Topography and Soils:

The upland portion of this Nature Area runs along a low sand and gravel ridge which was probably a successional bank of a glacial spillway channel. West of the ridge is an area of flat to slightly hummocky lowland extending to the Nassau Mills Road. The ridge soils and most of the lowland belong to the *finely* Series which are of a medium texture, moderately stony and imperfectly drained. A small strip of *Farmington* Series soils, which are medium textured, slightly to moderately stony and are of variable drainage, lies west of the *finely* deposit. Lowland soils are poorly-drained, having shallow deposits of heavy clay over limestone.

### Hydrology:

The ridge and old field are well-drained. Soil moisture levels gradually increase in the lowland west of the ridge grading into a narrow band of wetland. The wetland is patchy and indistinct, consisting of saturated soils and shallow pools interspersed with knolls of slightly higher, drier soils.

Water drains slowly southward through the wetland from roadside ditches and marshes that are located on Trent-Severn property to the north. Low relief and shallow soil over the limestone rock impedes wetland drainage. Intermittent outflow drains onto Trent-Severn property south of the Nature Area and eventually into the Chocomaee River.

### Vegetation:

The primary vegetation cover of this Nature Area is mature conifer forest (Fig. 9-2). White cedar is the most abundant tree species, but white pine gives the impression of dominance because of their great height (over 30 m tall), trunk size and age (100+ years). Large Eastern hemlock, white spruce and balsam fir trees are also present. Poison ivy is common among the mature trees. In the lowland west of the conifer stand, there is a mixed-wood swamp composed of aspen, white cedar and balsam fir. Tree cover in this community is immature and patchy, permitting the growth of shrubby thickets in openings. An upland old field community borders the conifer stand to the south and east. The white pine are not regenerating beneath the mature canopy but are colonizing the area west of the swamp and the old field.

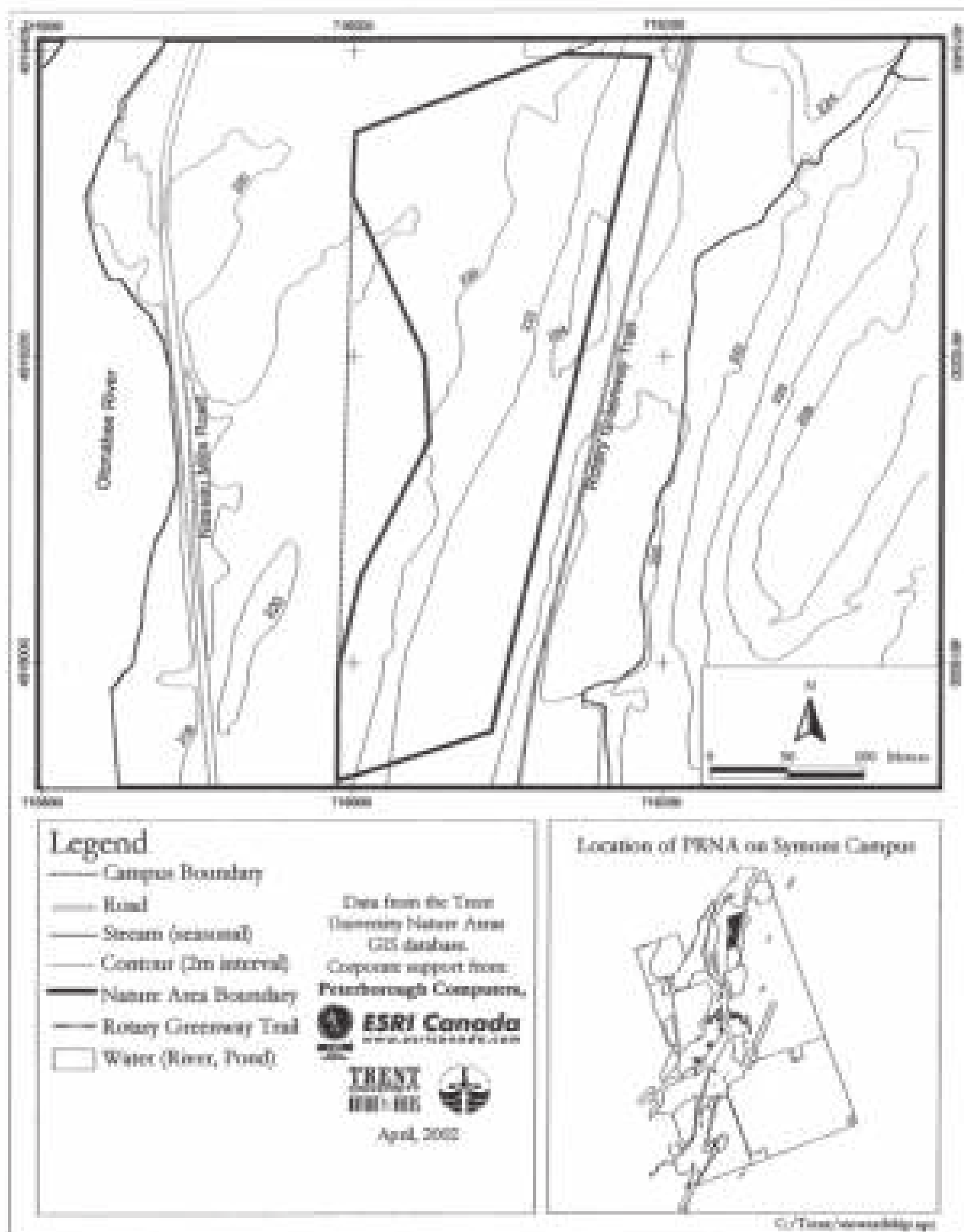


Figure 9-1. Contour Map of the Promise Rock Nature Area, Symmes Campus, Trent University, Peterborough, Ontario.





## APPENDIX 1

### STEWARDSHIP PLAN FOR TENTH CENTURY WOODLAND

1. The site is a 100-acre woodland area located in the heart of the city of Trent, Ontario. It is a valuable natural resource and a significant part of the city's heritage. The site is currently owned by the City of Trent and is being managed as a public park.

2. The site is a 100-acre woodland area located in the heart of the city of Trent, Ontario. It is a valuable natural resource and a significant part of the city's heritage. The site is currently owned by the City of Trent and is being managed as a public park.

3. The site is a 100-acre woodland area located in the heart of the city of Trent, Ontario. It is a valuable natural resource and a significant part of the city's heritage. The site is currently owned by the City of Trent and is being managed as a public park.



## Wildlife

The mixed conifer woods attract several uncommon species of birds not noted elsewhere on campus. A few of these birds are characteristic of more northerly locations. A black-throated green warbler, an uncommon summer resident, was heard singing in the pines on two occasions in the summer of 1996. A short-eared owl, a rare visitor to Peterborough County, was observed on the western edge of the woods during December 1996. Other birds observed include the great-horned owl, brown creeper, red-breasted nuthatch, white-breasted nuthatch, black-and-white warbler, white-throated sparrow and black-capped chickadee. Red squirrels are common in the mixed conifer woods.

## Historical Features:

This Nature Area is named after a large, flat, lime-stone rock near the north end of the property, known as Promise Rock because of its use by the local area Scouting movement for the induction of new Scouts. It is still used for this rite of passage by some Peterborough Scouts. There are also remains of a Scout camp in the southeast portion of the property. The camp operated from the 1940s to the 1960s and still present are foundations of buildings demolished when Trent University acquired the land. Another feature of note is the Rail Trail which runs along east side of the property. Also of interest is an old garbage dump south of the farm track.

There are also features of past agricultural and logging activities in this Nature Area.

## Significant Features:

White pine communities of this age are relatively uncommon in the municipality. There are also many other species of trees there, such as hemlock, white cedar and white spruce, with individual trees over 100 years of age. This is the only community of this type on campus and is a remnant of a once common forest community removed from this area by logging. This stand is a noticeable feature in the landscape, being visible from viewpoints such as the Lady Eaton Drumlin and even the Faryon Bridge over the Otonabee. Proximity to the Rail Trail and Environmental Science Building makes this a popular Nature Area for walking and also for skiing in winter.

## Land Use

### Teaching and Research

The PEANA is used for ecological and forest management studies by undergraduate classes in Biology and Environmental Science and Resource Studies. It is the only site on campus with such an unique collection of 100+ years old White pines, eastern hemlock and white cedar trees available for teaching and research studies.

### Recreation

The woods are well-used for walking, skiing, nature appreciation and organized nature walks. The nature trail and access lane incurs low usage by ATV riders and horse riders. The PEANA nature trail is easily accessed from the Rotary Greenway trail and, by walking north along the river bank and crossing the Lock 22 dam, the nature trail in the Lady Eaton Drumlin NA. From the nature trail one can marvel the large, 100+ year-old trees around the Promise Rock and unique to the Symsco campus. The Promise Rock continues to be used by local Scout troops.

### Adjacent Land Use

To the west and north are lands of the Trent Severn Waterway and the Otonabee River. Beyond the southern boundary is the campus core and beyond the eastern boundary is leased farmland.

### Management Issues:

#### Ecological Integrity

There is concern that:

- interference with the hydrological regime of the PRNA may kill or detrimentally affect many of the mature trees, many of which are over 100 years of age. Nowhere on the Symons Campus is there such a magnificent collection of ancient trees.
- the coring of mature coniferous trees, may be detrimental to their well being and should be discontinued.
- the invasion of the forest edge by European buckthorn and in the forest, itself, where light conditions are suitable for establishment of this noxious weed, is detrimental to native species.

#### Recreation

There is concern that:

- the formal trail established in the PRNA is not being maintained and that the trail is seriously invaded by poison ivy

## WETLAND COMPLEX NATURE AREA (WCNA)

Nature Area Number: 10

Former Nature Area Number: 13

Nature Area Classification: A

### Introduction:

The Wetland Complex NA (Figure 10-1), covers an area of 12 ha. It begins just north of the Environmental Science Building parking lot (Lot Q) and extends north for approximately 1 km. This area is accessible from the Rail Trail or parking lot Q. A hydro corridor through the central section bisects this Nature Area.

### Topography and Soils:

This wetland complex occupies a long narrow depression in a relatively flat, lowland plain. The eastern edge is bordered by upland composed of small hills and a large drumlin, the west slope of which is very steep. This slope, and the eastern slope of the Lady Eaton Drumlin, were probably once the banks of a glacial spillway channel. The soils in the WCNA belong to the Otonabee Series, having a medium texture, are moderately stony and good to excessively drained and to the Frobisher Series. These latter soils have a coarse texture, are stone free and have poor to very poor drainage.

### Hydrology:

This wetland occupies what appears to be the natural drainage course between the pond in the Ninth Line NA and the Otonabee River. The major water source appears to be a steady flow of water via partially-buried pipe from a spring at the wetland's northeastern edge. Other springs may be present elsewhere in the complex and field drains may exit into the wetland. Drainage from the pipe flows south through areas of mixedwood swamp, thicket swamp, marsh meadow and shallow marsh. Shallow water can remain year-round in the thicket swamp. Surface water is temporal in some parts of the treed swamps, shallow marsh and marsh meadow. Ditches running parallel to the Rail Trail drain water from the wetland into the Otonabee River.

### Vegetation:

The wetland vegetation consists of a mix of open, wooded and shrubby communities (Figure 10-2). White Cedar is the dominant cover in both treed swamps. Areas of shallow marsh are vegetated by patches of cattails, sedges, grasses and low shrubs. Shrubby willows dominate a thicket swamp.

### Wildlife:

White-tailed deer appear to frequently use the coniferous swamp and marsh meadow. Numerous sets of tracks and scats were noted in the swamp, and several bedding sites were apparent in the tall vegetation of the marsh meadow. A well-worn animal trail crosses the cedar swamp and continues into the marsh meadow.

The shrubby willows in the thicket swamp support a rich and varied community of nesting songbirds.

Amphibians reproduce in several pools in the wetland, but are particularly abundant in the thicket swamp because of the permanent water. Muskrat activity has been noted in the shallow marsh in the vicinity of the hydro corridor. Evidence of red fox, porcupine and other smaller mammals was observed in the mixed forest.

#### Historical Features:

The WCNA is bordered on the west side by the old rail line – now used as a recreational trail. Some fences and some old farm equipment are left from abandoned agricultural fields.

#### Significant Features:

The thicket swamp contains one of the largest bodies of permanent water found in any of the Trent Nature Areas. Year-round water is essential to some types of aquatic organisms. The cool, moist conditions of the cedar swamp provide habitat for colonies of ferns and small patches of *Sphagnum* spp., an uncommon genus in the municipality. The mixed forest on the drumlin contains several very large deciduous and coniferous trees. The wooded drumlin slope is of geological interest, and contributes to hydrological processes affecting the wetland.

#### Land Use:

The WCNA is used for teaching and research. It is also used when nature walks are taken along the Rail Trail.

A hydro transmission corridor crosses another part of the wetland. One of the towers carries a radio communications disk and an associated building.

The white cedar swamp and adjoining wooded uplands were selectively logged, for cedar trees in particular as piles of cedar posts, slash and cedar stumps in various stages of decay may be found in the southern swamp.

Wooded areas were used as depositories for some farm and household refuse. There is an old metal tank in the mixed wood swamp. The conifer swamp harbours a disused car and bottle dump, as well as scattered pools and sheet metal.

#### Adjacent Land Use:

Portions of the wetland adjoin agricultural fields, leased from Trent University for farming. Hay is harvested from drier portions of one of these fields. Cattle are pastured in another field through which the wetland has been channelized. The Rail Trail, an old field, and immature woodlands bound the western side of the WCNA.

#### Recreational Potential

Due to its wetness, this area has low recreational potential. Parts of the wetland are visible from the Rail Trail, providing walkers the opportunity to view and listen to wildlife, such as birds and the calls of frogs. An informal trail on the east side of the WCNA should be upgraded.

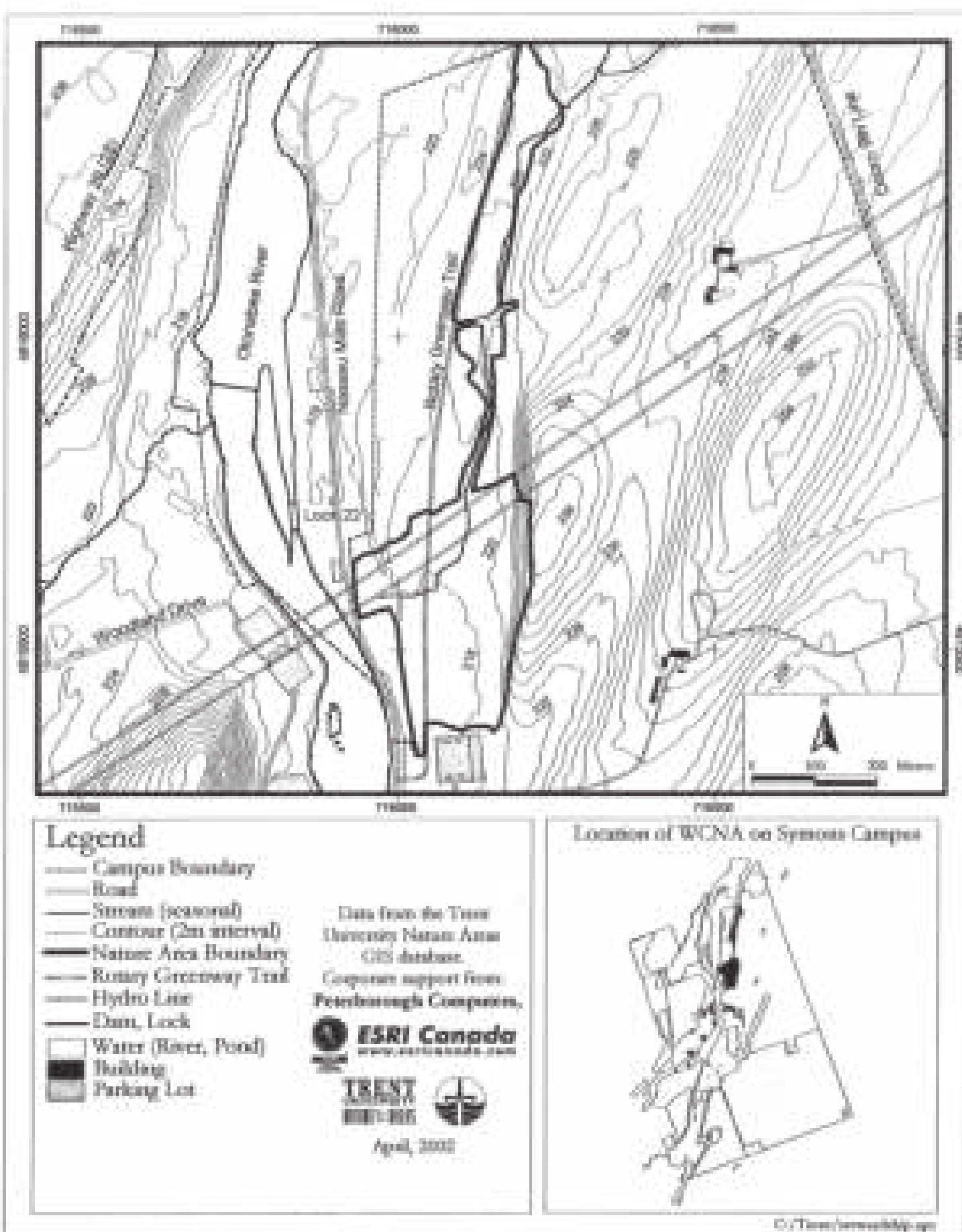


Figure 10-1. Contour Map of the Wetland Complex Nature Area, Symons Campus, Trent University, Peterborough, Ontario



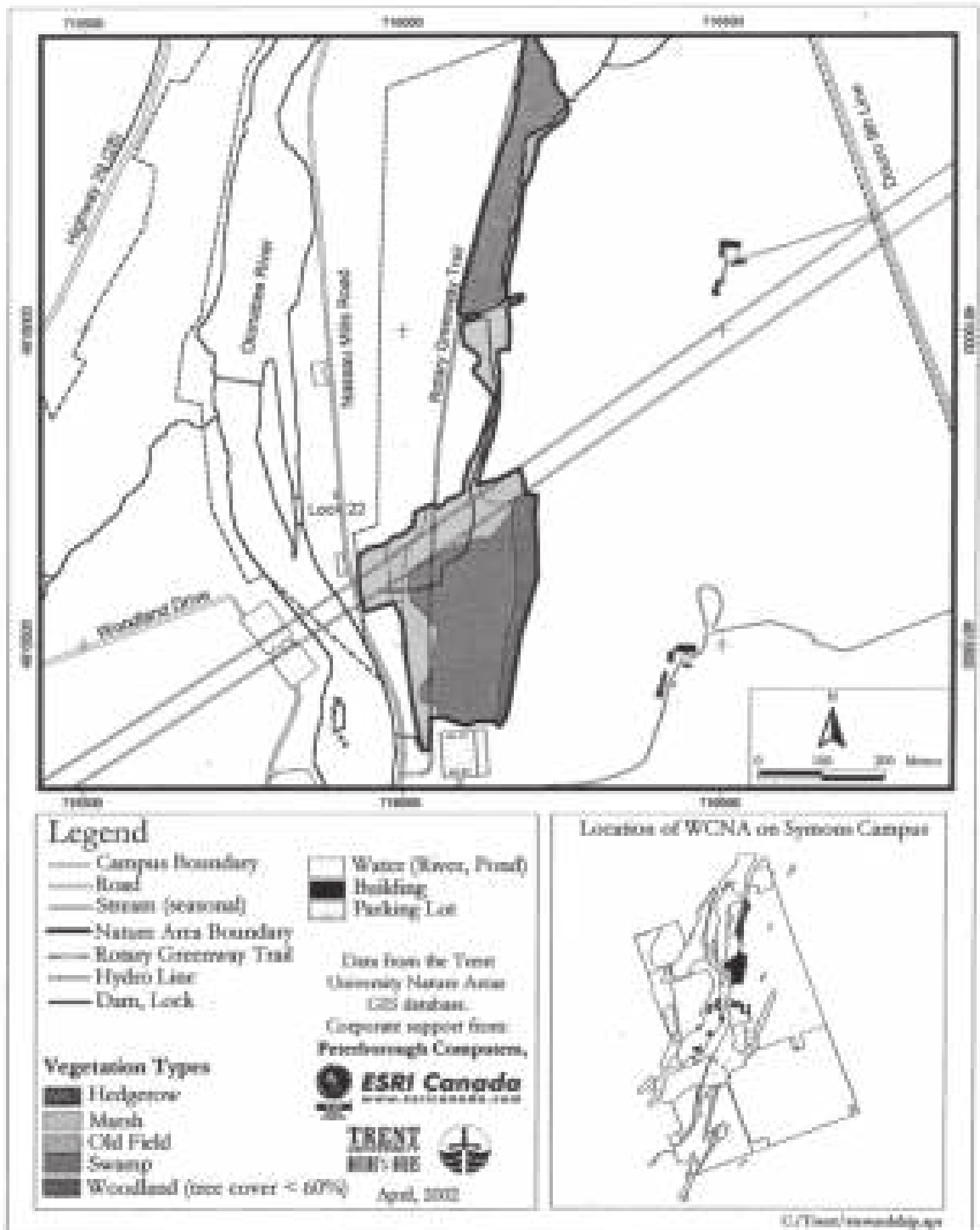


Figure 10-2. Vegetation Types in the Wetland Complex Natural Area, Symons Campus, Trent University, Peterborough, Ontario.





### Management Issues:

#### Ecological Integrity

There is concern that:

- impacts on the hydrologic regime will have detrimental effects on the vegetation and animal communities.
- European buckthorn constitutes a major component of the shrub layer in the corridor and mixed swamps and that this species will continue to increase in abundance and shade out indigenous species.
- there is potential for damage to the vegetation and soils that may be caused if Hydro One workers cross the shallow marsh in the hydro corridor with heavy equipment.
- the wet soils and delicate flora of the corridor swamp may be detrimentally affected by heavy foot traffic.

#### Hydrology

There is concern that:

- because the origin of the spring providing water to the wetland is unclear that construction activities could affect the water regime of this wetland.

## ARCHAEOLOGY CENTRE WETLAND NATURE AREA (ACWNA)

|                             |    |
|-----------------------------|----|
| Nature Area Number:         | 11 |
| Former Nature Area Number:  | 6  |
| Nature Area Classification: | A  |

### Introduction:

The Archaeology Centre Wetland NA (Fig. 11-1) covers an area of 8 ha and is located just west of the Archaeology Centre and the Mackenzie Gallery. This Nature Area can be reached via a path from the Environmental Science Building and Otonabee College or by a lane from Pioneer Road.

### Topography and Soils:

This wetland occupies a shallow depression in what was once the Otonabee River floodplain, and is surrounded by uplands of only slightly higher elevation. The soils belong to the Foodons Series which have a coarse texture, are stone free and have poor to very poor drainage. A layer of organic soil has accumulated in the wettest areas.

### Hydrology:

The wetland does not appear to be fed by inflow channels or springs. It is possible that drainage to this area was affected by construction and farming activities. The north and south sections of the wetland are separated by a berm located at a narrowing of the wetland (Fig 11-1). The lowest area, in the northern part, is occupied by a small, permanent pond, apparently excavated (Figure 11-1). This pond, approximately 700 m<sup>2</sup> in area, is about 1 m deeper than the rest of the wetland and its banks are bermed along three sides. Nutrient levels appear to be high, and the water depth and surface area appears to have significantly decreased in recent years. Certainly in the past, water levels in the pond were much higher, to the extent that a boat was needed for biological studies of pond life. Land at the north end of the pond is often inundated for most of the year, becoming dry in late summer.

The south section of this Nature Area has wet soils interspersed with small, shallow pools, which flow intermittently south through a culvert into the Wildlife Sanctuary.

### Vegetation:

Wetland vegetation in the ACWNA consists of a mixture of open, wooded and shrubby communities. White cedar is the dominant cover in both treed swamps (Figure 11-2). Areas of shallow marsh are vegetated by patches of cattails, sedges, grasses and low shrubs. Shrubby willows dominate a thicket swamp which supports a rich and varied community of nesting songbirds. White-tailed deer appear to frequently use the coniferous swamp and marsh meadow. Numerous sets of tracks and scats were noted in the swamp, and several bedding sites were apparent in the tall vegetation of the marsh meadow. A well-worn animal trail crosses the cedar swamp and continues into the marsh meadow.

### Wildlife:

Amphibians reproduce in several pools in the wetland, but are particularly abundant in the thicket swamp because of the permanent water. Muskrat activity has been noted in the shallow

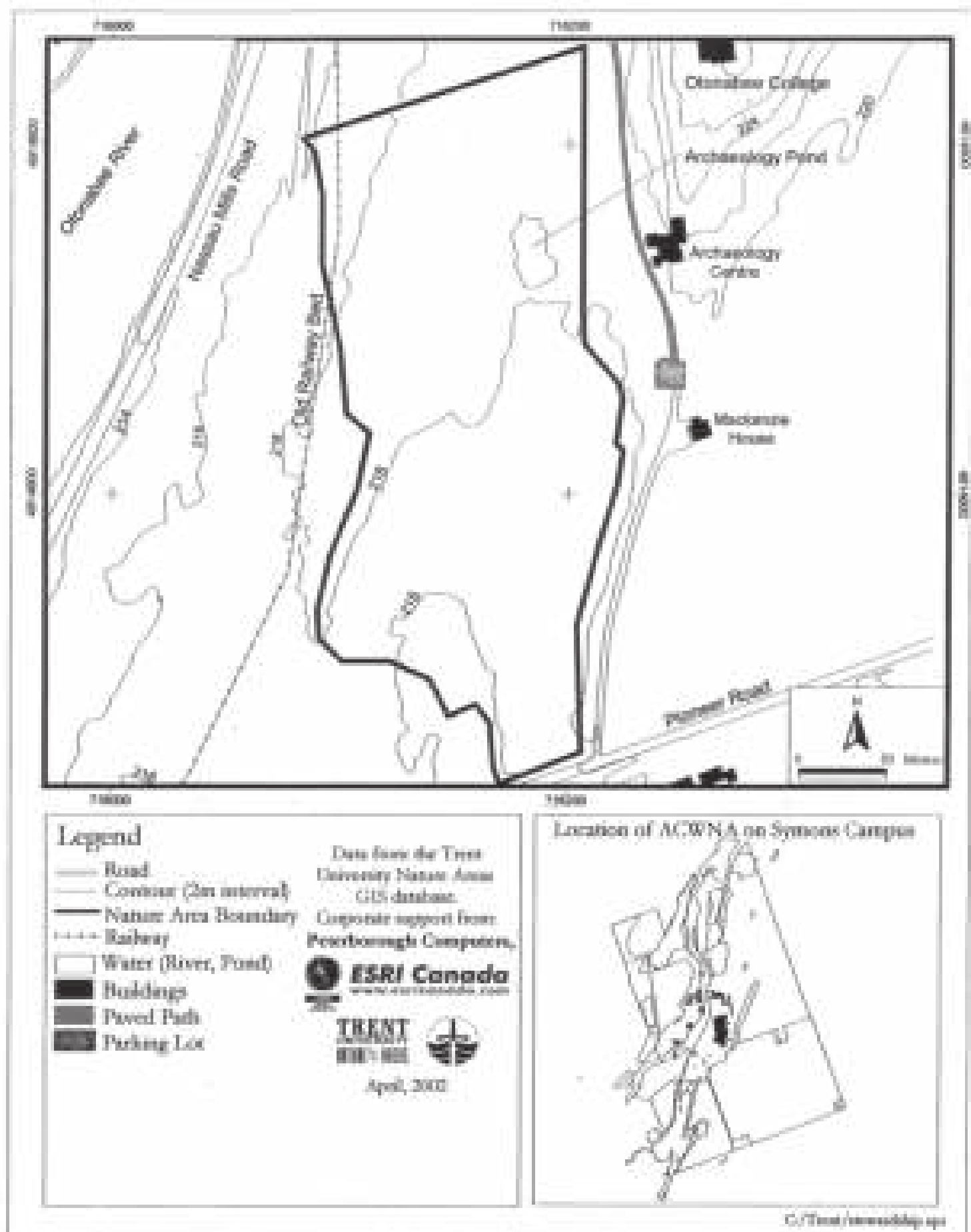


Figure 11-1. Contour Map of the Archaeology Centre Wetland Nature Area, Symons Campus, Trent University, Peterborough, Ontario.



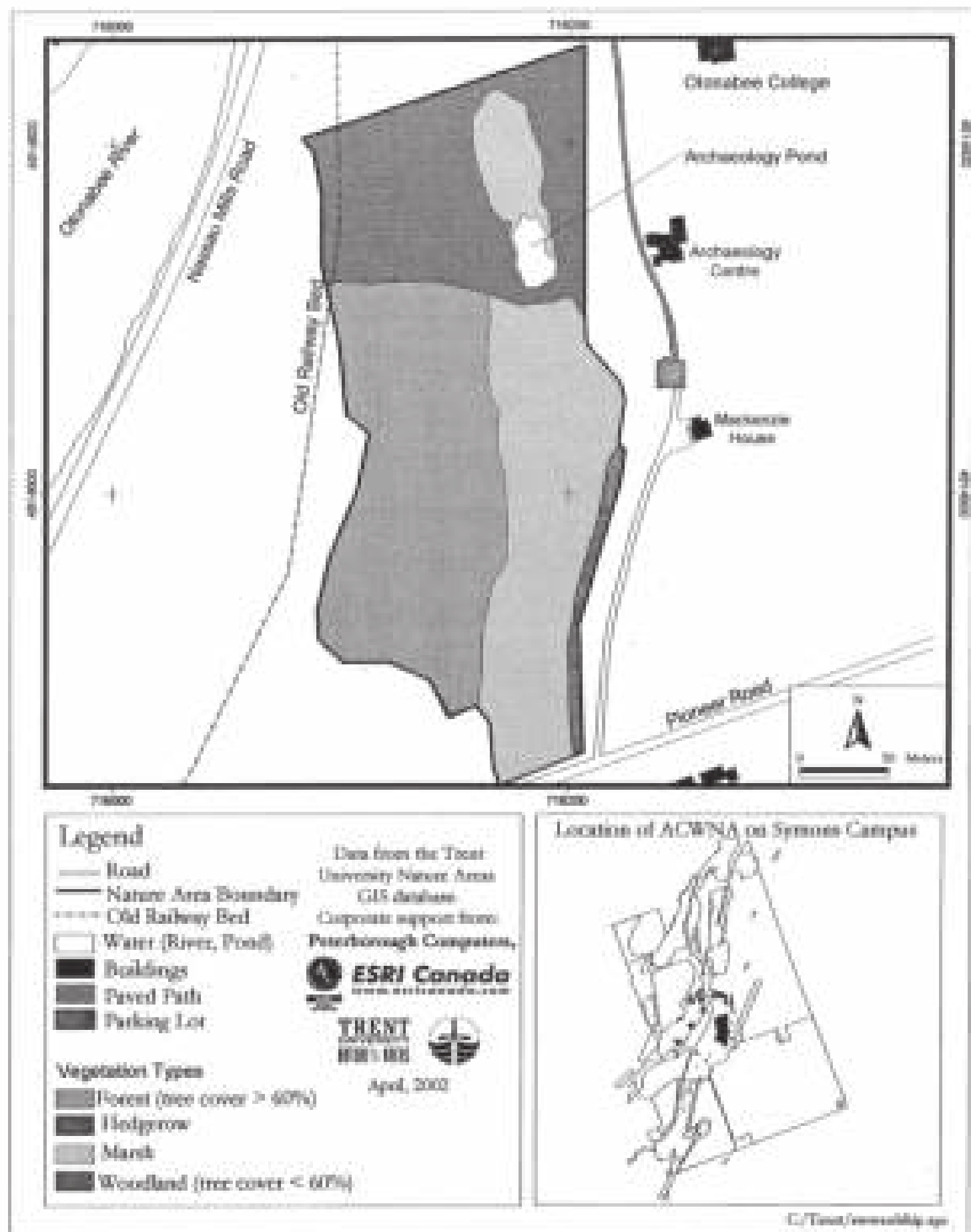


Figure 11-2. Vegetation Types in the Archaeology Centre Wetland Nature Area, Symons Campus, Trent University, Peterborough, Ontario.



marsh in the vicinity of the hydro corridor. Evidence of red fox, porcupine and other smaller mammals was observed in the mixed forest.

#### **Historical Features:**

The most important historical feature in the ACWNA is the apparently man-made pond, surrounded by berms of excavated soil, probably to serve as a source of water for stock animals. There is the foundation of a log-barn that burned down in 1969 (R. Jones pers. comm.) and a site foundation close by at the end of the driveway on which Otonabee College was constructed. Mackenzie House was the dwelling for the farm.

#### **Significant Features**

The most significant feature in this Nature Area is the pond and it's diversity of plants and wildlife.

#### **Land Use:**

#### **Teaching and Research**

The closeness of the ACWNA to the Environmental Sciences Building makes it important for undergraduate field classes and both undergraduate and graduate research.

#### **Adjacent Land Use:**

The ACWNA is surrounded on three sides by the campus core and endowment lands while to the south, across Pioneer Road is the Wildlife Sanctuary NA. Mackenzie House, the Archaeology Centre, a parking lot, and a paved path are all located near the eastern edge of the wetland. Pioneer Road and the Wildlife Sanctuary border to the south.

#### **Recreational Potential**

The potential for damage to the vegetation and soils suggests that this Nature Area is not suitable for recreational activities.

#### **Management Issues:**

#### **Ecological Integrity**

There is concern that:

- drainage into the pond may have been interrupted with as the pond was once several feet deep.
- cattail invasion of the pond is occurring because of the substantial decline in the depth of water in the pond. Transpiration by these emergent plants is exacerbating the declining water levels.
- in the absence of a boardwalk, the wet soils and herbaceous species will be damaged unless groups using the ACWNA are small.
- the ACWNA is being invaded by European buckthorn and purple loosestrife which have the ability to out-compete native species.

## OTONABEE COLLEGE WETLAND NATURE AREA (OCWNA)

Nature Area Number: 12

Former Nature Area Number: 5

Nature Area Classification: A

### Introduction:

The Otonabee College Wetland NA (Fig. 12-1) covers 6 ha and is located 80 to 100 m east of the Archaeology Centre and Mackenzie House. It extends 760 m north from Pioneer Road, and is accessible from this road as well as from fields east of Otonabee College or the Mackenzie House.

### Topography and Soils:

The long narrow lowland in which this wetland is situated is bounded to the east and west by flat to rolling uplands. A broad, gently sloping valley from the north narrows towards the wetland. Soils belong to the Foxboro Series. These soils have a coarse texture, are stone free and have poor to very poor drainage occur in the wettest areas.

### Hydrology:

This small, isolated wetland has no apparent inflow or springs. Water inflow, is probably from surface and subsurface drainage from surrounding uplands, particularly from the agricultural lands. Three roughly constructed stone berms across the wetland and shallow depressions hold back some water in small, ephemeral pools. These pools are connected by moist marsh meadows. The outflow from the OCWNA is through a culvert beneath Pioneer Road into the Wildlife Sanctuary.

### Vegetation:

Scattered patches of shrub thicket among expanses of marsh meadow form the vegetation of the OCWNA (Figure 12-3). The thickets, composed primarily of shrubby willows, with slender willow being the dominant species, occur mainly in the pools or on wetter soils. The marsh meadows support graminoids, tall herbs and low shrubs. The uneven terrain in the marsh meadows and consequent variations in soil moisture content, gives rise to a mixture of upland and wetland plants such as Canada goldenrod and jewelweed, tolerant of wet and dry conditions.

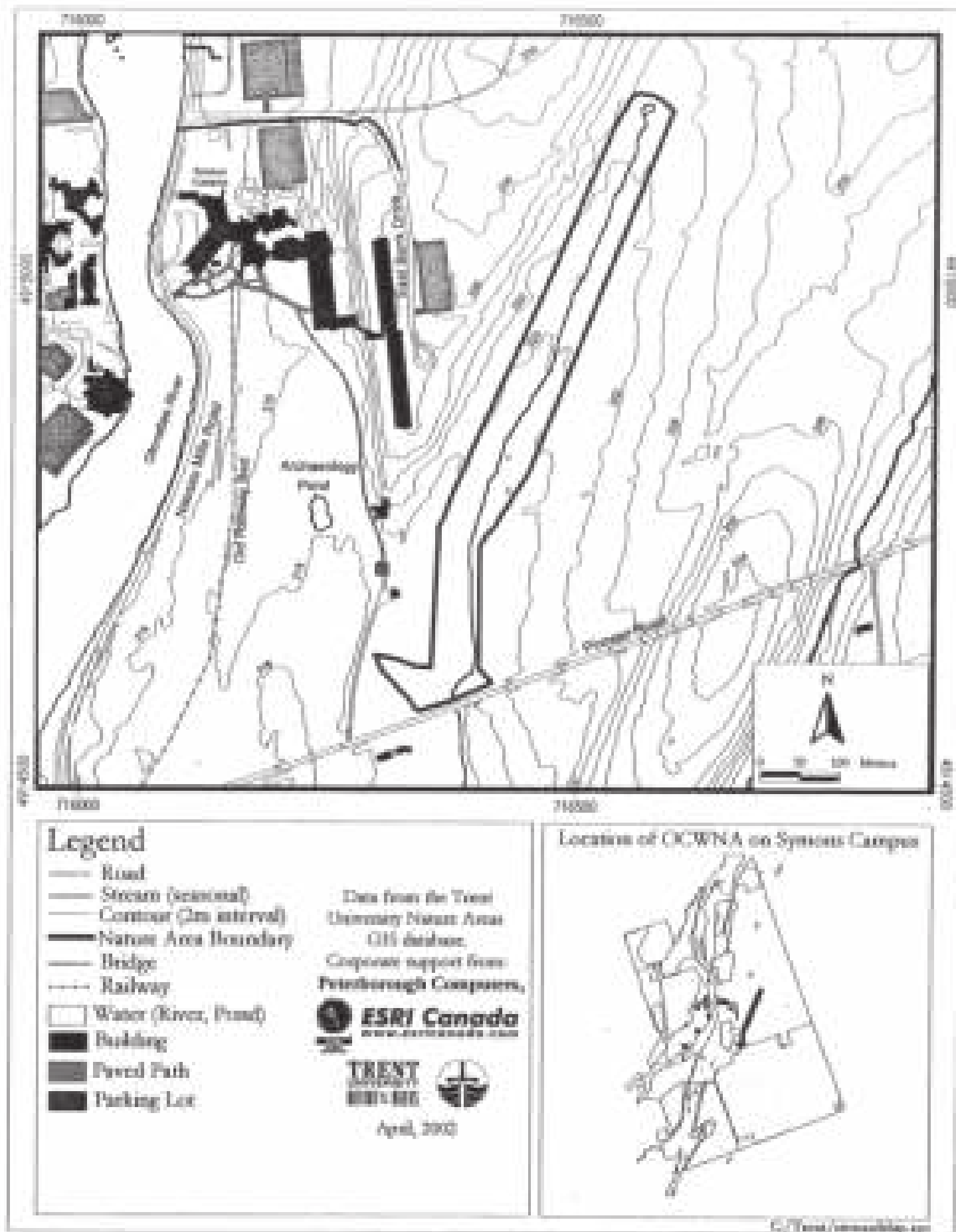
### Wildlife:

A variety of bird species are supported in this Nature Area, including the American goldfinch, common yellow throat, American redstart, yellow warbler, gray catbird, common snipe, American woodcock, swamp sparrow and song sparrow. A well used animal trail runs the entire length of the wetland and red fox and white-tailed deer tracks have been observed. Four species of amphibian reproduce in pools in the wetland: the northern leopard frog, American toad, striped chorus frog and tetraploid gray treefrog.

### Historical Features:

There are three roughly constructed stone berms retaining the wetland waters which appear to be the only historical feature in the OCWNA.







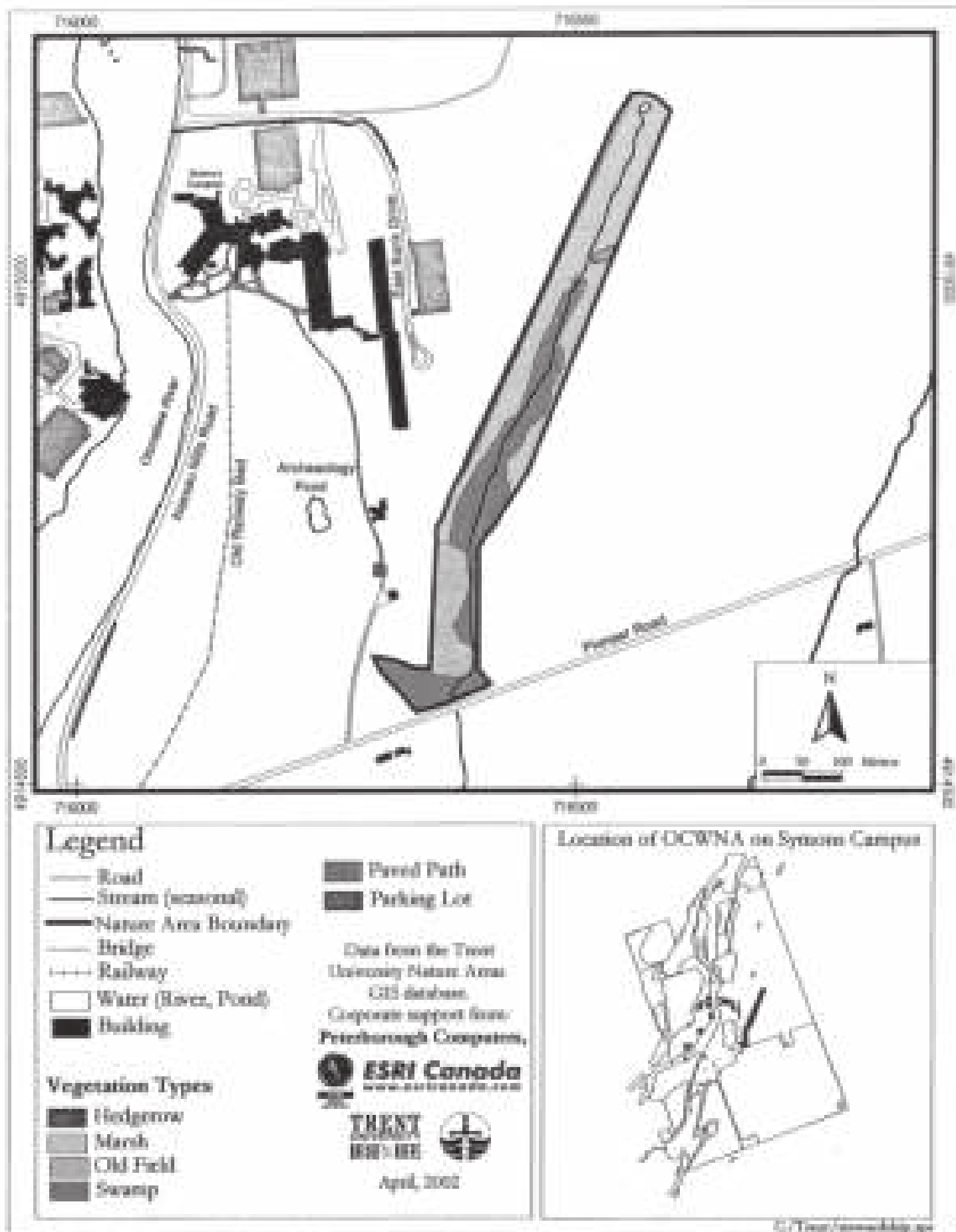


Figure 12-2. Vegetation Types in the Dundee College Wetland Nature Area, Symons Campus, Trent University, Peterborough, Ontario.



### Significant Features:

This Nature Area is an example of an inter-drainage swale which provides habitat for amphibians. Amphibian research and viewing has occurred and there is potential for further use.

### Land Use:

#### Teaching and Research

Graduate student research on amphibian ecology has been conducted in the area.

#### Nature Interpretation

This is a good area to visit to listen to frogs and view displaying American woodcocks. The University Naturalist Club has visited this area several times for these purposes.

### Adjacent Landuse:

This wetland is bordered to the east by hay and corn fields. Along the western edge of the southern section of this wetland is an old field being invaded by shrubs and trees. To the north is an un-managed grassy area east of Otonabee College. A debris and rubble dump is located near the north end of the wetland. Across Pioneer Road is the Wildlife Sanctuary NA.

### Recreational Potential

This Nature Area is not suitable for walking trails. However, the closeness of parking and the paved path by MacKenzie House means that this wetland is suitable for visits by small groups for nature interpretation, listening to frogs and observing woodcocks on spring evenings.

### Management Issues:

#### Ecological Integrity

There is concern that:

- the biodiversity of this is wetland may be compromised by purple loose-strife invasion since a few plants of this species were removed from the wetland east of Otonabee College in 1996
- soil, possibly contaminated with fertilizers and pesticides from adjacent corn fields, is being carried by stormwater run-off into the wetland
- a University refuse dump situated on a hill close to the western edge of the wetland, if expanded to the east, will encroach upon the wetland
- runoff from a road through or in the OCWNA has the potential to contaminate this wetland with road salt and hydrocarbon products. Water from this wetland drains through the Wildlife Sanctuary NA and Canal NA into the Trent Canal

TRENT UNIVERSITY NATURE AREAS COMMITTEE – 1994/95

EXHIBIT 3

REPORT TO SENATE AND BOARD OF GOVERNORS

Chair: Roger Jones, Department of Biology

**NATURE AREAS COMMITTEE (NAC) MEMBERS 1994/95:** Profs. J. Marsh (First term), R. Helleiner (Second term), T. Hutchinson (EPS) and B. Williams (Native Studies). J. Langston (TSU), B. Wytele (TUNO) (secretary), R. Rishkol (GSA), J. Watson (JSSA), J. Neufeld, Vice-president (ex officio), S. Dantzer, Director of Physical Resources (ex officio), Prof. C. Greene, Chair, Site Development Committee (ex officio). Co-opted: R. vanDorpelaar (Physical Resources), D. Moger (EPS) and Dr. D. Sadler.

This report has been discussed by, received input from and endorsed by the 1995/96 NAC Committee. Membership included Chair, Professor J. Marsh, Professors M. Fox, P. Morton and D. Torgerson, Mr. S. Reid (GSA) and Mr. R. vanDorpelaar (Department of Physical Resources).

EXECUTIVE SUMMARY

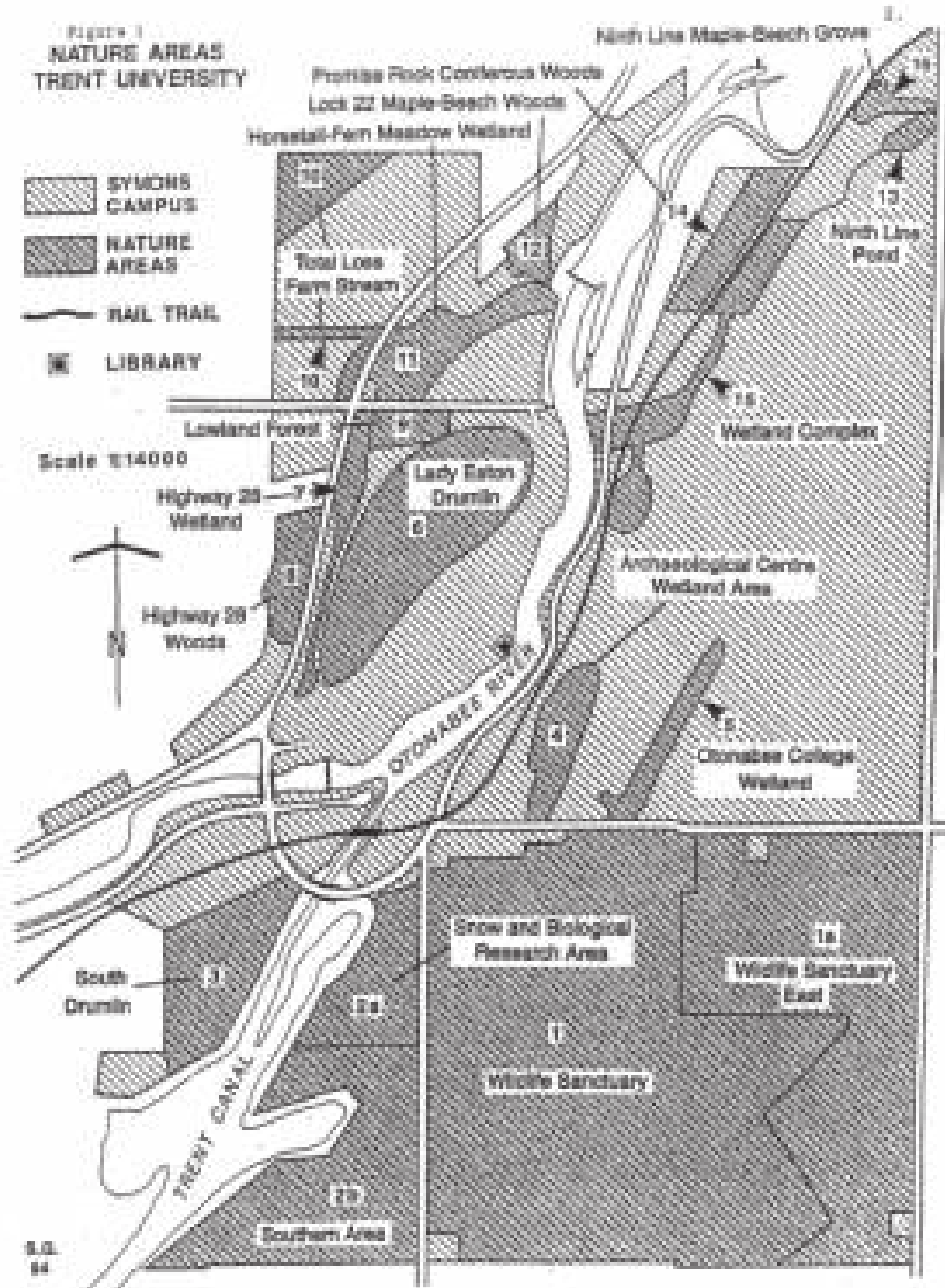
"NATURALLY SPECTACULAR CAMPUS" UNDER THREAT

Trent University was blessed with a spectacular site encompassing a wonderful array of landscapes and habitats, ranging from wetlands and dry uplands to a variety of woodlots and abandoned farm fields when it admitted its first undergraduate class in 1964. However, the lack of a long-term vision and an implemented Stewardship Plan has led to an ad hoc approach towards use and management of a large part of this "Naturally Spectacular Campus", the description given to it in the recent University Prospectus (Appendix V). Trails and associated structures are not being managed and maintained on a regular basis, giving rise to safety and liability concerns. Habitat diversity and biodiversity in many areas of the campus are being compromised by excessive spread of White Cedars and invasion by the European Buckthorn, a noxious weed that is outcompeting and displacing native species of herbs and shrubs. The University needs to decide where the Nature Areas fit as a "natural laboratory" in its goals and priorities.

1. **NATURE AREAS AND THEIR IMPORTANCE AS A DISTINCT UNIVERSITY AND PUBLIC ASSET**

- The attractiveness of the campus as a "natural laboratory" for students coming to Trent to study the natural sciences has received much prominence in the recent University Prospectus.
- Nature Areas (Figure 1), comprising about 50% of the 1400-acre Symons Campus, are important areas used in undergraduate teaching and research in anthropology, biology, environmental and resource studies, geography and native studies.
- Nature Areas are used also as sites for research by faculty and graduate students.
- Nature Areas are used year-round by members of the Trent and Peterborough communities for recreational activities and as areas in which to walk, commune with nature and enjoy the outdoor environment.

Figure 1  
NATURE AREAS  
TRENT UNIVERSITY







TRENT UNIVERSITY  
SYMONS CAMPUS LOCATOR MAP

**Nature Area Map**

Authors: Lawrence  
Mullins, Barbara Lee  
Brown, and Margaret  
Brown  
Revised: 1998  
Scale: 1:25,000  
Map Date: 1998  
Map Title: Nature Area Map  
Map Scale: 1:25,000  
Map Date: 1998  
Map Title: Nature Area Map  
Map Scale: 1:25,000  
Map Date: 1998

**Legend**

- river
- campus border
- building
- road
- walking trail
- nature area with  
designation (see  
reverse for key)
- land with  
designation

0 0.6 1.2 km  
scale 1:25,000

N

Professional Design: D&D by S. Day, R. Loring, S. Gifford, J. Day



- \* They comprise about half of the green space in the city of Peterborough.
- \* However, the Nature Areas are in urgent need of attention as management consists very largely of benevolent neglect which is finally causing problems for their future.
- \* The University, needs to develop a long-term vision and Stewardship Plan incorporating the Nature Areas into the University's goals and priorities.

**2. RECOMMENDATIONS TO SENATE AND THE BOARD OF GOVERNORS, BASED ON DISCUSSIONS HELD AT NAC MEETINGS DURING 1994/95 AND ENDORSED BY THE 1995/96 NAC.**

The terms of reference (Appendix I) given to the Committee call for recommendations to be made to Senate and the Board of Governors by the NAC. Because the NAC does not have access to University funds it cannot collect the necessary data to meet its mandate of making specific recommendations about Nature Areas, and in fact, without the requisite resources, is unlikely ever to be able to do so. This situation has been and continues to be extremely discouraging and frustrating for committee members. In the Chair's remarks at the March 6, 1995 meeting of the Board of Governors Property Committee, Mr. M.J. Nolan "noted with regret that no operating funds were available to support the (NAC) Committee's work". Consequently, the three recommendations below are made because:

- \* There is much concern about safety and liability issues due to the ad hoc approach to management and maintenance of trails and associated structures.
- \* There is much concern about growth of Poison Ivy on and very close to trails.
- \* The NAC needs information about possible long-term vegetation change in the Nature Areas and the implications of this change for teaching, research, recreation and other uses.
- \* Habitat diversity and consequently biodiversity in many upland fields are in danger because these fields are being overrun by Eastern White Cedars (*Thuja occidentalis*). Many of these open habitats and their constituent species are in danger of being lost.
- \* There is a problem in many Nature Areas of significant and expanding invasion, to the detriment of herbaceous and shrub species, by an alien species, the European Buckthorn (*Rhamnus cathartica*).
- \* The extent of use of Nature Areas for teaching, research, recreational or other activities needs to be monitored. There is little record-keeping about the Nature Areas.
- \* It needs to be determined if there is overuse of any nature areas. It is evident that parts of trails need periodic realignment to reduce erosion.
- \* The NAC does not have the resources to carry out the terms of reference given to it by Senate.

Background and details for the following recommendations are presented in Appendix 4

**RECOMMENDATION 1: FOR IMMEDIATE ACTION:**

- A. That trails and their associated structures be managed and maintained because of safety and liability concerns.
- B. That procedures be developed for granting permission for use of Nature Areas by outside groups or organisations and that they be invited to make a donation to be used for maintenance of Nature Areas. Outside Groups and Organisations should be required to sign an Hold Harness Agreement with the University.
- C. That invasion of trails by Poison Ivy be addressed.
- D. That access to all areas for safety purposes be evaluated and planned since the new Prospectus advertises "Skiing, running, hiking or just a walk anywhere around the 1400 acres of scenic campus....". It may be necessary, for example, to get rapidly to a fire which might occur during hot, dry summers in fields where there are dense stands of White Cedars. Fire pits have been observed in Nature Areas.
- E. The potential loss of habitat and biodiversity caused by invasive species (European Buckthorn, in particular) and by native species (e.g. White Cedar and Black Locust) should immediately be tackled.
- F. If Senate and the Board of Governors reject or delay Recommendations 2 and 3 below, and if the Senate and Board of Governors expects the NAC to fulfil its terms of reference (Appendix 3), then resources must be made available to the NAC since the committee does not currently have access to University funding.

**RECOMMENDATION 2: THAT THE UNIVERSITY PREPARE IMMEDIATELY A STEWARDSHIP PLAN FOR THE NATURE AREAS ON THE SYMONS CAMPUS.**

- \* E, in the future, the University hopes to have for teaching, research, recreational use, the same degree of access and of habitat and species diversity in its Nature Areas as occurs today, then it is essential to abandon the current benign neglect and ad hoc approach to these areas. Neither approaches to the Nature Areas are in the long-term interest of the academic program or other uses by the University or Peterborough communities.
- \* The NAC is convinced that an implemented, Stewardship Plan is required for long-term sustainable use and management of the Nature Areas so as to maintain for the future our "naturally spectacular campus" as "the perfect environment for learning and recreation".

**RECOMMENDATION 3: THAT ONCE A STEWARDSHIP PLAN IS PREPARED AND APPROVED THEN AN INDIVIDUAL WITH A KNOWLEDGE OF NATURAL HISTORY, VEGETATION AND RECREATION MANAGEMENT (A "UNIVERSITY NATURALIST") SHOULD HAVE RESPONSIBILITY FOR THE NATURE AREAS AND ADVISE THE NAC AND UNIVERSITY ON IMPLEMENTATION OF THE STEWARDSHIP PLAN FOR TRENT'S NATURE AREAS**

- \* The NAC is convinced that the only way to implement a Stewardship Plan is for an individual, in consultation with the NAC and Department of Physical Resources, to have ongoing

responsibility for the Plan. Other responsibilities would include day to day management of the Nature Areas, organising the efforts of the many volunteers who seem to be available and seeking funds.

- \* The NAC believes that such a position, with the title of Trent University "Naturalist", would transform the present unsatisfactory neglect of the nature areas into a practice consistent with Trent's environmental values.

#### **LACK OF ACTION BY SENATE AND THE BOARD OF GOVERNORS TO THE RECOMMENDATIONS**

The problems caused by not having an implemented Stewardship Plan predate, by far, recent moves towards financial cutbacks. If the recommendations to prepare and implement a Stewardship Plan are rejected, or the resources to carry them out are not found, then the University should be aware of the potential costs of not addressing the short- and long-term environmental, recreational and safety implications following from continued neglect of Nature Areas. These include -

- \* Damage to the image of an University extolling in its Prospectus the use of and virtues of the Nature Areas on campus as a "natural laboratory". The image of an institution concerned about the environment will be compromised.
- \* Exposure of the University to safety and liability issues related to the various uses occurring in the Nature Areas. Trails and their associated structures need management and maintenance.
- \* Loss of habitat diversity and biodiversity due to excessive spread of cedars and invasion by European Buckthorn. Maintenance of habitat diversity probably decreases the threat of extensive fire.
- \* Reduced access to, and movement within, Nature Areas.
- \* Continued inability of the NAC to carry out the mandate given to it by Senate and the Board of Governors.

Thus, if we continue to neglect the nature areas, in the same way as for the past 25 years, then many of the nature areas are unlikely to remain attractive for teaching or research and certainly not for their recreational or aesthetic values.

#### **3. FUNDING**

The NAC realises that the University is in a climate of fiscal cutbacks and restraints. Nevertheless, the Nature Areas are in urgent need of attention and their continued neglect does much disservice to the group of far-sighted persons who purchased this large body of land for the University. They surely did not anticipate abandonment of much of the campus. Undoubtedly in the past, because of the ad hoc approach to the Nature Areas, funding possibilities available for a variety of activities were not exploited.

The preparation of a Stewardship Plan and its implementation requires funds. To this end, a presentation was submitted by the NAC to the President's working group on fundraising support. The NAC also has additional suggestions to aid with funding of the Nature Areas. These

suggestions, include organisation of a Friends of Trent Nature Areas (FOTNA) to help promote the Nature Areas in the University and local community. Sale of hats, mugs, shirts etc and a Nature Areas day planner. Ticket sales from an annual presentation by well-known Naturalists e.g. John and Janet Foster. An ongoing appeal to alumni. Solicitation of funds from foundations, local businesses etc.

Details of funding suggestions are presented in Appendix III

#### 4. COMMITTEE ACTIVITIES.

- Ten meetings were held during the 1994/95 academic year and minutes are lodged in the University Archives.
- For several years, the NAC has become increasingly concerned about the lack of a long-term vision and Stewardship Plan for the Nature Areas. Consequently, the 1994/95 NAC initiated preparation of a Stewardship Plan by organising two Open Houses for the University and Peterborough communities. The first Open House (January 24, 1995) provided information about nature areas and each person attending was invited to complete a questionnaire on use and management issues. The questionnaire also was circulated widely in the University during February and March and the results presented at the second Open House (March 23, 1995) and then were followed by a general discussion.
- The Chair presented at its May 8, 1995 meeting, the Board of Governors' Property Committee a report and photographs detailing a range of land management issues relative to the Nature Areas. The many concerns and frustrations of the NAC were explained to the Property Committee. The Property Committee resolved:

"THAT the advice of the Senate Nature Areas Committee as outlined in the Chair's Submission to the Property Committee, May 8, 1995 be received and that the issues outlined in the submission be recognized as matters for ongoing consideration by the Board of Governors' Property Committee".

#### 5. ACTIVITIES RELATED TO NATURE AREAS DURING 1994-95.

A variety of activities were undertaken during the year, ranging from the Open Houses, clearing parts of established trails and opening the first new trail since the mid-1970's, organising hikes and interpretive walks. To raise some funds Nature Areas mugs, caps, and t-shirts and sweatshirts were designed and sold. Details of activities etc. are presented in Appendix IV.

## APPENDIX I

### TERMS OF REFERENCE FOR THE COMMITTEE

- (i) To advise Senate on the wise use of the University Nature areas
- (ii) To advise the Board of Governors on the management of the nature areas to ensure their protection and appropriate use
- (iii) To promote awareness of and appropriate university use and public use of the University nature areas
- (iv) To encourage further investigation of the natural characteristics of the University nature areas
- (v) To designate lands outside but affecting the nature areas so that they can be managed as a buffer zone to ensure there are no detrimental impacts on the nature areas
- (vi) To identify any other nature areas not included in the 1989 study and recommend their inclusion as University nature areas

### COMPOSITION OF THE NATURE AREAS COMMITTEE

1 faculty member of the Biology Department  
1 faculty member of the Geography Department  
1 faculty member of the Environmental and Resource Studies Program  
1 faculty member at large.  
(all four faculty to be chosen by the Nominating Committee)  
1 TSU student, 1 JSC student, 1 GSA student, 1 Trent University Naturalists Group student rep. (all four to be chosen by the respective constituencies)  
The Chair of the Site Development Committee, or his or her delegate (ex officio). The Director of the Physical Resources Department, or his or her delegate (ex officio). The Vice-President (University Services) ex officio

During the academic year, 10 meetings were held. Minutes for each meeting are lodged in the University Archives. Additionally, in order to initiate the process of preparing a Stewardship Plan for the University Nature Areas, two Open Houses were organised by the Committee to gather information about use of Nature Areas on the Symons Campus and as an initial forum for University and public input into a plan. A tape recording of the second Open House and a transcript of the proceedings, prepared by the Chair of NAC, is in the University Archives.

## APPENDIX II

### DETAILS AND BACKGROUND FOR THE RECOMMENDATIONS MADE TO SENATE AND THE BOARD OF GOVERNORS BASED ON DISCUSSIONS HELD AT NAC MEETING DURING 1994/95 AND IN 1995/96:

#### RECOMMENDATION 1. IMMEDIATE ACTION.

Lack of a Stewardship Plan and a person with responsibility for Nature Areas means that work on trails and work in nature areas is basically on an ad hoc basis – carried out by concerned or interested faculty or staff members (or even members of the public). A consequence of such an ad hoc approach will be continued erosion of trails, signs replaced in 1989 may well again fail and associated structures such as boardwalks and bridges may not be maintained until they become serious safety hazards. Because of neglect, the large footbridge in the Wildlife Sanctuary had fallen into such a serious state of disrepair that it was replaced, on an emergency basis, in November 1994. There are still significant safety issues related to trail and nature area use which require immediate and continued attention. Funds and resources must be found in order to carry out these aspects of responsible stewardship of the Symons Campus.

The invasion of many Nature Areas, and the rest of the campus, by the alien shrub species, the European Buckthorn (*Xanthoxylum coccineum*), that appears to have begun about 15 years ago, is progressing rapidly. Spread of this species is progressing rapidly through the campus, displacing herbaceous plants and shrubs. A buckthorn control and removal program should be implemented as quickly as possible, beginning in the central core and in selected Nature Areas.

Upland fields in some nature areas are being overrun by extremely dense stands of Eastern White Cedar (*Thuja occidentalis*), up to 65,000 seedlings and saplings or more per hectare in some areas, that are preventing establishment of hardwood tree species. Some fields have been so completely taken over by cedar as to make the fields essentially inaccessible. While the established stands are so extensive that they cannot be removed without great effort and expense, a cedar control program, is nevertheless, needed immediately to reduce spread of this species in order to maintain the remaining open habitat in affected fields.

These changes described above have occurred and continue to occur because no one has been recording or reporting to the University how vegetation and habitats are changing. The NAC is unable to do this because of lack of resources (i.e. no ongoing University funding) for such studies.

#### RECOMMENDATION 2. THAT THE UNIVERSITY DEVELOP IMMEDIATELY A STEWARDSHIP PLAN FOR THE NATURE AREAS ON THE SYMONS CAMPUS.

Even though the 16 nature areas approved by the Board of Governors in 1989 comprise a large part of the 1400 acres (566 ha) Symons Campus, the University has not developed a Stewardship Plan for their use and management. The Senate and Board of Governors need to decide what the function of Nature Areas is and how they fit in the goals and priorities of the institution. What would the University like its "natural laboratory" to look like in 5, 10, 25, 50 years?



The NAC believes that if the University wishes for the future the same degree of access to Nature Areas as occurs today and to prevent decline of habitat diversity and species diversity on the campus then the current policy of benign neglect of the nature areas must be abandoned in favour of a pro-active policy spelled out in an effectively implemented Stewardship Plan.

The NAC recommends that, for responsible stewardship of University lands, a long-term management and use be spelled out in an effectively implemented Stewardship Plan. The University needs, in view of the claims made in the recent Prospectus and its image of commitment to the environment, such a plan to demonstrate a professional approach to the stewardship of campus nature areas. Ecologists and other persons working in the natural areas field are amazed that we do not have an implemented Stewardship Plan, particularly as the University has such a large land base with such a diversity of habitats. An effectively implemented plan is vital to maintain long-term habitat diversity and hence biodiversity for the teaching of future generations of undergraduates in Anthropology, Biology, Environmental and Resource Studies, Geography and Native Studies, for research, for recreation and for aesthetic reasons. We need to practice what we preach.

The actual preparation and writing of a Stewardship Plan are beyond the ability of a Committee with no resources (funding). The Committee is of the opinion that a draft plan needs to be prepared by an individual specifically employed to do it or by someone assigned to do it.

The Nature Areas Committee, this past year, initiated the process of preparing a Stewardship Plan by holding an Information Open House on January 24, 1995 and a follow-up Open House on March 23, 1995. Public and University participation was sought on both occasions. Such information as was available about the Nature Areas was presented, in poster format, at the first Open House by students enrolled in the ERS forestry class. Comments and suggestions for use of nature areas were sought in a questionnaire which later was circulated widely in the University community and copies placed in a box at the Wildlife Sanctuary Nature Area for user input.

Approximately 60% of 160 respondents (students, faculty, staff and members of the public) who completed questionnaires expressed willingness to volunteer their help in some aspect dealing with Nature Areas. This included trail clearing, leading hikes and interpretive walks, helping with inventories etc. However, this volunteer effort cannot be effectively mounted because there is not a Stewardship Plan to serve as a guide for work currently needed, let alone in the future. To be effective, volunteer work must be planned, well organized and supervised.

The NAC hopes that the effort and work put into the Open Houses was not a fruitless exercise and that the process of developing a Stewardship Plan will proceed expeditiously.

Because of lack of an implemented Stewardship Plan information about the teaching and research use of Trent's nature areas or how they are used by non-university groups and organizations is incomplete. The parking lot and trail system in the Wildlife Sanctuary Nature Area, which have been open for public use for over 20 years. Unknown, for example, to the NAC, Lakefield College School, twice a week in autumn 1994, used the Wildlife Sanctuary Nature Area for orienteering purposes, perhaps with unintended impacts on wildlife. Apparently the Wildlife Sanctuary has been used for orienteering for many years. The

Frontise Rock Nature Areas has been used by Scouts. In the past, Nature Areas have been used by non-Trent groups as a collecting area for edible wild plants – without the University's knowledge or permission. It was only by chance that advertisements for such activities were seen in the local press by the 1994/95 Chair of the NAC.

Use of Nature Areas by outside groups presumably exposes the University to safety and liability issues.

In addition to lack of records of activities in nature areas, information about the impact various uses may be having on individual nature areas is not known. It is not known, for example, if some areas are being overused and if, as a result of overuse, they are consequently suffering significant long-term damage. Some trails on the campus, for example, need periodic re-routing to avoid or to reduce damage to vegetation and erosion. It is not known if too much collecting of organisms for teaching or research purposes is happening.

The implications of long-term vegetation change in Nature Areas are not known. What information there is about changes that have occurred during the past 35 years is mainly unsystematic and anecdotal. There has not been systematic documentation, for example, of the rate of spread of white cedars or rate of invasion by European buckthorn in nature areas (also Black Locust). If there had been a person with responsibility for nature areas at an earlier stage than the NAC would have been warned of potentially adverse developments in these areas and could have recommended remedial action to Senate and the Board of Governors.

### RECOMMENDATION 3.

**THAT ONCE A STEWARDSHIP PLAN IS DEVELOPED AND APPROVED THEN AN INDIVIDUAL WITH A GOOD KNOWLEDGE OF NATURAL HISTORY, VEGETATION AND RECREATION MANAGEMENT (A "UNIVERSITY NATURALIST") SHOULD HAVE RESPONSIBILITY FOR THE AREAS AND ADVISE THE NAC AND UNIVERSITY ON IMPLEMENTATION OF THE STEWARDSHIP PLAN FOR TRENT'S NATURE AREAS.**

Responsible stewardship of the Nature Areas requires implementation of a long-term Stewardship Plan, and implementation requires more than the ad hoc input of Committee members or Committee member during each academic year (September to April). It is totally unrealistic, given the size of the area covered by Trent's nature areas and the time involved, to expect the Chair of the Nature Areas Committee, or a Committee member or members to undertake surveys of 16 Nature Areas, conduct field studies, check on use of nature areas, keep and maintain records and do the necessary updating of information about these areas. Furthermore, Committee members, the majority of whom are new to the Committee each year, are unlikely to have the time to become familiar with the details of a Stewardship Plan or with the current state of most of Trent's nature areas. A cursory examination of the composition of the NAC shows that members cannot adequately perform the above tasks. The NAC is concerned that unless a person is given responsibility for the plan, its implementation will be haphazard and sporadic, unlikely to be effective and, not in the long-term interest of the University.

The NAC is convinced that for effective implementation of the Stewardship Plan and for the day-to-day administration of the Nature Areas a qualified person employed fulltime or, at the

very least, on a half-time basis is absolutely necessary – in other words, an University Naturalist. This person, in conjunction with the Development Office, would also be expected to raise funds.

Examples of some of the duties and responsibilities which could be expected of the "Naturalist" are described below.

- check that the Stewardship Plan is working, and propose, as required, additions and/or changes to the plan to the NAC, and ultimately to Senate and the Board of Governors.
- be responsible, in co-ordination with the Department of Physical Resources, for day-to-day management of the Nature Areas. For example, to be responsible for checking the condition of trails and associated structures.
- monitor Nature Areas to note vegetation change and, at the very least, to maintain photographic and/or video records.
- organise and supervise volunteer assistance for various tasks.
- liaise with the Development Office to raise funds and prepare grant applications. Again because of lack of a Stewardship Plan, opportunities for obtaining funds from various government agencies or foundations have not been fully exploited. Currently, the preparation of funding applications depends on NAC members first of all being aware of appropriate sources of funds, and secondly on faculty members being willing to submit or sponsor an application, and if successful, taking on the additional responsibility of supervising student help at a time of year (usually the summer) favourable for faculty research. Another factor relating to applications is that they are often made in one academic year and then the Committee Chair and Committee membership are changed for the following academic year during which the students are employed with those funds. Given the increased teaching loads of recent years and increased emphasis on research activity it is not at all surprising that faculty members may be reluctant to take on such additional responsibilities in the summer months. For the first time, in the 1994/95 academic year two students were employed using the Ontario Work Study Program. They cleared, signed and undertook maintenance of some trails. While this has been a productive effort (a new Promise Rock Trail was cleared and signed and an existing trail cleared), the students employed require instruction and supervision. This can be time-consuming at a busy time of the year. In 1994/95 it involved week-and-visits by the Chair of NAC to check work done on trails. Having the Naturalist responsible for seeking and supervising paid student help and also for organising volunteers would address the totally undesirable past and current practice of sporadic activity and work in nature areas.
- documenting use of nature areas, preparation of interpretive materials such as brochures and maps.
- a naturalist would be expected to check nature areas for safety concerns, e.g., in addition to checking trail conditions, to determine if there is significant fuel accumulation (dead plant material, e.g., grasses) and hence significant fire risk in abandoned fields. The continued expansion of dense areas of white cedars with their

branches touching the ground and merging suggests the possibility of a major conflagration if a fire were to start in an upland area. In conjunction with the Department of Physical Resources, the Naturalist would determine routes to get to nature areas for fire and safety purposes. An emergency vehicle may have difficulty in accessing many parts of nature areas at this time because original farm tracks and access points have become eroded and/or overgrown.

- the naturalist could explore with the Ministry of Natural Resources potential research projects and funding for studying revegetation of abandoned farmland. The problem of invasive species comes to mind. Trent's nature areas may be well suited for such studies as the campus is now so near to the MNR headquarters in Peterborough.

- a naturalist would collect, organize and keep information generated as a result of class work or research studies in nature areas. The past and current situation is that information gets lost or is scattered widely throughout the University. Students and others seeking information find this extremely frustrating, often being passed from one faculty member to another. There is not even a system for placing information in the University archives. A naturalist would maintain an information base about the Nature Areas on Gopher.

- a Naturalist would be expected to develop an interpretation program, particularly for area schools. There are many local naturalists, faculty members, and students who would probably be willing to contribute to such programs. A program would be particularly effective if run out of an interpretation centre in Trent's "natural laboratory". It would also be a tremendous asset as an advertising feature for Trent University and the natural sciences.

Producing a Stewardship Plan and then not finding the means to implement it would mean not only the loss of the considerable time and effort needed for its preparation and production, but also the fact that over half of the campus covered by the plan will be abandoned to a failed policy of benign neglect and all that that entails for the future use of the campus for teaching, research, recreation and for aesthetic values.

## APPENDIX (B): FUNDING FOR NATURE AREAS.

Undoubtedly there will be concerns about sources of funds to carry out the recommendations of the NAC. The past and current situation regarding access to operating funds was commented upon by the Chair of the Property Committee, Mr. Michael Nolan, at a meeting of this Committee on March 8, 1995 when "it was noted with regret that no operating funds were available to support the (NAC) Committee's work". The President mentioned to the May 9, 1995 meeting of the Board of Governors Property Committee Meeting "that the working group on fundraising support had received a strong submission from the NAC which would be considered by the Development Committee of the Board along with a number of other fundraising priorities".

The NAC is convinced that fund raising appeals made, in conjunction with the Development Office, to major corporations and organisations concerned with the environment would be successful in gaining funds for use in connection with the University Nature Areas.

Other fund raising suggestions include:

1. The person employed to prepare the Stewardship Plan could also be charged with dealing with the Development Office to seek funds for the Nature Areas.
2. The University Naturalist would be expected to do the same thing. Applications could be made, for example, to such organisations as the Canada Trust Friends of the Environment, or the Mountain Equipment Co-op, which award funds for environmental projects.
3. A Friends of Trent Nature Areas (FOTNA) should be organised - there would be an annual fee for membership and other fund raising activities would be encouraged. Friends are likely to provide much volunteer work.
4. An appeal to alumni.
5. An appeal, along the lines of the appeal by the World Wildlife Fund for saving tropical forests. Donations could be sought to help towards the upkeep of the nature areas.
6. In 1994/95 the Chair of NAC initiated the sales of merchandise such as Nature Areas mugs, hats and shirts. Sales of such items could raise \$1000 to \$2000.00 or more per year.
7. Marketing a Nature Areas daily planner to students, staff and faculty. A planner of this kind has the potential to raise \$1000 to \$2000 or more since over 400 copies of a commercial daily planner having an environmental theme are sold for \$4.99 each in the Campus store.
8. An annual NAC guest lecture by well-known naturalists, such as John and Janet Foster, Robert Saleman, or R.D. Lawrence could raise \$1500 to \$2000.

## APPENDIX IV

## ACTIVITIES DURING 1994-95

- A major accomplishment during the year was the beginning made by the NAC towards preparation of a long overdue Stewardship Plan for Trent's nature areas. A plan is needed to address the place of the Nature Areas in the University and the stewardship of these lands which has been neglected for far too long. The beginning was the holding of an Open House on January 24, 1995 to provide information for the public and University about Trent's nature areas and a follow-up Open House on March 23, 1995 when questions could be raised by participants. Both Open Houses were widely advertised in the University and in the Peterborough community. Information available about some individual Nature Areas was presented in poster format at the first open house by students enrolled in the ERS Forestry class. Comments and suggestions for use of nature areas were sought in a questionnaire circulated at the first Open House and which was also later circulated widely in the University. Copies also were placed in a box at the Wildlife Sanctuary Nature Area for user input.
- a second major accomplishment was developing and opening the first trail outside of the Wildlife Sanctuary Nature Area. This is the Promise Rock Trail, which was officially opened on March 4, 1994. The trail begins at the parking lot for the Science Complex and runs north along the abandoned rail line to the Promise Rock area. The opening ceremony was organized by the Trent University Naturalists (TUNG) and a ribbon to celebrate the occasion was cut by local Scout leaders who once used the Promise Rock area for camping and jamborees. Thirty persons, comprising faculty, staff and their families, students, and members of the public were present and hiked or skied the new trail. Hot drinks were provided by TUNG.
- applications to the Environmental Youth Corps (EYC) program to employ 3 students during the summers of 1994 and 1995 were unsuccessful so there was no work on any of the trails during the late spring and summer of both years.
- a student, Sandra Dickman, was employed under the SEED program for 16 weeks during the summer of 1994. She, with valuable help from Dr. Doug Sadler, expanded species inventories for several nature areas. On a visit to the South Drumlin Nature Area, they were accompanied by Mr. M. Oldham and Mr. D. Sutherland, employees of the Natural Heritage Information Centre in McKenzie House. In addition, Ms. Dickman researched descriptions of shrubs and trees as a beginning for an identification guide for Trent's Nature Areas. Mr. R. Tuckerman, a local wildlife artist, prepared several pen and ink illustrations for the proposed guide.
- the Chair invited President Conolly to visit part of the Wildlife Sanctuary Nature Area on July 28, 1994. The poor condition of the boardwalks and the hazardous state of the foot-bridge near the parking lot were observed. The loss of field habitat and invasion of the campus by European Buckthorn was explained.
- Vice-President Sullivan was shown part of the same nature areas on August 8, 1994. She also visited the Promise Rock Nature Area on December 1, 1994.
- Mr. Ray Chen was employed with funds from the Nind Fund to promote the nature areas to new students during the introductory week. He collected names for a garbage collection in

the Promise Rock Nature Area, but of some 20 or so persons who signed up, only 4 turned out on the allotted (Friday) afternoon. None-the-less, the exercise was successful because a considerable amount of garbage (e.g. old tires, tin cans, a washing machine) was collected and taken away by the Physical Resources personnel. There is still a considerable amount of similar garbage present in the area. Mr. Chan also organised several walks to nature areas for students during the fall term.

- the Chair supervised two students, Mr. Deryck Robertson and Mr. Stephen Irwin, employed with funds from the Ontario Work Study Program, to clear and sign trails. During the Fall term they cleared a significant length of the "Old Blue Trail" in the Wildlife Sanctuary Nature Area and cleared and signed a new trail in the north part of the campus through the Promise Rock Nature Area. Wooden direction signs for the Promise Rock trail were made and donated by Professor J. Earnshaw.
- In September, 1994 vegetation on trails in the Wildlife Sanctuary Nature Area was cut mechanically with a tractor-mounted mower by Department of Physical Resources personnel. The trails had been cleared and widened in 1993 after many years of neglect so that they can be cut each year by Physical Resources personnel.
- a visit on the afternoon of October 28, 1994 by some members of the Board of Governors, accompanied the Chair, and some members of the Nature Areas Committee, Dr. Doug Sadler, Mr. Roatta Ben-Oliel, and Mr. Sandra Dickman, to the Wildlife Sanctuary Nature Areas to view problems there. Participants showed interest in a number of plants in flower and in the birds to be seen and the condition of the area. Governors were shown the boardwalks in need of repairs and the dilapidated foot-bridge (now replaced) near the parking lot.
- the President visited the Promise Rock Nature Area with the Chair, Professor Marsh and Sandra Dickman, a student on November 15, 1994. This nature area has a magnificent stand of softwoods containing 100-year-old white pine, white spruce, eastern hemlock and white cedars. Even this nature area, though, is being invaded by European Buckthorn, which is establishing itself in the open fields leading to the large trees.
- in November/December, the hazardous foot-bridge was replaced with a new one by personnel from the Department of Physical Resources.
- two open wells in the WSPA were enclosed by the Department of Physical Resources, one in a wire cage and the other was capped with a steel plate.
- Mr. S. Gardner, Geography Department, updated a map of the trails in the Wildlife Sanctuary Nature Area to indicate the trail to this nature area from the Environmental Sciences Building. This map was prepared in 1993 as part of an EYC project.
- to raise some funds to supplement declining Trust Funds the Chair initiated the sales of Nature Areas hats, mugs and sweatshirts. Sales were by volunteers, and at the Bookstore and the Campus Store and demonstrated that there is potential to raise funds in this way for Nature Areas use.
- GIS mapping project. The Chair acted as a client for a GIS project undertaken by a student, Rebecca Kay. She produced a map of the Symons campus showing field boundaries and

gave each field a number so that studies on the campus could be referenced as to location (Figure 2). She also determined the area of each field. This map will allow for more accurate recording of field observations in courses and in research projects on the Symore Campus.

- the Chair organised two interpretation walks for Spring 1995. The NAC thanks Dr. M. Berrill, Biology, for leading an amphibian walk and Dr. Sheila McFee, Biology, for leading a flower walk.
- the Chair and the NAC are particularly grateful for the interest, enthusiasm, natural history knowledge and expertise provided to it by Dr. Doug. Sacher, (Honourary Doctor of Laws, Trent University). He attended practically all of the NAC meetings and accompanied Mr. Dickman on many field trips to Nature Areas to increase species lists. The interest, enthusiasm and expertise demonstrated at NAC meetings and at the Open Houses by Professor Dennis McGee, who teaches the ERS forestry course, too, were appreciated.

*Roger Jones*

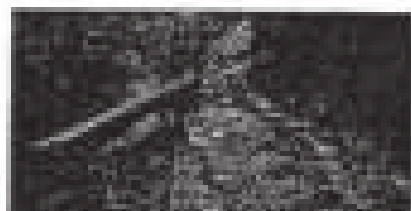
*November 27, 1995.*



*Student life that's second to none*

The Trent experience begins the first time you set foot on campus and continues long past graduation day.

1

*A campus environment that feels like home*

Our naturally spectacular campus provides the perfect environment for learning and recreation.

2

*The academic program and philosophy of education*

Our flexible approach to learning will encourage you to explore and grow. Programs of study. Admission requirements. A philosophy of education designed to support you.

12

*Faculty that inspire*

You'll study with faculty members who are as committed to teaching as they are to their research activities.

19

*Your next step*

Booking a campus tour. Applying for admission.

24

# natural

The area's natural charm and recreational opportunities combine to offer a therapy that appeals to many. That's why many Trent students choose to remain in Peterborough long after graduation day.



Located just a few minutes' walk from the central core of buildings on the Symons Campus, the nature areas (which make up over half of the campus's 1,600 acres) have been preserved for teaching, research, and recreation. These areas — which include a diverse range of habitats, including deciduous wetlands, woodlots, and open fields — are home to white-tailed deer, porcupines, squirrels, rabbits, beavers, hawks, more than 100 species of butterfly, and numerous other varieties of wildlife.

Because of the diversity of the habitats available on campus — and because of the uncommon types of plant and animal species that can be found here — courses in such varied disciplines as biology, zoology, animal behaviour, conservation biology, environmental sciences, geography, climatology, and, anthropology and native studies rely upon the campus's natural laboratory.

It's not uncommon to see students studying the habits of small mammals, conducting projects for their environmental studies courses, monitoring the campus's geography, or discussing the role of water in native traditions. Some research projects have focused on the campus itself. Even today — more than 30 years into Trent's history — there are still parts of the campus that are being mapped and studied by students for the very first time.



"...skiing, running,

hiking or

just a walk

anywhere

around the

1,400 acres of

scenic campus..."

**APPENDIX F: By-law Excerpts from the "Office Consolidation of By-law 97-123 as Amended October 2001: Permitted Land Uses and Regulations for Major Institutional and Major Open Space Areas in the City of Peterborough, Ontario, November 2000.**

**SECTION 22**

**UNIVERSITY AND COLLEGE DISTRICT (UC)**

**PERMITTED USES**

22.1 No person shall within any UC District use any land or erect, alter or use any building or part thereof for any purpose other than:

- (a) a university
- (b) a college
- (c) a university or college residence
- (d) an adult retirement centre
- (e) any of the following commercial purposes when located in a building designated forming an integral part of a university or college:
  - i) a barber shop
  - ii) a beauty shop
  - iii) a dry cleaning establishment - Class 2
  - iv) a drug store
  - v) a sub-post office
  - vi) a restaurant
  - vii) a convenience retail store
  - viii) a bank, financial institution or loan company

**REGULATIONS**

22.2 No person shall within any UC District use any land or erect, alter or use any building or part thereof except in accordance with the following regulations:

| Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Requirements                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| a) minimum lot width                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 30 metres                                                        |
| b) minimum lot depth                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 30 metres                                                        |
| c) minimum building setback - side lot line or rear lot line                                                                                                                                                                                                                                                                                                                                                                                                                      | 3 metres or the height of the building, whichever is the greater |
| d) maximum building coverage                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 40%                                                              |
| e) maximum lot coverage by open parking areas, driveways and vehicle movement areas                                                                                                                                                                                                                                                                                                                                                                                               | 25%                                                              |
| f) the following regulations shall apply to the commercial purposes in section 22.1(e): <ul style="list-style-type: none"> <li>i) maximum floor area per commercial purpose</li> <li>ii) no curb service, drive-in service, take-out service or pick-up service shall be permitted if such service comprises the primary activity of the establishment</li> <li>iii) any such purpose shall be located only in a building on a lot having a minimum area of 4 hectares</li> </ul> | 140 square metres                                                |

## SECTION 24 OPEN SPACE DISTRICT 1 (OS.1)

### PERMITTED USES

24.1 No person shall within any OS.1 District use any land for any purpose other than a conservation area.

### REGULATIONS

24.2 No building shall be permitted.

24.3 OS.1 District is hereby designated as an open space district.

January 4, 2001

## SECTION 25 OPEN SPACE DISTRICT 2 (OS.2)

### PERMITTED USES

25.1 No person shall within any OS.2 District use any land for any purpose other than those uses listed below:

- (a) a conservation area
- (b) a park
- (c) an outdoor pool
- (d) a golf course
- (e) a botanical garden

### REGULATIONS

25.2 No person shall within any OS.2 District use any land or erect, alter or use any building or part thereof except in accordance with the following regulations:

| Type                                                                                                                                           | Requirement |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| a) Minimum building setback from all lot lines                                                                                                 | 9 meters    |
| b) Maximum building coverage                                                                                                                   | 5 %         |
| c) Minimum width of landscaped open space required to be established and maintained along all lot lines except where interrupted by driveways. | 9 meters    |

25.3 OS.2 District is hereby designated as an open space district.

## SECTION 26 OPEN SPACE DISTRICT 3 (OS.3)

### PERMITTED USES

26.1 No person shall within any OS.3 District use any land for any purpose other than those uses listed below:

- (a) a purpose permitted under OS.2
- (b) a campground
- (c) a fairground
- (d) a cemetery

### REGULATIONS

26.2 No person shall within any OS.3 District use any land or erect, alter or use any building or part thereof except in accordance with the following regulations:

| Type                                                                                                                                          | Requirement |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| a) Minimum building setback from all lot lines                                                                                                | 9 meters    |
| b) Maximum building coverage                                                                                                                  | 5 %         |
| c) Minimum width of landscaped open space required to be established and maintained along all lot lines except where interrupted by driveways | 9 meters    |

26.3 OS.3 District is hereby designated as an open space district.

## APPENDIX G: Cultural Histories of the Symons Campus, Trent University, Peterborough, Ontario

Prepared by: Professor Susan M. Jamieson, Department of Anthropology, Trent University

### Introduction

Trent University's Symons Campus has never been systematically surveyed in order to locate traces of past human activities (i.e., archaeological sites). Consequently, only one aboriginal site (of undetermined cultural affiliation) has been reported for that area<sup>1</sup>. Archival documents and limited surface survey confirm the presence of nineteenth century Euro-Canadian industrial, residential, and special purpose sites on the property.

In the absence of systematic survey, detailed discussion of archaeological resources on the University's main campus is effectively precluded. Thus, the following sections overview features and events thought to be relevant to our understanding of native developments in the Peterborough area in general and Euro-Canadian developments on Symons Campus in particular. On the basis of this overview, we must assume that there is a very high probability that substantial archaeological evidence exists on the grounds of Symons Campus. Although this evidence may well encompass the entire 11,000 span that people have lived in this region, the preponderance can be anticipated to date from the past 6,000 or so years.

In Ontario, The Ontario Heritage Act, The Planning Act, The Aggregate Resources Act, and The Environmental Assessment Act address the protection and pre-development mitigation of archaeological sites and objects. In addition, The Cemeteries Act outlines procedures and requirements for dealing with unmarked burials, likely to be encountered in the course of archaeological investigation or campus development. Of particular concern is fact that this legislation can impede or halt development should sites, objects, or burials be discovered during initial groundbreaking for services, roadways, building foundations, etc. Concomitantly, development costs can escalate as personnel and equipment are held idle or, even worse, the project must be revised and redesigned.

Obviously, the prudent approach is to initiate systematic archaeological survey of the main campus, first concentrating on those areas most likely to undergo development, well in advance of any proposed ground breaking and preferably early in the planning stage (normally it is more cost effective to design around a site than it is to excavate it or, alternately, if excavation is to be carried out inexpensively as one component of a Trent fieldschool, considerable lead time will be necessary). A lead time of three to five years is recommended, as this would permit government paperwork to be processed (there is an amazing amount of this), allow salvage of any discovered archaeological remains in advance of development (in which case unexpected complications could be dealt with prior to hiring personnel and equipment), and provide a reasonable time frame within which negotiations could take place with First Nations or other local communities should human remains be encountered (as required under The Cemeteries Act and involving a number of government ministries and agents in addition to community representatives).

### Native Culture Histories

People have lived in Peterborough County throughout the past 11,000 years. It should come as no surprise that such a lengthy period of human occupation can be set against a backdrop of changing topography, climate and vegetation.

The early native history of southern Ontario in general and Peterborough County in particular was influenced by the effects of continental glaciation in Late Wisconsin times. From a maximum advance extending into Ohio and Illinois some 20,000 years ago, the Laurentide ice sheet began to retreat (although it did repeatedly re-advance) until parts of southernmost Ontario were ice free about 14,000 years ago (Dreimanns 1977; Karrow and Warner 1990). These advances picked up surficial material which was pushed forward to form moraines (ridges) at the leading edge of the advanced ice front and was deposited as sheet-like till plains (ground moraine) behind that front. Much of Peterborough County can be described as a drumlinized till plain, in which till initially deposited as a ground moraine was later shaped into oval hills (drumlins) by overriding ice (Chapman and Putnam 1973). As Ontario was exposed, the masses of melting ice formed huge post-glacial lakes in the present Lake Ontario and Lake Huron basins (Karrow and Warner 1990).

By about 12,000 years ago, the Peterborough region had been uncovered by ice retreat. At this time, the ground was covered by tundra-like plants, predominantly sedges (McAndrews 1972, 1984).

These were quickly replaced by an open forest dominated by spruce, not only because of the prevailing cooler climate, but also because of the species' preference for the (then) prevalent wet, poorly drained soils. The spruce forest is inferred to have been roughly similar to the spruce-parkland/forest-tundra transition zone of northern Canada today.

In the Lake Ontario basin, post-glacial Lake Iroquois was formed about 12,500 years ago. For about 500 years the water levels of this lake were much higher than they are in present Lake Ontario, extending northwards into part of the Rice Lake basin: the ice sheet still covered and blocked the St. Lawrence area as an outlet (Gadd 1980). Lake Iroquois was fed by water discharging by way of the Otonabee and Indian Rivers into the Ontario basin from post-glacial Lake Algonquin, located in the Lake Huron and Simcoe basins (Chapman and Putnam 1973; Karrow and Warner 1990).

Following Karrow and Warner (1990) and Roberts (1994), early post-glacial Lake Algonquin was formed about 12,400 years ago along the ice front, then standing roughly at the latitude of Bracebridge. As the ice retreated, an outlet along the Trent Valley to Lake Iroquois was formed. This resulted in a drop of Early Lake Algonquin levels. This outlet subsequently was cut off, either because of isostatic rebound or ice advance, and water levels in the Huron basin rose to form Main Lake Algonquin about 11,200 years ago. This main stage extended until about 10,400 years ago until an outlet opened at North Bay. Lake Algonquin drained through this outlet down the Ottawa Valley until waters in the Huron Basin became markedly lower than today. The spruce parkland was replaced rather abruptly ca. 9,500 years ago by a closed forest having the boreal forest of the Canadian Shield as its nearest modern analogue. The mix of pine and deciduous species in this forest implies increased temperatures and humidity. The next major change in vegetation, ca. 8,000 to 7,000 years ago, formed a relatively closed, shady, conifer dominated, boreal/mixed deciduous forest which persisted for about 2,000 years when there was an abrupt decrease in hemlock, most probably due to disease and not climatic change. Hemlock was replaced by increasing amounts of oak, birch, beech, and maple, and essentially a more open mixed hardwood/conifer forest, of a modern character, was established. During this period, too, water levels, roughly approximating those in the Huron basin today, were reached.

### **Paleoindians**

The earliest occupants of southern Ontario, the Paleoindians, colonized the newly exposed land surfaces left by the retreating glaciers (Ellis and Deller 1990; Spots and Stock 1990; Stock 1982, 1988, 1990).



Archaeological work along the Lake Iroquois strandline (elevation 660') near Rice Lake has produced evidence which Jackson (1977) has interpreted as suggesting an early Paleoindian (ca. 11,000 - 10,500 years ago) focus in that area. Evidence for a more limited late Paleoindian (ca. 10,500 - 9,500 years ago) use of the area also is indicated. Archaeological survey of the 625' and 660' terraces along the Chertabaw Spillway south of Bensdorf Bridge has failed to produce any indications of Paleoindian presence.

We do not know whether this is a sampling problem (the spillway north of Bensdorf Bridge has not been adequately surveyed by archaeologists) or whether it actually reflects Paleoindian land use patterns. Current evidence indicates that peoples living in the Rice Lake region were predominantly interacting with peoples to the southeast, although not exclusively so.

Lake Iroquois may have attracted Paleoindian peoples for several reasons. Vegetation may have remained more open in these areas given the cool winds blowing off the lake, hence would have attracted herbivores and, consequently, their hunters. The winds, too, might have deterred insect pests. Additionally, the more open nature of these areas would have made travel easier. In fact, it may be that the lake itself made travel easier as it permitted the use of watercraft. These areas might also have been attractive for their resources of waterfowl and fish. Presumably, as water levels in post-glacial Lake Iroquois began to drop after 10,000 years ago and as vegetation changed to a closed coniferous forest, many Late Paleoindian peoples continued to derive their livelihood from the water's edge or the lake itself, camping on newly formed beaches now lying under Rice Lake and Lake Ontario with the result that only a small number of isolated inland camps, located adjacent to what would have been swampy areas at the time, remain for archaeological inspection.

Paleoindians probably lived in small groups of one or more related families. At different times of the year, they ranged over vast areas to take advantage of various food sources. Such a high mobility is strongly indicated by the distribution of materials used to make stone tools, which were often procured from sources located up to several hundred kilometers from where the tools were discarded. This suggests the use of transportation aids such as sleds and watercraft. At times smaller groups of people undoubtedly came together where there were rich food sources (e.g., caribou herd crossings or favoured fishing locales) that could support larger populations. These early societies were likely egalitarian, whereby virtually everyone had the same status and group decisions were made on a consensus basis with no real authority vested in specific individuals.

Paleoindian sites range from small, briefly occupied hunting camps to larger, repeatedly occupied sites. There is no evidence of house structures, probably because of Paleoindian mobility. Most structures were probably used in one location for only short periods of time, and consisted of portable shelters such as tents of hide, fastened down with rocks or small stakes. Paleoindian burials are rare, but the two known for the Great Lakes area are cremations, probably of single individuals. This lack of cemeteries is, to some extent, also a product of mobility in that few individuals would die at, and therefore be interred at the same location (Deller and Ellis 1984, 1992).

It seems most reasonable to infer from this summary that while there may be Paleoindian sites on the higher elevations of Symons Campus, these are not likely to be numerous. Furthermore, as these are most apt to be small inland hunting camps, they will have very low archaeological visibility.

## Archaic

The Archaic period dates to ca. 10,000 to 3,000 years ago and, as traditionally defined by Ontario archaeologists, is divided into three periods: Early (10,000 – 8,000 years ago), Middle (8,000 – 6,000 years ago), and Late (6,000 – 3,000 years ago) (Ellis, Kervyn and Spence 1990). The earliest Archaic manifestations are quite similar to earlier cultures, so much so that some archaeologists have argued that they are better regarded as Late Paleoindians. However, while there may be some similarities between the two cultures, there are a number of significant differences.

As was the case with the Paleoindians, Archaic peoples in Ontario subsisted on hunting, fowling and fishing; indeed, fishing became increasingly important during this period. The gathering of wild plant foods, particularly nuts and berries, also became increasingly more important (Ellis, Kervyn and Spence 1990). Essentially, the Archaic period represents a gradual adaptation of peoples to localized environmental conditions. This process was partially the result of an increasing familiarity with local conditions and partly the product of the establishment of stable, more productive environments which, at least by the Late Archaic, approximated those of the present day. This adaptation resulted in more regional diversity in patterns of livelihood and associated technology, as opposed to the relative homogeneity of earlier Paleoindian lifeways. For example, there is greater use of more localized sources of stone for tools. As a consequence of this reliance on local stone materials, the elaborate chipped stone tool kit of Paleoindian times is replaced by an Archaic one which makes more extensive use of simple, amorphous tools that were briefly used and then discarded.

Closely tied to the appearance of a more stable and productive environment is a shift to a more sedentary way of life. This is evident in the appearance of more substantial shelters; in the presence of relatively large middens (garbage dumps) which suggest longer-term occupations of some sites; in the introduction of large, less portable stone tools such as axes; and in the practice of burying the dead in the same consistent locations (i.e., cemeteries). The profusion of sites reported for southern Ontario suggest an increasing population, at least by later times.

The Early and Middle Archaic are poorly known for southern Ontario, including Peterborough County (Wright 1978). I am aware, however, of a projectile point with a split or bifurcate base that was found near Rice Lake and another from Kirkfield. This type of point dates ca. 8,500 – 8,000 years ago, to the Early Archaic.

The Late Archaic is better known from southern Ontario, and is well represented in Peterborough County. Excavated sites suggest that relatively large local groups of Late Archaic peoples made use of ecologically rich lakeshore environments during the warmer seasons of the year, where they accessed a broad range of resources. During the colder part of the year, the local groups broke down into smaller family units which headed into the interior to camp in sheltered locations and hunt deer (e.g., Johnston 1984).

In essence, combined archaeological and ethnographic information suggests that Late Archaic peoples lived out their lives as members, simultaneously, of two levels of society. On one hand, people belonged with their immediate and extended families to an autonomous and self-sufficient local group of perhaps 50 persons. In particularly resource rich locations, several of these local groups interacted among themselves in an amorphous regional group of perhaps as many as 200 or more people. Like the Paleoindians before them, most of these societies were likely egalitarian (i.e., virtually everyone had the same status and group decisions were made on a consensus basis with no real authority vested in specific individuals).

In the Lower Great Lakes area, including southern Ontario, several Late Archaic cemeteries have been reported. Some burials include grave goods (including materials imported from considerable distances), and are liberally sprinkled with red pigment. Dog burials also have been found in Late Archaic contexts. Studies of human skeletal remains reveal many aspects of Late Archaic lifeways not readily observable by other means. For example, well-developed muscle attachments indicate an extremely vigorous lifestyle, a lifestyle also attested to by frequent healed fractures, and a lifespan of about 30-40 years. Teeth are heavily worn, indicating a rough diet, but they are almost totally free of cavities due to the low sugar content of the Late Archaic diet (Pfeiffer 1977). Although there are variations in the amount of grave goods deposited with individuals, there is no evidence to suggest hereditary rank distinctions. Any status differences that did exist were probably due to age, sex, and achievement.

The Symons Campus straddles the Otonabee River, the volume and downcutting of which would have varied as the Great Lakes adjusted to essentially modern levels, reached ca. 5,500 years ago. Changes in the Otonabee would have impacted the availability of fish, a staple food, during the Archaic as well as its suitability as a route of travel. Both of these factors, in turn, have implications for human presence on the Symons Campus during the Archaic Period. Although there is no reason to infer that Early and Middle Archaic peoples did not inhabit the main campus area, archaeological data support arguments for increasingly heavy use of the Otonabee and adjacent lands after ca. 6,000/5,500 years ago, when the Trent-Severn System developed as a major route between the Upper and Lower Great Lakes. Given this, coupled with increasing human populations at the time, I anticipate many Late Archaic sites on the main campus property.

### Woodland

The Woodland period dates from ca. 3,000 to a little more than 300 years ago (1000 B.C. to ca. A.D. 1750). The major distinguishing criterion of this period is the introduction of pottery. Initially, there are few other differences from the preceding Archaic period. However, in Woodland times we see the introduction of cultigens and a switch to an agricultural economy. This innovation was accompanied by an increasing population density and the appearance of a sedentary lifestyle in villages.

As with the preceding Archaic period, the Woodland period is sub-divided into three sub-periods, Early (3,000 - 2,400 years ago), Middle (2,400 - 1,300 years ago), and Late (1,300 - ca. 250 years ago). It is likely that sites from all three Woodland periods will be found on the Symons Campus, particularly as the Trent-Severn route continued to play a major role in the movement of peoples and goods and as topography, soils, and other resources have been conducive to Woodland settlement and subsistence practices.

### Early Woodland

It is during this period that ceramic vessels first appear in southern Ontario (Jackson 1980). These early pots are generally quite small, and are thick, roughly made and poorly fired. Chipped stone tools are of variable quality, but projectile points are carefully crafted and of distinctive shapes (Ritchie 1969; Ritchie and Fink 1973). Long, tubular, or cigar-shaped pipes are present and these represent the first appearance of smoking pipes in Ontario's archaeological record. These pipes, which occasionally are of clay, are often made on a "pipestone" originating in Ohio. This adoption of pipes may be related to the diffusion of tobacco and tobacco ritual into Ontario. Specifically, pipes may have functioned then, as they do today in Native life, as vehicles for ritual transformation and communication; they are part of shamanistic "threshold rites" assisting in the transition between states of being (i.e., between profane and sacred) (Van Gennep 1960:22). There are also

several distinctive items which may be weights for spear-throwers and others of which may be status symbols or neck ornaments. Other distinctive ground stone items include adzes and axes.

Bone artifacts are common and include: tools used to make stone tools, awls, barbed points, woodworking tools, and flutes or whistles (used to call and communicate with spirits). Both basketry and fish-net fragments (and net sinkers associated with the latter) have been reported. Items made of copper from Lake Superior have been found and consist largely of rolled tubular beads and, occasionally, tools such as awls (Spence, Phil and Murphy 1990).

A noteworthy aspect of this period is its relatively elaborate burials, all of which are liberally covered in red ochre. Grave goods are often included, some of which were intentionally broken (to release/defuse spiritual power) at, or just prior to, the interment of the deceased. Pottery is never included as a grave good. The Bruck Steel Burial (downtown Peterborough) dates from this period (Kenyon and Cameron 1961).

Although burial sites were the kinds of features through which Early Woodland culture became initially known, in recent years several occupation sites have been excavated (e.g., Granger 1978). These latter sites include large storage pits suggesting a more stable way of life in contrast to earlier times. Acorns and hickory nuts have been found within these pits. Virtually every animal species known from the region today has been recovered from such sites. There is no evidence that horticulture was practiced in Ontario at this time. Few house structures have been reported but based on patterns left by decayed posts in the soil, possible examples found are small and circular to oblong in shape. We generally assume that social organization was similar to that of the preceding Late Archaic period.

### Middle Woodland

Middle Woodland pots are initially relatively small, like their ancestral Early Woodland forms, but they are generally thinner and better made and bear an array of decorations marked into the wet clay before firing (Spence, Phil and Murphy 1990).

Although well made, the chipped stone implements found on Middle Woodland sites are not distinctive and include a variety of small projectile points, drills, knives, and other tools. Other stone items include netsinkers, adzes, axes, whetstones and abraders, a variety of smoking pipe types, status symbols or neck ornaments, and other forms (Spence and Fox 1986).

Bone or antler items consist of projectile points, harpoons, fishing gear, tools for flaking stone, awls, daggers, pins, woodworking tools, 'combs', and an array of items having cosmological/religious significance. The last-noted, as well as other objects and burial in artificial mounds, tie Middle Woodland cultures in the Rice Lake and Lake Katchewanooka areas to a complex culture in the Ohio Valley (Johnston 1968; Spence, Fairlyson, and Phil 1979) by way of northern New York State.

The lifeways of Middle Woodland peoples are poorly understood (cf. Fiedel 1994; Spence 1986; Spence, Phil, and Molto 1984). Site data suggest that larger populations gathered along major rivers and waterways in the spring and summer to make use of riverine resources. These groups would disperse in the fall and winter, away from the rivers, to hunt. Examination of skeletal material suggests that Middle Woodland peoples were less robust than earlier groups. Some individuals clearly suffered from arthritis and osteomyelitis. Teeth are heavily worn, and abscesses and other dental problems are frequent. However, caries are rare, suggesting little or no reliance on cultigens (Katzenberg, Schwartz, Kryl, and McIlroy 1995).

Subsistence data from many areas suggest that Middle Woodland groups took a wide range of animals, birds, and fish comparable to those described for earlier groups. A major feature is the appearance of extensive shell-fish middens in the Rice Lake area. It is during the latter part of the Middle Woodland period that definite horticulture first appears in southern Ontario, although this does not seem to have had any immediate impact on lifeways (Crawford, Smith and Bowyer 1997). In essence, it was simply an activity 'grafted on' as an additional spring/summer activity. Late Woodland.

The Late Woodland marks the first appearance of cultures which can be traced to Iroquoian-speaking peoples (e.g., Huron, Neutral, Petun, St. Lawrence Iroquois) who inhabited southern Ontario at the time of European contact (Wright 1966). Agriculture, or more properly horticulture, formed the base upon which Late Woodland developments were founded, and included the cultivation of tobacco, beans, sunflowers, squash and maize (corn). Although horticulture provided a good portion of the diet, excavation on sites indicates that a very wide variety of mammals, fish and birds, as well as wild plant foods, still formed a substantial portion of the diet.

The development of a horticulturally-based economy resulted in the appearance of sedentary life in villages. However, a variety of smaller camps used for hunting, fishing, portages, etc. are also known. Villages ranged in size from one to five hectares in area, and housed from a few hundred to a few thousand individuals. Typically, such villages were located near, or on, areas of light sandy soils suitable for Iroquoian horticultural technology, with a water source nearby and sometimes in proximity to navigable waterways. These sites were usually situated in defensible locations bordered, at least on some sides, by difficult terrain such as swamps or steep natural slopes (Hildebrandt 1971, 1980).

The majority of these settlements were surrounded by one or more "palisades". These are evidenced by the stains they left in the soil. Site locations and use of palisades suggest that warfare, or more properly kin-based raiding and skirmishing, were part of Iroquoian lifeways from the earliest times.

Settlements consisted of several longhouses of the classic form, that is, elongated rectangles with rounded ends. These vary greatly in length but are a fairly standardized 6 to 8 metres wide. Excavations within these houses reveal the remains of hearths which, in later times, were distributed down the centre. Pits are commonly found, and were probably largely used for storage or as temporary dumps. Interior posts comprised major support members, posts to demarcate storage areas at the ends of houses, posts to support sleeping platforms, and posts to create/delimitate interior subdivisions of space (e.g., family areas along the sides). Based on early historic records, the longhouse was occupied by several family units related either by blood through the female line, or by a mythical ancestor or totem, or both (Noble 1968; Tucker 1964; Trigger 1976, 1980).

Excavation of villages has also revealed areas of dark, organic, ashy soil that contain large amounts of debris. They were found in areas between, or peripheral to, the houses and represent centralized garbage dumps or middens. These middens are also found along palisades and at the bases of slopes adjacent to the villages which obviously provided convenient places to dump debris.

Excavation of the associated material culture shows that Late Woodland pottery is thin and well made. Ceramics were usually made by a freehand modelling technique and were decorated on their upper halves. Overall, pots range in size from small, 1 litre vessels, to larger ones of about 10 to 15 litre capacity.

Several other ceramic artifacts occur. These include very small, crudely made pots often assumed to be the products of young girls learning to make ceramics, carefully crafted pipes presumably made by men, beads, and ceramic disks that may have been used in gambling and other games. A wide variety of chipped and ground stone tools have been reported, as have numerous shell, bone, and antler artifacts.

The Ontario Iroquois stage of the Late Woodland period is traditionally divided into three sub-stages of development referred to as Early (ca. A.D. 600 – A.D. 1350), Middle (ca. A.D. 1350 – A.D. 1450), and Late (ca. A.D. 1450 – A.D. 1650).

Early Ontario Iroquois villages tend to be small (under 1 hectare), with most houses being short (under 23 metres). Houses tend to be arranged haphazardly within villages (Kenyon 1968; Pearce 1978; Reid 1975). During this period, we have the first evidence of a burial method characteristic of Huron-Neutral groups): ossuary interment (eg., Kenyon 1968; Johnston 1979). In this method, the bodies of individuals were temporarily interred, and later, at certain intervals (ca. 10-15 years), were exhumed and reburied in a single communal pit. In the Early substage, these ossuaries tend to be small (under 25 individuals), and all lack grave goods. Even at this early time, dental caries were frequent, reflecting the switch to a corn-based diet (Wright and Anderson 1969).

During the Middle Ontario Iroquois substage (Noble 1968; Wright 1966), there is increased cultural homogeneity. An elaborate array of smoking pipes appears at this time, and presumably can be equated with an elaboration of the rites of transformation and spiritual communication. Villages tend to be small, at under 2.2 hectares, but they are occasionally larger, up to 3.5 hectares. A notable development is the appearance of very large longhouses, some as long as 90 metres which must signal a change in social organization (there is considerable debate about the precise nature of this change). Houses are not haphazardly placed within villages, but exhibit parallel alignments, a practice which continues into later periods. Ossuaries become larger, up to 200 or more individuals being present in each. They are often located on areas of elevated topography. Grave goods rarely appear.

During the Late Ontario Iroquois substage, we see the appearance of cultures which can be equated with specific, historically known groups in southern Ontario: Huron, Petan, St. Lawrence Iroquois, and Neutral. We also see the emergence of a group known only through archaeology, the North Shore Iroquois (Reid 1993). Only the Huron and the St. Lawrence and North Shore Iroquois occur in southcentral Ontario, hence only they will be discussed here.

Before European contact, Huron sites occurred throughout south-central Ontario, from just south of the Canadian Shield to Lake Ontario. The North Shore Iroquois were located along the north shore of Lake Ontario, from Toronto to Belleville. For reasons we do not yet understand, this group completely disappeared during the sixteenth century.

Villages can be quite large (although most are under 3.5 hectares) and they are well-paladed. These sites can exhibit evidence of extensive house and village expansion. Longhouses tend to be shorter than those of the preceding period, but longer than the earliest versions.

Huron and North Shore Iroquois pottery is decorated almost exclusively by incising. Decoration consists usually of simple vertical or oblique lines. Body surfaces of pots are almost exclusively smooth.

Ossuary burials are reported to contain up to 800 or more individuals. Before contact, these included few grave goods even though European goods did appear, albeit in low frequencies, on

North Shore Iroquois and Huron sites even prior to the actual arrival of Europeans in the area.

St. Lawrence Iroquois sites are distributed from just east of the lower Trent River, east along the St. Lawrence to Montreal and beyond (Pendergast 1967, 1968, 1973, 1981, 1985; Winterberg 1986). It was these peoples who were encountered along the St. Lawrence by Jacques Cartier in 1534, but by the time of the arrival of later Europeans (ca. A.D. 1600) this group, too, had disappeared.

St. Lawrence Iroquois pottery is elaborately decorated on its upper half by incising. Decorations involve chevrons bordered by horizontal lines, a stylized motif believed to represent an ear of corn, motifs resembling ladders, circular or annular punctates (formed by pressing the end of a hollow tube into the clay), and notches. Body shards generally have smooth exteriors although some are decorated.

The St. Lawrence Iroquois are also characterized by the frequent presence of human remains in garbage dumps (Jamieson 1980). This suggests ritual skirmishing and cannibalism. Burials are often found in the village and their periphery rather than in ossuaries. The remains are often found in articulated flexed positions. The villages were surrounded by earthworks consisting of ditches, the earth from which was heaped around the ditch interior to form, strengthen, and raise the palisade. Very elaborate bone tool complexes have also been found. At least some of the St. Lawrence Iroquois moved into the Upper Trent Valley during the latter part of the sixteenth century and were incorporated into Iroquoian populations there who continued to move west (into what is now Simcoe County) to become part of the historically-known Huron Confederacy (Darréger 1984; C. Ramaden 1989; E. Ramaden 1977, 1988, 1990; Sutton 1990).

When Europeans arrived in southern Ontario in the early 1600s, the North Shore and St. Lawrence Iroquois had disappeared and the Huron had greatly contracted their territory to the Simcoe County area. The Otonabee/Trent Valley was uninhabited, although the Huron continued to hunt there until they disposed as a political entity by the Seneca in 1649. For details of Huron lifeways during this period, I refer you to the excellent studies of Heidenreich (1971), Tooker (1964) and Trigger (1976, 1980).

Late Woodland sites have been reported from local along the Otonabee both north and south of Trent University's main campus (including from within the City of Peterborough), from Lake Katchewanooka, and surrounding areas. Therefore, there is a high probability that village and special purpose sites from this time period exist on the Symons Campus.

After the 1649 Huron dispersal, New York Iroquois League members began to establish settlements along the north shore of Lake Ontario. Algonkian groups (Kijikway, Mississauga) began to move south into vacated Huron territory (Hammond 1904; Orr 1915, 1917:17). These groups were largely hunter-gatherers who previously inhabited the Canadian Shield to the north. This movement south brought them into conflict with the New York Iroquois over trade routes. By aligning themselves with the French, the Algonkian groups were able to disperse the New York Iroquois from Ontario and took over the area by 1655. By 1746, some Mississaugas had aligned themselves with the New York Iroquois against the French and within a few years, the Mississaugas could be found all over Ontario, west of Kingston. These people were heavily involved with the fur trade and gradually adopted the trappings of European lifeways. It bears comment, however, that European materials were incorporated into the existing aboriginal belief system and both archaeological analyses and native oral traditions point to a resistance against Europeans. There should be many eighteenth and very early nineteenth century sites representing this period on the Symons Campus, and there may well be a few late seventeenth century Algonkian sites there as well.

## European Culture History

By the early nineteenth century, the British government had confined aboriginal populations to reserve lands, and crews had surveyed townships, concessions, and lots on both sides of the Otonabee River (Smith Township west of the river and Douro Township east of the river) preparatory to European settlement. Although the first European settlers arrived in Smith Township in 1818 (Cole 1975) and in Douro shortly thereafter (Amos 1967), archival material indicates that it is not likely there were any pre-1820 European homesteads on the Symons Campus property.

The first of these structures were likely small log cabins erected by George Cunningham and George Dougle (east of Nassau Mills Road and just north and south of Pioneer Road) as part of their homesteading obligations (Jamieson 1989). At this time, much of the Symons Campus property, although privately owned, appears to have been held for speculation and not to have been undergoing active development.

This development began in earnest ca. 1854 when Charles Perry built a water-powered sawmill and associated buildings at Nassau (Gillet 1957). The 1868 "Peterborough and Chemung Railway Lakefield Division Plan" shows that this mill was located on the west bank of the Otonabee, just north of the present Nassau Mills Road bridge. It also describes three or four residences, a boarding house, an office, and stables (later refined by Jones and Dyer [1987] as houses, an office, a large stable, a blacksmith's, a carpenter's, a barn, and other outbuildings), all located immediately south of Julian Blackburn Hall. Despite the fact that this area has been extensively landscaped and likely disturbed to some extent by the building of Blackburn Hall and the dam and power plant, there should still be considerable traces of these structures and associated materials in the ground.

Although records are not entirely clear, there appears to have been increased settlement of the Symons Campus lands for agricultural purposes during the latter part of the nineteenth century. At the same time, the area became serviced by bridges and rail and canal links (Jamieson 1989). Finally, between 1872 and 1897 a planing mill was constructed on the east side of the Otonabee River near the present power plant. Traces of this structure should be readily located even though these, too, will have been disturbed by more recent development.

## Summary

As the archaeological heritage of Trent University's Symons Campus has yet to be consistently evaluated even at a preliminary level, this paper only can address general features and events which highlight the possible types and density of archaeological remains thought to be on that property. While some archaeological sites and objects on the campus doubtless have been damaged or even destroyed by development, many more await discovery. The most expedient and cost-effective course of action is to ensure that this discovery is managed within a long term planning framework for the campus.

In 1974, anthropology undergraduate student Laurie Jackson surface surveyed the ploughed field to the east of MacKenzie Gallery where he collected purported chert and limestone flaking debris and a piece of bone from a large mammal. No temporally diagnostic artifacts were recovered. This material, from the northeast corner of the field, has been registered with the Ministry of Citizenship, Culture, and Recreation, Toronto, as BcGa-3, 'MacKenzie Gallery site'. Precise site details are available from the Department of Anthropology, Trent University.



This section focuses only on potential archaeological evidence and does not address readily visible built heritage resources, of which there are many on campus. This is, of course, an artificial distinction, as is the separation of aboriginal and white culture histories as presented in this text.

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APPENDIX H: A Bibliography of Publications and Reports for the Nature Areas on the  
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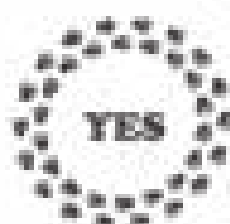
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Endangered by lack of a fee.  
A difference could've been made.  
With the \$2.00 they saved,  
To buy once a bagel and coffee.



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**This small contribution would have a huge impact! We could:**

- Hire students in the summer and during the year to maintain hiking and skiing trails, prepare maps and brochures, and lead nature walks.
- Create a nature interpretive center to host school groups and members of the community.
- Provide a diverse and accessible site for ongoing research by Trent students and professors.
- Ensure beautiful vistas to heighten the senses and straighten crooked nerves.



MAR 16 1997





## A few problems or concerns in the Nature Areas



Clockwise, from upper right: seeking support from nature trail users in the Wildlife Sanctuary F&A; without University funding and an organizer, volunteer activities in TPAAs may cease; water erosion of soils along nature trails needs to be tackled by installing water bars; interpretive signs are needed along nature trails, those erected in the past have not been maintained; northeast slope of Lady Saten Drivelin, mid-1980s, showing early invasion by European buckthorn; an alien species; the same slope in late 1990s, now extensively covered by buckthorn.



## A few problems or concerns in the Nature Areas



Clockwise, from upper left: Severe trail erosion due to lack of maintenance, Lady Lake Drumlin NA; Juniperus buckthorn, a seriously invasive shrub whose seeds are dispersed in bird droppings, growing beneath a "porch" near dense growth of eastern white cedar replacing open-field habitat in abandoned upland fields; soil erosion indicating lack of trail maintenance; unrestricted growth of eastern white cedars encroaching upon trails.







## Activities and volunteers in the Nature Areas



Clockwise, from upper left: Research,  
 North Line NA, 1988; safety and tool-use  
 instruction, 1990; Biology students under-  
 taking field studies, 1994; FOW "Ontario  
 Nature Volunteers" and Trent volunteers,  
 2002; Canada World Youth, volunteers  
 from India, and Trent summer students,  
 2005; bridge replacement, Dept. of Physical  
 Resources, 1985; ITCV from the UK,  
 FOW, Home Depot and Trent volunteers,  
 Lady Eaton Drumlin NA, 2008; rock collect-  
 ing for boardwalk crabs, Quebec conserva-  
 tion exchange volunteers and Dept. of  
 Physical Resources, 1991.



