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SOUTH MARCH HIGHLANDS STUDY AREA NATURAL ENVIRONMENT ASSESSMENT

Daniel F. Brunton

July 1992

Natural Environment research and planning

Natural Environment Inventory of the South March Highlands study area, Kanata, Regional Municipality of Ottawa-Carleton, Ontario

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Prepared for:

CITY OF KANATA,
Kanata, Ontario

PREFACE

Environmental evaluations are typically undertaken only in response to a specific development proposal. Such a reactive approach rarely allows the community and decision-makers the freedom to interpret environmental assessments in an objective, resource-directed manner, thus limiting the possible long-range options and natural environment protection opportunities.

Large-scale residential development in rural areas of the Regional Municipality of Ottawa-Carleton and throughout southern Ontario is experiencing an increasing intensity of scrutiny. As the overall level of awareness of the severe environmental and financial consequences of poor residential planning increases, provincial and municipal standards are being enhanced. The seriousness of this concern is evident by the ongoing review of the entire planning process in the province by the Commission on Planning and Development Reform in Ontario (the Sewell Commission). The Commission recognizes, among other things, that the relatively constraint-free, "easy" development areas have already largely been exploited. In other words, we must increasingly expect those remaining large areas of undeveloped land in southern Ontario - particularly in and near major urban centres - to possess significant economic, environmental, social and/or political development constraints. Accordingly, innovative, broad-minded and forward-thinking solutions are required if economically and environmentally viable development is to proceed at many of these locations.

The natural environment assessment of the South March Highlands study area is unique in the Regional Municipality of Ottawa-Carleton. It is being undertaken before particular development proposals for this large portion of the city of Kanata are brought forward, giving citizens and municipal officials an opportunity to independently consider the relative environmental values of the site and to evaluate it against the appropriate local and regional planning priorities.

The study is also a professional challenge which I am pleased to undertake, as it involves an area I have explored and enjoyed for some 20 years. In this regard, I owe thanks to the many local naturalists and residents who have shared their enthusiasm for and knowledge of this special place. They include a large number of naturalists and residents, including Clarence and Enid Frankton, R. Layberry, K. L. McIntosh, M. Webber, R. Taylor, W. Richardson, B. Bracken, A. & M. Davidson and R. Killeen.

The study also benefitted from the work of Bruce Di Labio who expertly conducted a field and archival assessment of breeding bird populations with his usual straightforward effectiveness. This greatly simplified the faunal analysis and permitted more of my time to be applied for other areas of investigation. I was accompanied on occasion during field work in the study area by various individuals, including R. Clarke, D. Woodcock, K. L. McIntosh and C. Frankton.

The contract to undertake this project was directed by the Kanata Director of Planning David Krajaefski and by Planner Carol Timusk. They handled the paper flow in addition to providing resource materials and information. The Planning Department also provided base maps, information and other materials at various times through the project. The project was assisted by the input of a Steering Committee representing landowners, community groups, the Ontario Ministry of Natural Resources, Kanata Environmental Advisory Committee, Regional Municipality of Ottawa-Carleton and City of Kanata.

The thoughtful reviews of the draft manuscript by Kanata Planner Carol Timusk and Regional Municipality of Ottawa-Carleton Planner Lesley Paterson were extremely helpful in clarifying the conclusions and applications of the data assembled during the course of the investigation. A meeting and discussion with landowners and the Steering Committee on 22 July 1992 was similarly valuable in the crafting of the final document.

Important information was provided by a variety of resource specialists, including scientists with the National Museum of Nature (F. Cook, G. Argus), the Biosystematics Research Centre, Agriculture Canada (W. G. Dore, J. D. Lafontaine and P. M. Catling), biologists/ecologists with the Ministry of Natural Resources (D. Cuddy, K. Taylor, H. McLeod) and Dr. D. M. Britton of University of Guelph.

And finally, acknowledgement is also due to former Kanata Mayor Des Adam who initiated the undertaking of these investigations. It is my hope that the achievement of a land use plan which accommodates ecologically appropriate levels of residential development as well as areas important Natural Environment Areas will be the worthy, innovative product of that initiative.

Daniel F. Brunton

27 July 1992

PREFACE TO THE WEB EDITION

This Report has become particularly topical as the City of Ottawa is presently caarrying out a Special Study of that part of the South March Highlands lying between the 1st Line and the proposed Terry Fox Drive realignment.

While every effort was made to present the content of this Report as accurately as possible on the World Wide Web in the widely accessible PDF format, formatting discrepancies due to technical reasons may be evident. Also, the originals of the photographs were not available, so photocopied replicas are used wherever available. For the Report original, readers are directed to the Ottawa Public Library, Beaverbrook Branch. The cooperation of the City of Ottawa and kind assistance of the report author is gratefully acknowledged.

Mikelis Svilans, Kanata Lakes Community Association, 16th August 2003

EXECUTIVE SUMMARY

The ca. 780 ha South March Highlands study area is a remarkably site, constituting a vital part of a Provincially Significant natural area adjacent to rapidly urbanizing lands. This natural environment inventory and assessment was undertaken to determine the natural significance of the site and to recommend candidate Natural Environment Areas (NEAs) within it before development pressures preclude potential planning and conservation options. The study was also intended to harmonize natural environment conservation concerns with those of the adjacent Kanata Lakes study area in which candidate NEA area have already been proposed.

The concept of Sustainable Development is the guiding principal for this study. It has resulted in a zoning/management concept that, if implemented, predicts a option level of residential development with no net loss of significant natural values from the study area.

Almost 450 vascular plant species were recorded in the South March Highlands study area, including many species found virtually nowhere else in the Regional Municipality of Ottawa-Carleton. Approximately 75 species of breeding birds were also recorded, as were a number of mammals, amphibians and reptiles considered representative of the Carp Ridge. Several of these animals are significant in the Regional Municipality of Ottawa-Carleton. The study area also contains the core of a large deer yard which supports a viable and expanding White-tailed Deer population. The "wildness" of the area is further indicated by the prolonged residency of a family of Black Bears in the spring and summer of 1992.

Much of the study area is contained within a vaguely defined Class 1 wetland complex in which, by the terms of the June 1992 Ontario Wetland Policy, development is prohibited. The implications for development in the South March Highlands and elsewhere in the city will require immediate attention by Kanata staff and Council.

Two large NEA zones are proposed. They emphasize the Provincially Significant landform/vegetation complex dominated by bedrock outcrop and bedrock-controlled wetland systems above the Hazeldean Escarpment. The two zones constitute approximately 285 ha and contain a complete cross-section of the significant natural environment values of the study area. It is recommended that these areas should ideally become public land in order to maximize management control. Creative solutions to the question of fair compensation for existing landowners are required, solutions which may involve up-grading development potential on excluded portions of the South March Highlands.

An evaluation of the existing Official Plan suggests that more direction is required to ensure that effective and meaningful conservation management objectives can be achieved in NEA zones. An amendment to the Official Plan is proposed, as are elements of a supporting municipal by-law to facilitate the objectives of the Official Plan. Several recommendations are provided which are intended to assist the city of Kanata in effecting these designations and plans without significantly constraining the development potential of the less environmentally significant portions of the study area.

CONTENTS

CHAPTER 4: DEVELOPMENT AND MANAGEMENT

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

(1) Location and Situation

The study area is a rural part of the city of Kanata, Regional Municipality of Ottawa-Carleton, Ontario (Figure 1). It is ca. 565 ha. (1400 acres) in size and is owned by approximately two dozen landholders. Individual parcels vary in size from 2 to 200 acres, with the smaller units mostly associated with estate residential lots along the periphery of the study area.

The site is situated in Lots 6 to 12, Concession 1, and Lots 9 to 12 in Concession 2. It is centred at 45o 20' N, 75o 58' W and forms a large, contiguous block of land bounded by agricultural land to the southwest and southeast (beyond Huntmar Road and Richardson Side Road, respectively). To the northwest (across Old Carp Road), forested land and a large golf course complex dominate the landscape. The Marchwood-Lakeside area of Kanata occupies the lands immediately to the east of the study area (cf. Brunton 1992b).

Agricultural development characterizes the Carp River lowland (Figure 2) and eastward to the edge of the Hazeldean Escarpment. Agricultural land was more extensively distributed in upland areas in former times but less productive sites have been abandoned. Away from the river flats this is now restricted to pastureland along the railway.

No industrial development occurs here although residential structures are dispersed along Huntmar, Old Carp and Richardson Side Roads.

Other than access lanes to residential and agricultural structures there are no roads in the study area. The Canadian National Railway line transects the site in an east-west direction. It is infrequently used and slated for removal within a few years. An extensive series of cross-country ski trails has been developed in the upland portion of the area.

(2) Study Objectives and Assumptions

The city of Kanata Environmental Code of Ethics is a corporate commitment to providing environmentally sound development planning and decision-making (Kanata 1990). The Code resolves to factor environmental assessment into " *... the earliest stages of planning ...*" and to increase public awareness of, involvement in and commitment to sound environmental principals in all facets of the city's operation. This commitment to leadership is supported administratively by the Kanata Official Plan which includes an Environmental Protection objective to "*... conserve and protect reforested areas, provincially significant wetlands and wildlife habitats from development that would be detrimental to such areas*" (Kanata Official Plan Section 2.2.6; Haigis, MacNabb, DeLeuw Ltd. (1991) and Amendment 13, 22 October 1991).

The combination of these describes a corporate commitment to Sustainable Development not unlike that accepted by the government of Canada (Environment Canada 1991). 'Sustainable Development' is "*... development that ensures that the use of resources and the environment today does not damage prospects for their use by future generations*" (Ironsides 1991). In other words, it requires no net loss of natural environment resources and use options by present development actions and decisions.

The study area was identified to City Council as a landscape of particular significance to the city of Kanata, one containing "*... many significant natural features such as sensitive wetlands, important vegetation and mature tree stands ...* [much like the] *adjacent urban area of Kanata Lakes which has a policy of 40% open space and a significant natural environment area*" (D. Adam, City of Kanata Report 65-03-91, 27 February 1991). To satisfy the environmental mandate directed by the Code of Ethics and the Official Plan, Kanata Council identified this as a special study area and excluded it (5 March 1991) from the on-going review of Official Plan policies for the rural area (cf. Kanata Official Plan Section 4.4.5 (Haigis, MacNabb, DeLeuw Ltd. (1991) and Amendment 13, 22 October 1991). At a subsequent meeting (16 April 1991), Kanata Council approved the terms of reference for this environmental assessment of the area.

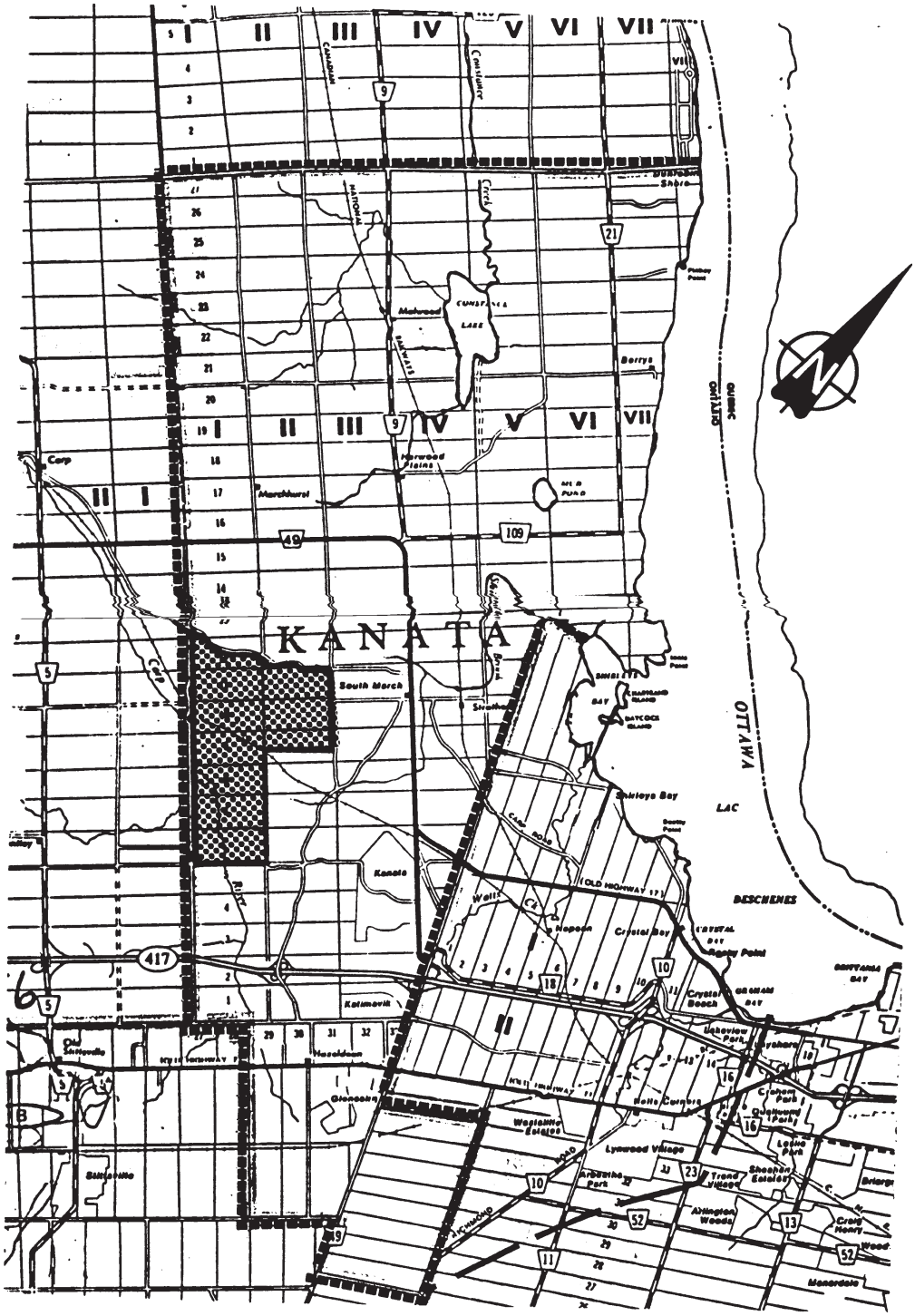

Figure 1: Location of the South March Highlands Study Area within City of Kanata

(study area shaded)

Authorizing this study represents a uniquely progressive municipal undertaking in the Regional Municipality of Ottawa-Carleton. Kanata is developing a detailed ecological understanding of a large area *before* any development proposals had been reviewed. This not only satisfies the information needs implied/ required by the Kanata Environmental Code of Ethics but reflects development concerns and questions being evaluated by the Sewell Commission (the Commission on Planning and Development Reform in Ontario) (Silversides 1991; 1992). It gives the citizens and Council of Kanata a clearer understanding of the values and development options before them.

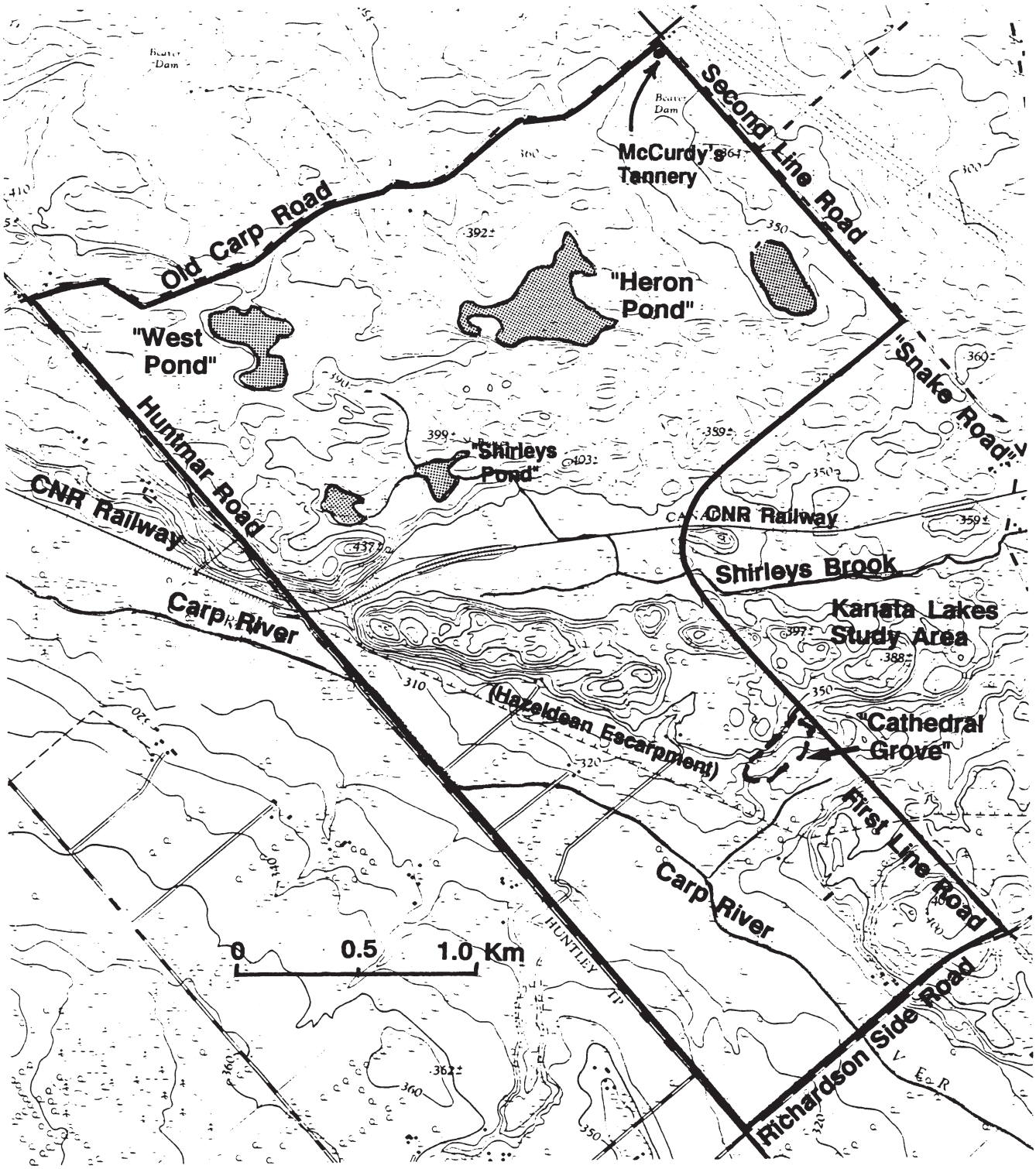

Figure 2: South March Highlands study area Situation
(Scale 1: 25,000)

The study also addresses the city of Kanata's environmental commitment through achievement of the following objectives:

- *to provide a complete and detailed inventory of the vertebrate fauna (mammals, reptiles, amphibians, birds), vascular flora and vegetation in order to identify the full range of biological diversity of the South March Highlands study area*;

- *to provide an ecological interpretation of these inventory data in order to delineate significant species, features and areas*;

- *to recommendation candidate Natural Environment Areas (NEA), as indicated by the findings of the natural environment assessment*;

- *to provide recommendations to assist planners in accommodating ecologically appropriate development (residential, transportation corridors, recreational facilities, etc.) in the study area*.

- *to provide recommendations to minimize development impact on significant natural environment features and values in the study area*.

The study is based on several "givens" which colour the methodology to be employed and the interpretation of data:

1. that the railway line will remain active for at least 2 to 3 years;

2. that the study will maintain close contact throughout with the investigation of the adjacent Kanata Lakes study area and will encourage natural environment data analyses which are mutually complimentary.

3. that no major facilities will be developed or land use changes approved during the course of the study.

3) Methodology

The natural environment assessment of the South March Highlands study area was undertaken between April 1991 and February 1992. The data gathering and analysis was conducted by D. F. Brunton, with the assistance of B. M. Di Labio who had the primary responsibility for data gathering and analysis of breeding and migratory bird populations.

The study program consisted of Pre-inventory, Inventory and Post-inventory phases, as follows:

Pre-Inventory (April/May 1991)

This was undertaken to provide logistical preparation and to conduct off-site preparatory research (i.e. assessment of the existing data base) and included:

- *the assessment of local, regional and provincial natural environment literature; discussion with appropriate natural environment experts (academic, provincial and federal agencies) and local authorities on the area (natural environment, development, planning), as well as a review of personal natural history data collections;*

- *written communication with all landowners, introducing the project and requesting permission to enter posted lands [1];*
- *review of municipal zoning and background site condition data;*
- *logistical and administrative detail such as contract finalization, base map determination, development of field program for inventory team, etc.*
- *preliminary meeting and discussion with project directors/Steering Committee;*
- *preparation of working floral and faunal lists, including vascular plants, birds, mammals, amphibians and reptiles.*

Inventory (April/October 1991)

This was executed at various periods to provide detailed on-site identification, mapping and assessment of natural environment features during the entire growing season. A detailed inventory was conducted between April and September 1991. It was conducted in three major blocks, with additional visits at various time up to and including October 1991 for various follow-up purposes.

The schedule of field work was as follows:

Early Season (late April-early May; early June) - survey of all major habitats and areas in study area conducted, focusing of assessment of diversity and populations of amphibians, breeding birds, spring vascular flora, migrant wildlife and vegetation quality.

Mid Season (late June - early August) - detailed survey and ecological mapping of site undertaken;

Late Season (late August-mid Sept) - late season floral /faunal diversity and vegetation conditions were observed and documented in all major habitats; remaining vegetation/habitat mapping completed.

The field work included transects of all habitat types during which written observations were documented, collection of voucher specimens of unfamiliar/significant plant species and marking of features on large scale aerial photographs for later transferral to composite site maps completed; aerial reconnaissance and photography was undertaken in late August and early September and photographic and written records of on-site observations made. Detailed mapping of vegetation units onto stereo aerial photographs was undertaken and documentation of vegetation variation and constitution completed. Identification of floral/faunal diversity and the production of black and white photographs of significant features and representative habitats for inclusion in the final report were also undertaken.

[1] No-one refused access permission to their property; authorization forms (sent to all landowners) were not returned by several property owners in the northwest corner of the study area, however. A large majority did accommodate the request and several offered much-appreciated information on their properties. Posted areas on properties for which a signed permission form had not been returned, therefore, were not entered. Off-site assessment (e.g. by aerial photographs) was relied upon for lands in properties where access permission had not been confirmed by the landowner(s).

Post-field (mid-September 1992 to February 1992)
This involved the assimilation and analysis of field data as well as off-site data gathered from other sources such as literature, resources specialists and field authorities in order to determine the local, regional or provincial level of significance (and hence, conservation priorities) of natural environment values.

Included were:

- the processing, identification and distribution of voucher specimens for significant/ unidentified vascular plant specimens;
- processing and selection of black and white photographic images, organization of field data, etc.;
- review of progress and analyses with Steering Committee;
- documentation of findings in annotated lists, on maps and in written form;
- comparison of data with regional data sources and authorities;
- identification and priorization of significant features, complexes and areas;
- the delineation and mapping of significant areas, including natural habitat corridors;
- consideration of spatial and ecological relationships between significant natural features/areas here, in the Kanata Lakes study area and in other significant natural areas in the Kanata area.
- preparation of a comprehensive draft report by February 1992 and, following review, preparation of final report.

(4) Previous Studies

Although the study area and the entire Carp Ridge have long been known to represent a complex of habitats rarely encountered in the Regional Municipality of Ottawa-Carleton and throughout eastern Ontario, life science investigations have been remarkably few. A few sketchy reports from the Carp Ridge a few kilometres north of the study area dating from 1840 (Lett 1890) constitute the only mammal records until at least the 1940s (Rand 1945). Bird sightings were similarly fragmentary. Only a handful of records were known from the area until recent years, those being observations by the famous conservation biologist Harrison F. Lewis in 1943 from “South March” (Lloyd 1944). Since the 1960s, however, the Old Carp and Huntmar Roads have been included in the route followed by area birders, particularly in the spring and winter seasons.

Botanical data are also limited. W. G. Dore (1959), for example, indicates that less than 1% of the exceptionally large number of grass specimens preserved in the huge Agriculture Canada and National Museum of Nature collections were taken from the Carp Ridge and notes none from the South March Highlands portion. And the same lack of exploration can be inferred from the distribution maps of Ottawa District amphibians and reptiles published over twenty years later (Cook 1981).

The first precise documentation of natural history elements in the South March Highlands portion of the Carp Ridge was likely the notification by W. G. Dore that the area contained unusual botanical values, specifically the northernmost known population of the uncommon Blue Phlox (*Phlox divaricata*) (Dore 1968).

More comprehensive investigations of the flora of the South March Highlands in general (focusing on the Kanata Lakes area - cf. Brunton 1992b) were initiated in the early 1960s by Dr. Clarence Frankton and Enid Frankton. Beginning in August 1966 and continuing to the present day, the Franktons have repeatedly surveyed the area, documenting observations in note form and through the collection of voucher specimens (preserved in Agriculture Canada's Biosystematics Research Centre herbarium). Many of these observations involve the South March Highlands study area, particularly along portions of the Old Carp Road, along the railway track and southwest of "Snake" Road.

Beginning in the late 1960s through the information being disseminated by the Franktons, W. G. Dore and others (e.g. Solman 1968), naturalists with the Ottawa Field-Naturalists' Club increasingly explored the special natural history features of the Carp Ridge and South March Highlands. Formal and informal outings to various sites were initiated and continue to the present day (pers. obs.). Based on the information gathered by these naturalists, a proposal for conservation of these lands within a larger South March Highlands conservation area was made to the Regional Municipality of Ottawa-Carleton (Anonymous 1970).

A formal ecological investigation was first undertaken in the study area by students at the University of Ottawa in response to its designation as part of a larger Regional Municipality of Ottawa-Carleton conservation area in the 1974 Regional Official Plan. This reconnaissance inventory highlighted the major vegetation and landform features as well as relating unusual discoveries by the Ottawa Field Naturalists (Reed 1975). The conservation designation was removed by a decision of the Regional Municipality of Ottawa-Carleton Council in 1980 (Brunton 1981b).

A natural environment assessment was undertaken of a 80 hectare area in the eastern portion of the South March Highlands study area (east of Heron Pond) in the late 1980s (Brunton 1988).

Informal studies since then by a number of naturalists including members of the Ottawa Field-Naturalists, Kanata residents Martha Weber and Claus Gottleib and individuals involved in the Breeding Atlas of Ontario Birds Project (Cadman 1987) have contributed a variety of life science data on the study area and its surrounding lands.

CHAPTER 2: RESOURCE ASSESSMENT

(1) Landscape

a) Topography and Drainage

This is the southeastern portion of a large Precambrian bedrock outcrop area known as the Carp Ridge, extending from Morris Island near Fitzroy Harbour to central Kanata, a distance of about 15 km (Figure 3). The South March Highlands study area constitutes a low portion of the Ridge, with maximum elevations of ca. 120 - 127 m above sea level (asl) found along the peak of the Hazeldean Escarpment which runs across the western southcentral area of the study area. The lowest point is just under 94 m asl (along Huntmar Road at the Carp River bridge).

Bare granitic and gneissic rock ridges are common in the South March Highlands study area, grading into upland scrub and mixed and/or deciduous forest vegetation. Swamp vegetation in bedrock (and beaver) controlled wetlands occupy many of the abundant landscape depressions, some of these (such as Heron Pond) constituting sizable water bodies.

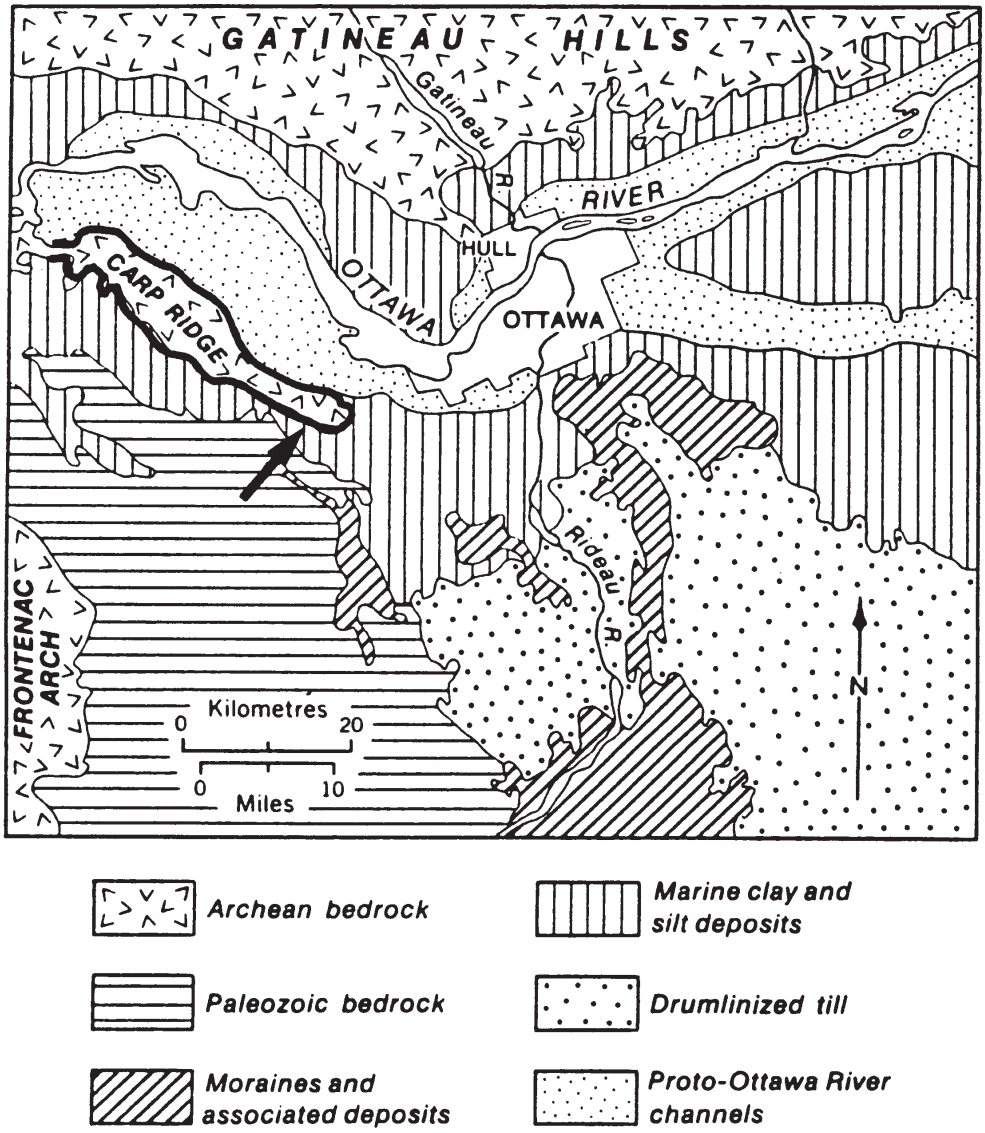

Figure 3: The Carp Ridge and A Simplified Geology of the Ottawa District
(Arrow points to study area; from Belanger & Harrison 1980)

Drainage is divided primarily between the north and northeastern-flowing tributaries of Shirleys Brook above the Hazeldean Escapement and the northwest flowing Carp River below the Escarpment (Figure 4).

The Carp River system accommodates drainage from the western slopes of the Hazeldean Escarpment as well as the Carp River flats (Needham & Hawley *et al.* 1991). A small area in the northwestern corner of the study area constitutes the headwaters for a minor creek which flows northward through a creek/ drain complex to Constance Lake, hence to the Ottawa River at Constance Bay.

Most of the upland portion of the South March Highlands study area is drained thorough Shirleys Brook, either *via* a northern branch which is seasonally dry and which exits through the northeast corner of the area, or through the main branch which drains eastward by the railway line. The headwater area for Shirleys Brook is situated in bedrock depressions in the northern portion of the study area.

b) Bedrock Geology

The bedrock geology of the South March Highlands study area (Figure 5) is superficially like that of much of the Gatineau Hills of Quebec, 15 km to the north east (Renaud 1979; Potvin 1979). The study area is underlain by ancient, erosion-resistant, acidic, Precambrian-age gneissic bedrock over much of the upland area. Such areas are thinly buried in overburden and yield to younger, less acidic Cambrian-age sedimentary Nepean sandstone in the northeast section (by Heron Pond).

The South March Highlands study area contains a rich and chemically complex mosaic of diorite, gabbro, quartz and marble in a predominately non-basic gneissic substrate that, in conjunction with the adjacent Kanata Lakes study area (Brunton 1992b) is part of a landscape unique in southern Ontario ((Wilson 1956; Freeman 1979).

This complex geology has physical, chemical and nutrient loading implications for the soil and vegetation, contributing to the diversity and floristic uniqueness of the site.

The escarpment formed along the Hazeldean Fault is the most dramatic geological structure in the study area. The Precambrian bedrock outcrops 20 to 30 m above limestone-underlain clay plain of the Carp River flats.

Minor ledge and cliff systems criss-cross the area in many places, particularly along the interface between gneiss and sandstone bedrock types west of Heron Pond, reflecting the long, complex history of landscape formation in the South March Highlands study area. These frequently alter and disrupt surface drainage, contributing to the formation of ephemeral pools and innumerable small drainage channels.

c) Geomorphology

The variation of surface material on this bedrock-dominated landscape is limited. The site is characterized by bare to thinly-buried, glacially-scoured bedrock outcrop with extensive areas of marine clay at lower elevations upon which agricultural development has long been active. Small areas of glacial till remain along the Huntmar Road and at a site straddling the Old Carp Road west of Heron Pond. Organic deposits are localized to lowland areas along the upper course of Shirleys Brook and in a band connecting the Carp River clay flats with to the headwaters of Watts Creek ("Kizell's Pond") (Yeager and Daley 1974).

Many of these surficial deposits result from deposition from or erosion by the post-glacial Champlain Sea. This Atlantic Ocean embayment flooded the lower Ottawa Valley following deglaciation ca. 10,000 years B. P.. Isostatic rebound raised the land sufficiently by 8,400 years B. P. to expose the Ottawa area (Dyke and Prest 1987a) but not before the vast quantity of glacial meltwater significantly altered the local landscape by depositional and erosional activities (Chapman and Putnam 1984). The thinly covered, scoured outcrops of this upland area and the rarity of till materials are examples of this alteration.

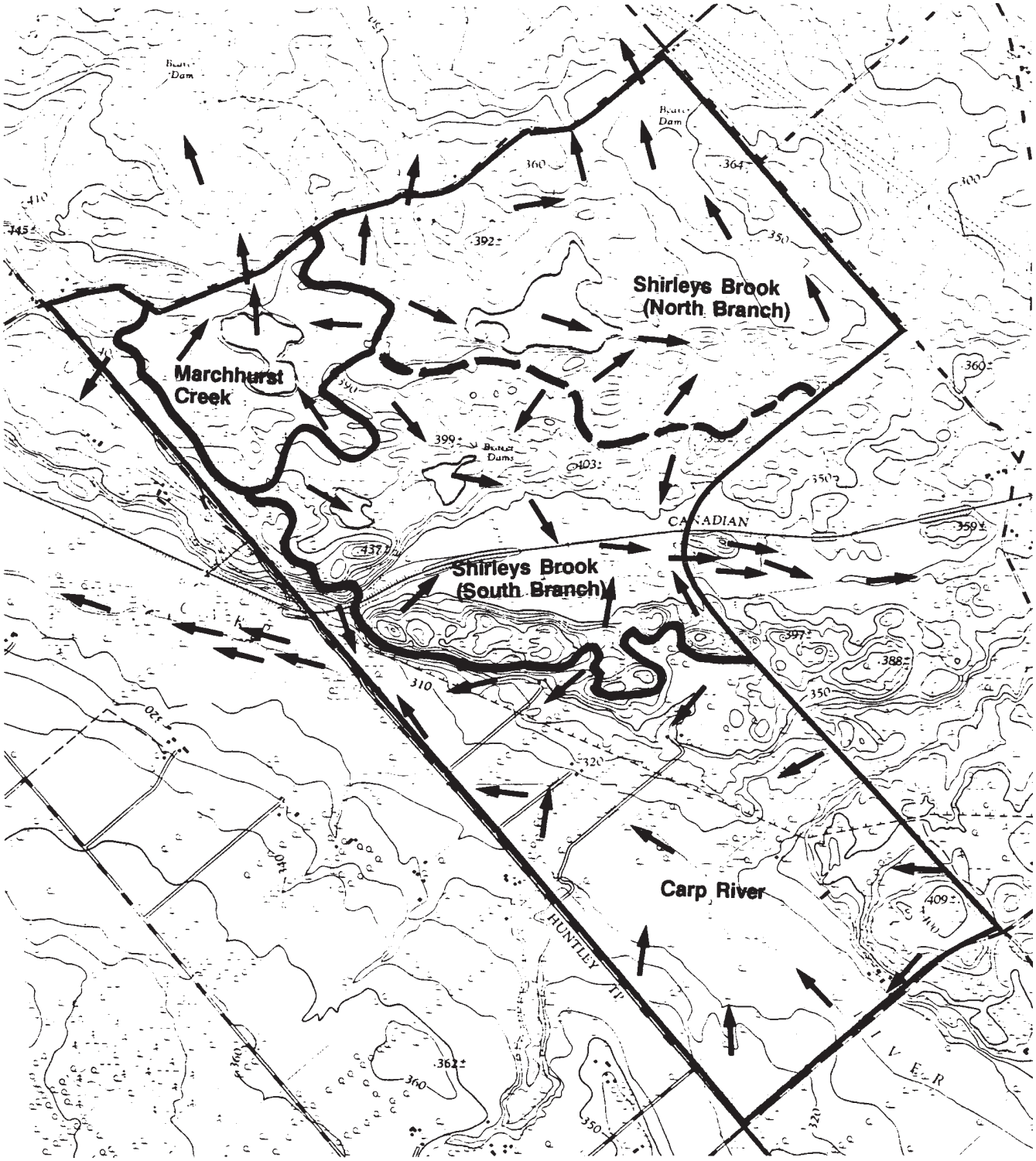

Figure 4: Drainage Patterns in the South March Highlands study area
(Arrows = direction of flow)

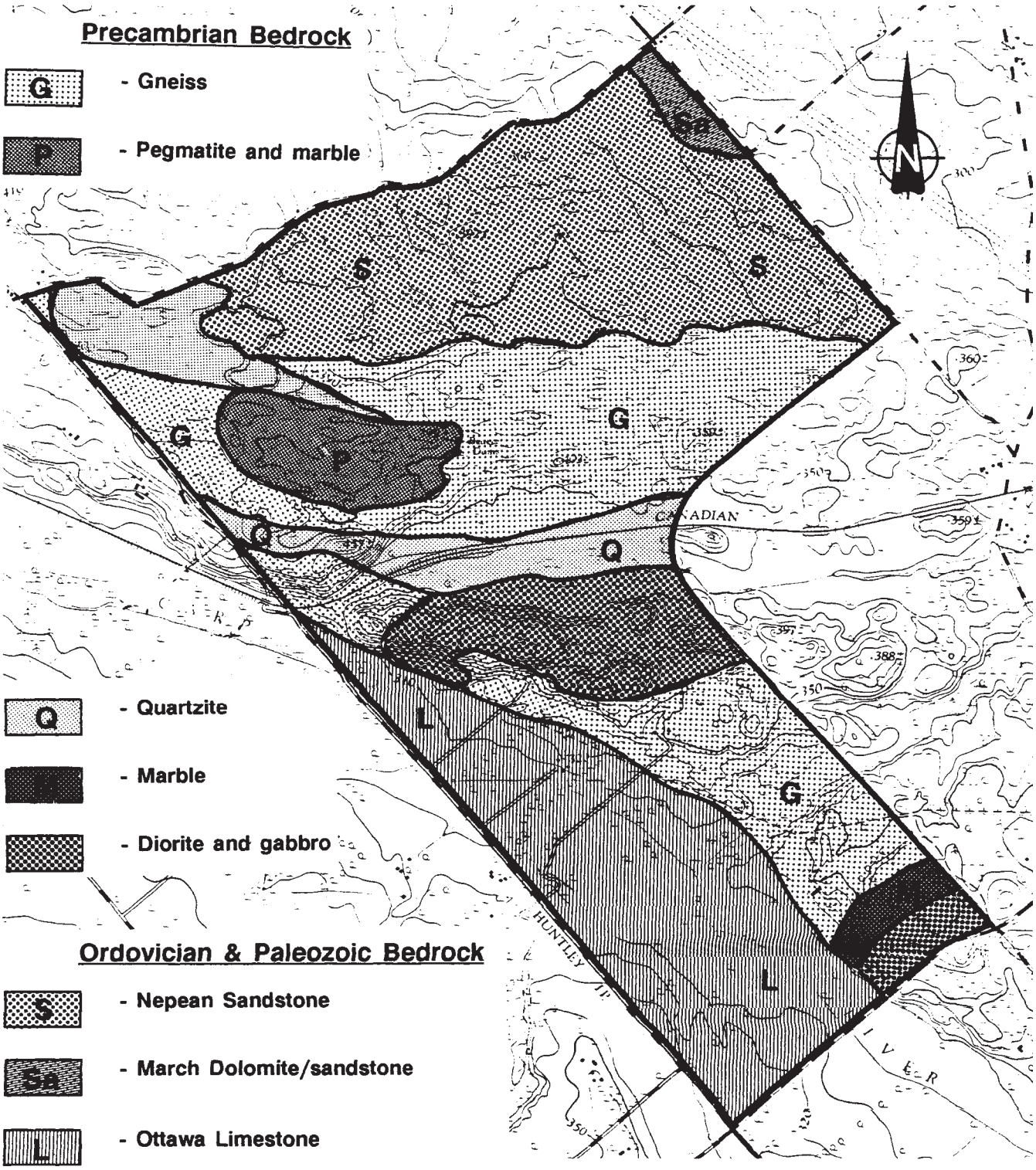

Figure 5: Bedrock Geology of the South March Highlands study area
(adapted from Renaud 1979; Potvin 1979)

During the latter stages of the reduction of water levels in the Ottawa Valley (9,000 - 8,000 years B. P. - McAndrews et al. 1984) the glacial meltwater formed a proto-Ottawa River which was much larger than today's river and likely formed a large lake (Dadswell 1974). A boreal-subarctic vegetation would have dominated during the colder period following deglaciation.

Western Quebec and eastern Ontario underwent a warmer climatic period between 7,000 and 4,000 years B. P. (the hypsithermal period) (McAndrews et al. 1987) during which the Great Lake drained through the Ottawa Valley and provided a direct link with areas to the west (until about 5,000 years B. P.)(Dyke and Prest 1987b).

The entire Carp Ridge was initially an island in this floodwater and the well-developed, post-glacial terraces along the present-day Carp River east of Huntmar Road suggest that the period of inundation was likely a long one. Southern vegetation would have migrated along these river and lake shores relatively rapidly during this warmer period to become established in the study area and the lower Ottawa Valley (Brunton 1980).

By ca. 4,000 years B.P. the landscape and vegetation characteristic of contemporary natural sites was established (Dadswell 1974; McAndrews et al. 1987). In the study area this would have been a somewhat more mature version of the vegetation we see in the study area today, with more fire and drought-tolerant forest vegetation dominating the most exposed outcrop areas. Mature late successional hardwood and mixed forests likely dominated the lower, more mesic, more deeply buried sites along the drainage channels, Carp River flats and on till deposits. Eastern Hemlock was likely a considerably more significant component of such mature forests before its selective removal by early settlers (see below).

(2) Historical Impact and Development

a) Early Development

Significant activity in the South March Highlands study area began in the early 19th century with the arrival of British and Canadian colonial settlers who initiated the agricultural activity which is still evident. Prior to that time local aboriginal people focused their activity along the biologically more productive and logistically less demanding shore areas of major river systems. It is unlikely that aboriginal activity would have amounted to more than seasonal hunting activity (Brault 1946).

All of the study area has been logged since the early 19th century. Timber extraction commenced in the Ottawa-Hull area in the last years of the 18th century and remained the primary industrial activity here for many decades (Walker & Walker 1969). Burns et al. (1972) suggest that Philemon Wright's company may have logged Red Pine and some White Pine from the region of the study area in the 1820s. More likely, given the complete absence of any natural Red Pine in Nepean or Kanata today (pers. obs.), only White Pine was extracted. In any event, the first wave of export logging activity passed beyond the Kanata area by 1830. Subsequent timber activity, evident into the 1850s, would likely have been for saw-logs to supply local lumber needs.

The area (then March Township) was surveyed in 1820 and major road systems initiated thereafter. The Old Carp Road (then the 'Arnprior Highway' between Bytown (Ottawa) and Arnprior) was laid out by 1823. Development in the study area and in the South March Highlands as a whole focused on this section of the major transportation route as it was approximately half way between the two forest industry towns.

Kanata's first doctor, Dr. Alexander J. Christie, settled at Lot 13, Concession 1 which incorporates the extreme northwestern corner of the study area (and is buried here beyond the north side of the road).

As many as half a dozen hotels were established to service the increasingly heavy business traffic. Most of these developments were located at "Lewisville", a service centre at the northeastern corner of the study area (Figure 6). In winter during the 1850s this was a busy route, with upwards of 400 men and 300 horse-drawn teams travelling to and from the logging camps (Burns et al. 1967). Tradesmen such as weavers,

tanners and blacksmiths set up shop at Lewisville to service this traffic. There were four tanners working at McMurtry's Tannery at Lewisville (the ruins of which still stand at the corner of the Second Line Road and the Old Carp Road) in 1861.

The tannery indicates a connection between agricultural activity and timber extraction in the area. It seems likely that the late successional forests of the South March Highlands area once supported a substantial Eastern Hemlock component, as the bark of this tree was the mainstay of the 19th century Ontario tanning industry.

The importance of the Old Arnprior Highway and its services declined dramatically in the 1880s with the expansion of railways through the Kanata area. The commercial activity at Lewisville was soon abandoned.

How quickly land clearing took place after initial settlement in the early 1820s is unclear, but by the 1860s the South March Highlands had been largely settled, with most lots having one or more structures built upon them (Figure 6).

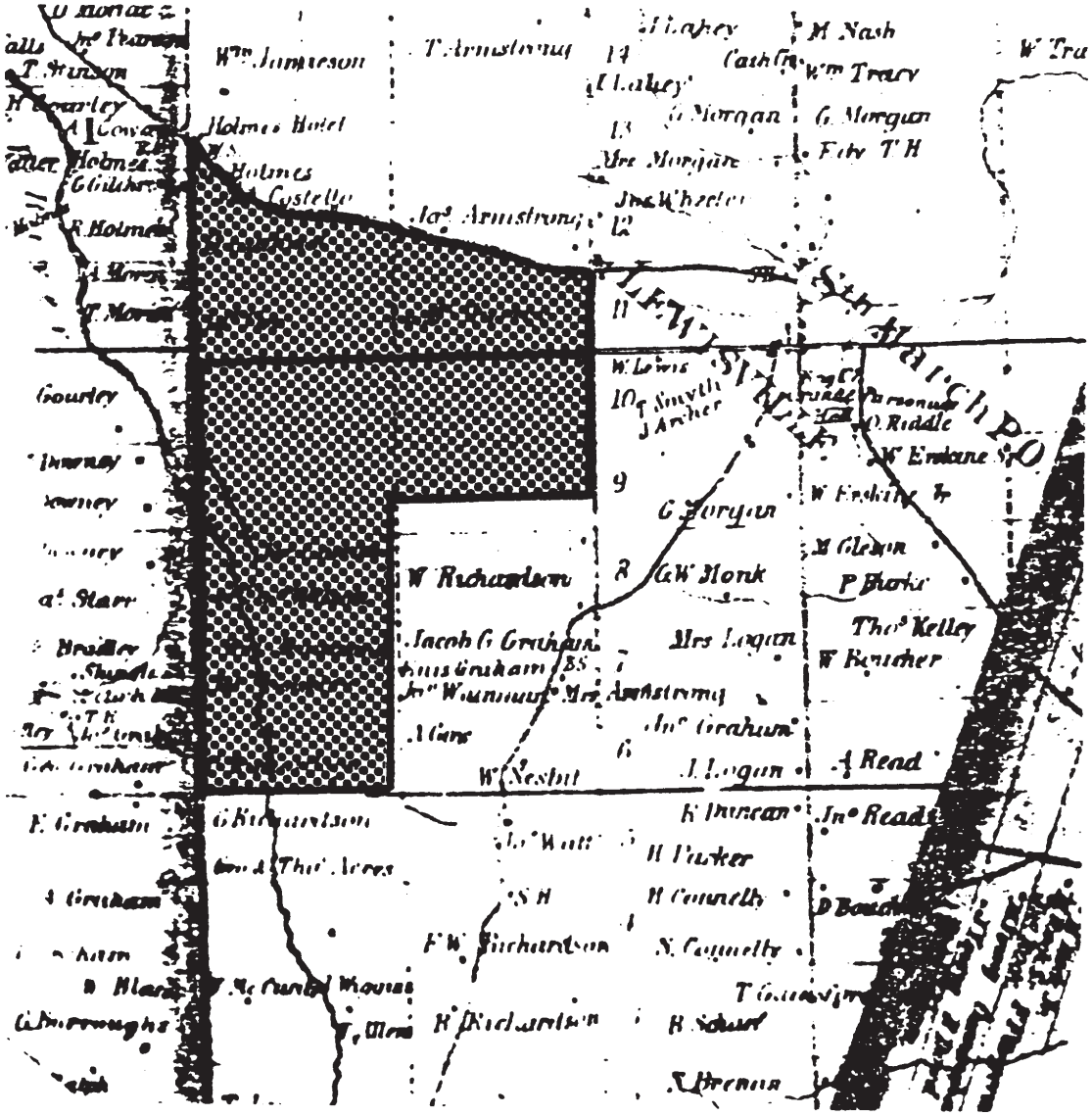

Figure 6: Settlement in the South March Highlands, 1863

The thin, relatively sterile soils of most of the South March Highlands provide limited agricultural production and virtually no active agriculture remains on the uplands in the area (Figure 7). On the Carp River flats, however, several families initiated agricultural operations which continue today. The Richardson family moved into this area from holdings to the south of present-day Richardson Side Road by the 1860s and still farm their property in the southwest of the South March Highlands study area (Figure 8).

The landscape impact of greatest significance next to agriculture in the South March Highlands study area was the Great Fire of 1870. A series of fires swept the entire western half of what is now the Regional Municipality of Ottawa-Carleton during a prolonged drought in August 1870 (Walker and Walker 1969). Much of the mixed forest and coniferous forest areas on the dry outcrop areas were severely impacted and still show signs of the 120 year old fire (pers. obs.). Particularly vulnerable were those areas bounded by cedar rail fences along which the fire spread rapidly.

Mature deciduous forest contains less combustible material than younger, disturbed forest and would have been less vulnerable to the advancing fire. The maple forest north of Heron Pond and those along north-facing slopes in the central portion of the study area may be examples of these spared areas. The open outcrop and thinly buried areas - *viz.*, the majority of the study area - was severely impacted, however, and their vegetation still reflects those events.

With commercial industry gone, the population of the South March Highlands study area declined through the 20th century as agriculture retreated from less productive highland sites.

A township dump was operated along the Second Line Road into the 1970s (Figure 2), with a variety of household, construction and miscellaneous debris being piled into the lowland depression occupied by the north branch of Shirleys Brook (pers. obs.). The site has been covered by fill and allowed to revegetate.

The South March Highlands study area and the entire South March Highlands was designated part of a Conservation Areas system in the 1974 Regional Official Plan. This designation was reversed several years later (Brunton 1981b; Haigis, McNabb & DeLeuw 1991).

b) Contemporary Situation

The study area likely now contains a lower population and fewer developments (Figure 2) than it did in the 1850s when the Arnprior Highway was a going concern and agricultural development was spreading up onto the highlands. A small number of private residences occupy scattered sites along the Richardson Side Road, Huntmar and old Carp Roads. Approximately twenty-four private landowners share proprietorship of the site.

Development options are significantly limited under present zoning. Upland areas are zoned Marginal Resource Restricted and the flood plain area of the Carp River (plus connecting organic soil deposits) are recognized as Environmental Constraints lands within Agricultural Resource and Marginal Resource Restricted zoning (Figure 41). Lot sizes of 10 ha for individual developments and 0.8 ha for subdivisions are defined by Amendment 13 (22 October 1991) of the Kanata Official Plan. That amendment also indicates that development applications in most of the South March Highlands Study Area will be deferred, pending the completion and consideration of this study. Agricultural activity is confined to the Carp River flats along the Richardson Side Road and Huntmar Road.

A spur line of the Canadian National Railway transects the centre of the area in an east-west direction. Few other corridors occur, although a minor transmission line extends northward along the First Line allowance on the eastern border of the site.

An extensive system of winter-skiing/summer hiking recreational trails connects the site with the undeveloped area in the adjacent Kanata Lakes area to the east (cf. Brunton 1992b).

Figure 7: Abandoned Farmhouse (“The haunted house”) along Hazeldean Escarpment

Figure 8: Richardson Farm, Richardson Side Road

(3) Vegetation

The vegetation of the study area is the framework upon which the natural environment assessment is structured, as most floral and faunal features are dependent upon it. The habitat categories utilized are compatible with those utilized in detailed inventories elsewhere in the Regional Municipality of Ottawa-Carleton (cf. Mosquin & Gillett 1984; Brunton 1984; 1992).

There are 12 vegetation types identified in the study area, in addition to developed land, agricultural land and open water. The majority of habitats represent upland vegetation complexes, all of which show impact from human activity to some degree.

Due to the level of disturbance in some areas and their transitional nature, it is difficult to precisely label large blocks of forest vegetation. In such situations the broad habitat category is identified; less attention is placed on labelling particular stands than classifying the overall habitat type and identifying natural environment significance.

Figure 9 illustrates the distribution of each of these vegetation types. This map is prepared directly from transparent overlay on 1:15,000 scale stereo aerial photographs of the study area [2]. The habitat code numbers/letters (noted in brackets) following the habitat name are those used in Figure 9.

The habitats identified in the study area are as follows:

WETLAND HABITATS

Open Water (OW)

Marsh (1)

Thicket Swamp (2)

Early Successional Mixed Swamp Forest (3)

Early Successional Deciduous Swamp Forest (4)

Late Successional Deciduous Swamp Forest (5)

UPLAND HABITATS

Late Successional Mixed Forest (6)

Late Successional Deciduous Forest (7)

Early Successional Deciduous Forest (8)

Early Successional Mixed Forest (9)

Early Successional Coniferous Forest (10)

Scrub and Thicket (S)

Bedrock Outcrop (R)

Meadow/Abandoned Cropland (M)

Developed/Severely Disturbed Land (D)

[2] A more detailed vegetation map, extrapolated from the aerial photographs onto much more detailed 1: 2,500 scale bases maps, has also been prepared. This requires several large sheets of paper to accommodate and is considered unnecessarily cumbersome for this document. Copies of the 1: 2,500 scale map have been deposited with the City of Kanata.

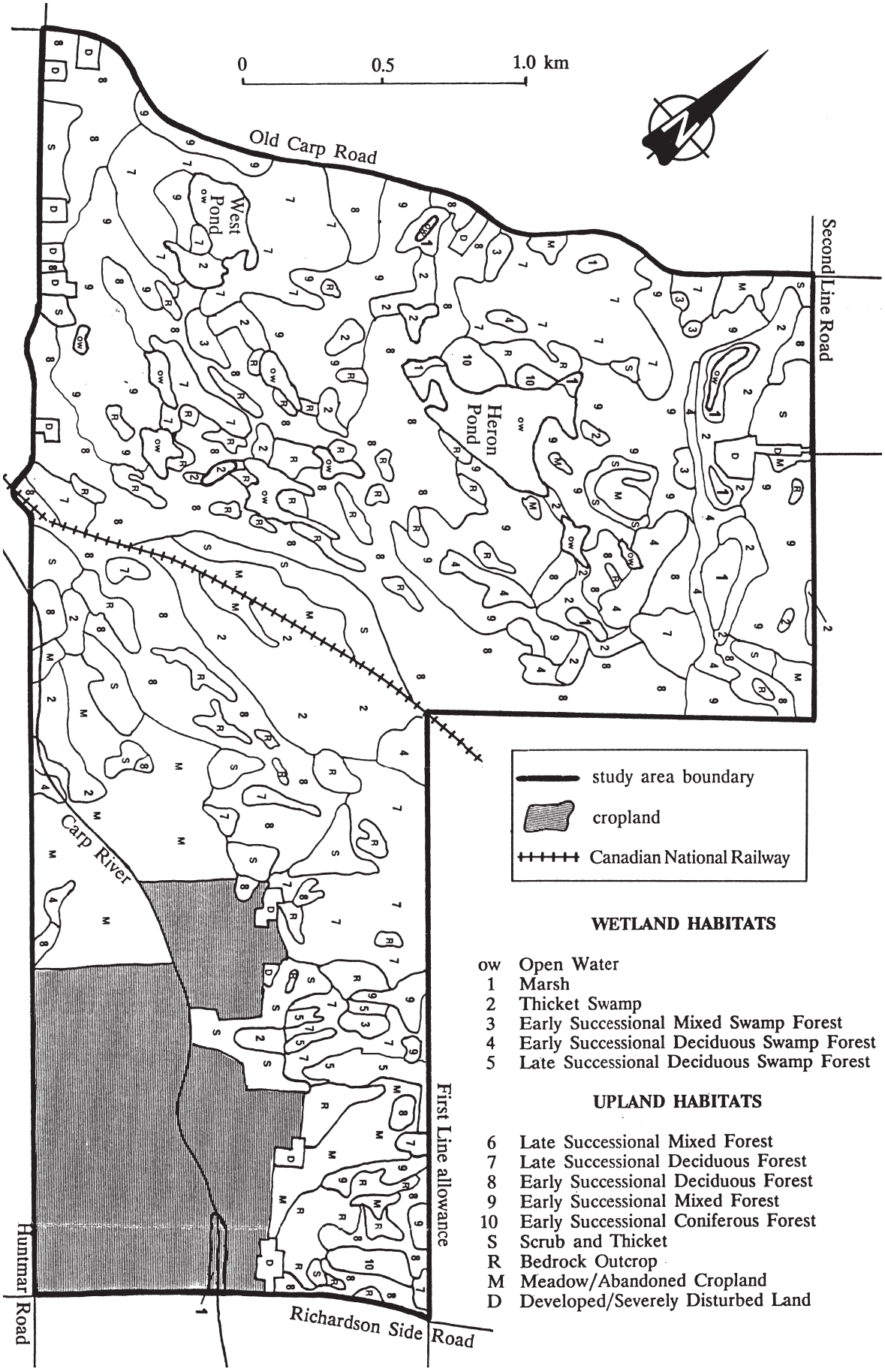

Figure 9: Habitats of the South March Highlands study area

The following discussions are provided in order to identify the biophysiological site variations and vegetation characteristics of each habitat type and to indicate the dominant vegetation associations, landscape appearance and ecological evolution of each. This will not only facilitate the identification of significant vegetation but will also assist in assessing the potential support for significant floral and faunal elements in the study area.

Each discussion begins with a brief description of the site, followed by vegetation characteristics, ecological trends and significant floral and faunal elements. The code letter(s) or number by which each habitat is identified on Figure 9 is noted following each discussion.

The criteria for significance of particular resources (Regionally or Provincially Rare, etc.) are noted at the beginning of Chapter 3: Significant Features Assessment.

WETLAND HABITATS

Open Water Habitat (OW) (Figures 10, 11)

This is common in the portion of the study area north of the railway tracks. It is found typically as small, shallow ponds in granitic bedrock depressions at the headwaters of Shirleys Brook, in small, transitory beaver ponds throughout the upland areas and along the Carp River.

Most waterbodies originate from damming activity by beaver along creeks. Two, Heron Pond and West Pond, are permanent but with size and water levels significantly affected by beaver dams at their outlets.

The vegetation in open water areas is characterized by a combination of true aquatic species (pondweeds, duckweed) and marsh plants (loosestrife, cattail, canary-grass, etc.) and is typically sparsely distributed on the surface. Characteristic species include:

Zizania palustris	*Scirpus lacustris*
Phalaris arundinacea	*Typha latifolia*
Lemna minor	*Potamogeton pusillus*
Alisma triviale	*Cicuta bulbifera*
Glyceria borealis	*Rumex orbiculatus*
Ceratophyllum demersum	*Nuphar variegatum*

Shallow sites succeed to marsh or thicket swamp unless reflooded by beaver activity. Such sites on granitic bedrock constitute a habitat which is confined exclusively within the Regional Municipality of Ottawa-Carleton to the Carp Ridge.

The Regionally Significant (Sparse or Rare) Green Bur-reed (*Sparganium chlorocarpon*), Floating Bur-reed (*Sparganium fluctuans*), Floating-heart (*Brasenia schreberi*) and Illinois Pondweed (*Potamogeton illinoensis*) are found in this habitat. It is also heavily utilized by breeding waterfowl, including Great Blue Herons which breed on Heron and West Ponds, Canada Geese and Mallards, and large numbers of autumn migrant waterfowl. The Regionally Significant Blanding's Turtle was observed in this habitat near the outlet of Heron Pond.

This form of open water vegetation is rare in the Regional Municipality of Ottawa-Carleton and is considered to be Provincially Significant (Brunton 1984; 1991; 1992).

Marsh Vegetation (1) (Figures 12, 13, 14, 15)

Marsh areas are uncommonly scattered across the study area in low bedrock depressions of old beaver ponds, drying drainage channels and along flowing waterways. They are most common in wetlands areas along Shirleys Brook (Figure 9) but never in large areas. Substrates contain a high organic component and often constitute a substantial layer of silty ooze over granite or sandstone bedrock.

Typical vegetation is characterized by graminoid and other monocot plant species. A wide variety of wetland dominants are evident here, varying from virtually pure stands of Canary-grass (*Phalaris arundinacea*) or Wild Rice (*Zizania palustris*) to Canary-grass-Cat-tail (*Typha latifolia*) - Purple Loosestrife (*Lythrum salicaria*) vegetation. As with the adjacent Kanata Lakes area (Brunton 1992b), the infestation by Purple Loosestrife of wetlands in the study area is severe.

A wide variety of herbaceous plant species are found here, including:

Phalaris arundinacea	*Zizania palustris*
Carex comosa	*Scirpus lacustris*
Aster lanceolatus	*Carex crinita*
Lythrum salicaria	*Triadenum virginicum*
Eleocharis smallii	*Galium palustris*
Cicuta bulbifera	*Scutellaria galericulata*
Urtica dioica	*Cornus stolonifera*
Lycopus uniflorus	*Thelypteris palustris*
Eupatorium perforatum	Typha latifolia
Verbena hastata	*Salix lucida*

Advanced vegetation growth encourages the developments of thicket swamp and upland forest vegetation, unless disturbance (usually by flooding) retards that succession. This habitat supports few significant natural environment components, although the Regionally Sparse plant species Dyer's Bedstraw (*Galium tinctorium*), Green Bur-reed (*Sparganium chlorocarpum*), Canada Rush (*Juncus canadensis*) and Prickly Sedge (*Carex echinata*) are recorded.

This vegetation is common in the Regional Municipality of Ottawa-Carleton (Brunton 1984; 1991) and the small examples found in the study area are of low natural environment significance.

Thicket Swamp (2) (Figures 16, 17)

This vegetation is common bordering marsh and swamp forest vegetation throughout upland portion of the study area and along the Carp River near the railway (Figure 9). It is dominated by Speckled Alder (*Alnus incana*) and other native shrubs like Red-osier Dogwood (*Cornus stolonifera*) and Slender Willow (*Salix petiolaris*). Undergrowth varies from sparse to dense with a significant number of marsh species developing within the shrub cover at some sites.

Typical floristic elements include:

Alnus incana	*Cornus stolonifera*
Bidens frondosa	*Ludwigia palustris*
Glyceria borealis	*Carex pseudo-cyperus*
Rorippa palustris	*Eleocharis obtusa*
Asclepias incarnata	*Eupatorium maculatum*
Eleocharis acicularis	*Cicuta bulbifera*
Scirpus cyperinus	*Spiraea alba*

As this vegetation ages and organic material accumulates, lowland tree species succeed the shrub component and transform the vegetation into a variety of swamp forest types. Revegetation of beaver pond areas and periodic flooding along the Carp River, however, is constantly providing new thicket swamp habitat and rejuvenating older stands.

This vegetation supports the Regionally Significant Fernald's Manna-grass (*Torreyochloa fernaldii*) along Shirleys Brook and a substantial population of Regionally Significant Willow Flycatchers along the Carp River.

It is common in the Regional Municipality of Ottawa-Carleton (Brunton 1984; 1991) and is of low natural environment significance in its own right in the study area.

Early Successional Mixed Swamp Forest (3) [cedar-hardwood swamp] (Figure 18)

Young swamp forest dominated by a mixture of hardwood and coniferous forest cover is uncommonly distributed in the South March Highlands study area. It typically occurs in shallow, organic-rich, acidic substrate deposits in bedrock depressions associated with ponds (i.e. east of Heron Pond) and on lower seepage slopes (along First Line allowance).

Red Maple, White Birch, White Elm, Green Ash and other early-successional tree species are secondary components of associations dominated by White Cedar and/or Black Ash. The undergrowth is typically a tangled, shrub-dominated vegetation with floristic components from upland and wetland sites.

The ground vegetation includes the following characteristic plant species:

Mentha arvensis	*Onoclea sensibilis*
Aster puniceus	*Lycopus uniflorus*
Parthenocissus vitacea	*Bohmeria cylindrica*
Impatiens capensis	*Dryopteris carthusiana*
Glyceria striata	*Spiraea alba*
Bidens frondosa	*Pilea pumila*

Such sites frequently have evolved from thicket swamp vegetation and, in the absence of disturbance (cutting, windthrow, flooding) will be themselves succeeded by late successional forest cover.

This vegetation, being early successional and transitional between deciduous and coniferous forest vegetation, has a low level of intrinsic natural significance in the Regional Municipality of Ottawa-Carleton (Brunton 1984; 1991). No significant faunal species and one Regionally Significant plant, Fernald's Manna-grass (*Torreyochloa fernaldii*), were observed.

Early Successional Deciduous Swamp Forest (4) [Black Ash swamp] (Figure 19)

Young hardwood swamp forests formed by White Elm, Red Maple, and/or Green Ash in combination with a predominant cover of Black Ash are maintained in permanently wet areas in thin organic, primarily acidic deposits across the upland portions of the study area. Many of these are tiny stands too small to appear in Figure 9. Beaver cutting and flooding has affected these sites significantly. Some small areas of trees have been killed by flooding, creating a variably open canopy.

The undergrowth, reflecting its evolution, is a combination of marsh, swamp thicket and early successional forest taxa. Although non-native elements are few, they have had a significant impact in some areas along Shirleys Brook (especially the Purple Loosestrife and Canary-grass).

Typical floristic elements include:

Carex crinita	*Athyrium filix-femina*
Carex utriculata	*Onoclea sensibilis*
Glyceria striata	*Carex bromoides*
Carex crinita	*Impatiens capensis*
Muhlenbergia mexicana	*Theylpteris palustris*
Circaea lutetiana	*Carex intumescens*
Bohmeria cylindrica	*Viola cucullata*

This vegetation succeeds to late successional deciduous swamp forest in due course. Disturbance (flooding, tree cutting) can alter that process by encouraging a return to thicket swamp vegetation or mixed swamp vegetation.

This habitat is common in the Regional Municipality of Ottawa-Carleton (Brunton 1984; 1991). It is of low intrinsic natural environment significance in the study area.

Late Successional Deciduous Swamp Forest (5) [maple swamp] (Figure 20)

This Red and Silver Maple dominated vegetation is rare in the South March Highlands study area, occurring in mappable stands along the First line Allowance and southeast of Heron Pond (Figure 9). Small pockets, usually dominated by a few large maples each occur elsewhere in small bedrock depressions and on lower seepage slopes. Eastern Hemlock occasionally is a significant associate.

Maple dominates sandy-loam substrate in bedrock depressions by rich, submature hardwood forest in sites typically flooded through all or most of the growing season. (Both sites were dry through most of the unusually dry summer of 1991). Undergrowth is sparse under the dense shade of the established canopy in the more mature site along the First Line allowance, becoming more diverse at the margins and in the less extensive stand southeast of Heron Pond.

Typical ground flora includes:

Aralia nudicaulis	*Rubus pubescens*
Pilea pumila	*Bidens frondosa*
Thelypteris palustris	*Urtica dioica*
Impatiens capensis	*Dryopteris carthusiana*
Lycopus uniflorus	*Onoclea sensibilis*
Betula allegheniensis	*Fraxinus nigra*
Carex cristatella	*Carex lupulina*
Carex tuckermanii	*Laportea canadensis*

The vegetation in this habitat is self-maintaining in larger stands, excepting major physical disturbance (windthrow, human impact). Reduction of the ground vegetation diversity will continue with increased maturity of the canopy.

This is a significant vegetation in the context of the Regional Municipality of Ottawa-Carleton (Brunton 1984; 1991) but the small size of these stands reduces their independent representative importance considerably.

UPLAND HABITATS

Late Successional Mixed Forest (6) [Sugar Maple-Eastern Hemlock forest] (Figure 21)

Submature to mature Sugar Maple forest with a substantial Eastern Hemlock component in wet-mesic loam and with scattered individuals of early successional species like American Basswood and White Birch, occurs rarely in the South March Highlands study area. It is found in a small stand north of Heron Pond, along the First Line allowance and in tiny, scattered sites too small to map in submature Sugar Maple forest. Selective logging of hemlock by pioneer settlers for bark for the tanning industry (see page 19) and fire suppression since the 1870s likely contribute to the scarcity of this vegetation type.

Undergrowth is sparse as a result of the heavy canopy shade. The ground vegetation is dominated by Sugar Maple seedlings and a scattering of mature hardwood forest herbaceous species.

This is a significant vegetation in the context of the Regional Municipality of Ottawa-Carleton (Brunton 1984) and contributes towards representation of a Provincially Significant landform/vegetation complex in the South March Highlands (Brunton 1992). The small size of such stands, however, dictates that such significance is only supportable within a larger unit containing the surrounding mature hardwood forest (Habitat 7, below). This habitat is *not* illustrated on Figure 9 due to the small size of individuals stands. It is found in the areas noted above within Sugar Maple (Late Successional Deciduous) Forest.

The Regionally Significant Prince's-pine (*Lycopodium obscurum* var. *obscurum*) was recorded in this habitat, although no significant fauna were noted here.

Late Successional Deciduous Forest (7) [Sugar Maple forest] (Figure 22)

Mature and submature forests dominated by Sugar Maple, with American Beech, Yellow Birch and submature to mature White Pine in deeper loam soil and Ironwood, Red Maple and Black Cherry on drier, rocky ground, are locally common in the South March Highlands study area, particularly north of Heron Pond and along the First Line allowance (Figure 9). Other species such as White Ash, White Spruce, White Birch, Red Oak, Eastern Hemlock and Basswood form locally important associations, depending on particular site conditions. Ground vegetation diversity varies from sparse (consisting mostly of Sugar Maple seedlings) to a relatively dense mixture of herbaceous and shrubby plant growth.

Typical ground species include:

Allium tricoccum
Maianthemum canadense
Carex communis
Erythronium americanum
Dirca palustris
Schizachne pupurascens
Hepatica acutiloba
Dryopteris intermedia
Lycopodium dendroideum
Oryzopsis racemosa
Osmorhiza claytonia
Trillium grandiflorum
Dicentra canadensis
Caulophyllum giganteum
Carex radiata
Acer saccharum (seedlings)
Carex arctata
Geranium robertianum

None of the mature Sugar Maple stands (or any vegetation in the South March Highlands study area) are ecologically pristine, but this vegetation is perhaps the least disturbed of the study area.

This vegetation has been identified as regionally significant in previous studies in the Regional Municipality of Ottawa-Carleton (Brunton 1980; 1984) and Provincially Significant here as part of a larger landform/vegetation complex (Brunton 1992). It contains a large number of significant natural environment values as well, including the following Regionally Significant (Sparse or Rare) plant species:

Carex sparganioides
Galium aparine
Luzula acuminata
Verbena urticifolia
Galium circaezans
Triosetum perfoliatum
Oryzopsis racemosa
Solidago flexicaulis

This vegetation provides breeding sites for the Regionally Uncommon Pileated Woodpecker as well.

Early Successional Deciduous Forest (8) [young hardwoods] (Figure 23)

This is the most common forest vegetation in the South March Highlands study area, reflecting the long history of disturbance through much of the area as a result of fires (especially those of 1870), logging, agricultural development and other human activity. It occupies a wide variety of dry to mesic upland sites in rocky outcrops to loam-filled depressions. Red Maple, White Ash, Green Ash, Basswood, Ironwood, Sugar Maple, Bitternut Hickory, White Elm, Bur Oak, Trembling Aspen and White Birch combine in various associations to form the dominants. Shrub and ground vegetation is diverse and includes the following amongst characteristic species:

Carex pedunculata
Galium triflorum
Toxicodendron rydbergii
Maianthemum canadense
Lonicera canadensis
Dryopteris intermedia
Juniperus communis
Pteridium aquilinum
Poa pratensis
Waldsteinia fragarioides

Aster ciliolatus
Monotropa uniflora
Trientalis borealis
Aster macrophyllus
Viola conspersa
Rubus strigosus
Oryzopsis asperifolia
Dryopteris marginalis
Lycopodium digitatum
Ribes cynosbati
Carex gracillima

Solidago juncea

Late successional deciduous and mixed forest succeed this vegetation. It is retarded in the thin, dry, rocky landscape of the South March Highlands study area where the effect of the fires of 1870 is still evident.

This is a common, insignificant vegetation in the Regional Municipality of Ottawa-Carleton (Brunton 1984) but it contributes to a Provincially Significant landform/vegetation complex in the study area (Brunton 1992). It supports several Regionally Significant (Sparse or Rare) flora, including Wood-rush (*Luzula acuminata*), Flat-leaved Clubmoss (*Lycopodium tristachyum*) and White Vervain (*Verbena urticifolia*).

Early Successional Mixed Forest (9) [young mixed forest] (Figure 24)

This vegetation is transitional between two early successional forest habitats, the common deciduous forest (Habitat 8, above) and the uncommon coniferous forest (Habitat 10, below). It occupies a variety of dry to mesic situations, from rocky ridges and south-facing slopes where White Pine, Trembling Aspen, White Spruce, White Ash, Basswood, White Cedar, Ironwood, Red Oak and Red Maple associate, as well as level bedrock-dominated flats of Red Maple, White Spruce, White Pine, Trembling Aspen and White Cedar. It is locally common west of Snake Road towards Heron Pond and west of the First Line allowance, though frequently in sites too small to form significant habitat units (Figure 9).

Typical ground vegetation includes:

Trientalis borealis
Maianthemum canadense
Amelanchier arborea var. laevis
Dryopteris marginalis
Fragaria virginiana
Pteridium aquilinum
Lycopodium digitatum

Poa compressa
Oxalis acetosella
Aralia nudicaulis
Cornus canadensis
Oryzopsis asperifolia
Cypripedium acaule
Juniperus communis
Carex gracillima

Carex pensylvanica

This habitat will ultimately succeed into late successional deciduous or mixed forest. Like other early successional upland vegetation, however, that succession is retarded in the thin, dry, rocky landscape of higher elevation sections of the South March Highlands study area where the intense impact of the fires of 1870 is still evident.

This vegetation is not considered to have a high degree of intrinsic natural significance in the Regional Municipality of Ottawa-Carleton (cf. Brunton 1984) but it contributes representation to a Provincially Significant landform/vegetation complex (*viz*, within Site District 6-12) as a significant element in the South March Highlands (Brunton 1992).

Figure 10: Open Water (ow) Habitat, Heron Pond

Figure 11: Beaver-dammed Open Water (ow) Habitat on Carp River, Huntmar Road

Figure 12: Aerial view of Drained Pond Converting to Marsh (Habitat 1), Second Line Road

Figure 13: Marsh Vegetation (Habitat 1) along North edge of Heron Pond

Figure 14: Wild Rice Marsh (Habitat 1) along Carp River, Richardson Side Road

Figure 15: Marsh on Mudflats, Heron Pond

Figure 16: Alder-Holly Thicket Swamp (Habitat 2) at Edge of Heron Pond

Figure 17: Alder Swamp Thicket (Habitat 2), Second Line Road

Figure 18: Cedar-Hardwood Swamp Forest (Habitat 3) by First Line Allowance

Figure 19: Wet, Open, Ground-Level Vegetation in Black Ash Swamp (Habitat 4), Richardson Side Road

Figure 20: Mature Silver Maple Swamp (Habitat 5), First Line Allowance

Figure 21: Sugar Maple - Eastern Hemlock Forest (Habitat 6), Heron Pond

Figure 22: Young Sugar Maple forest (Habitat 7) with large White Pine, “Cathedral Grove”, First Line Allowance

Figure 23: Young Trembling Aspen - Maple Hardwoods (Habitat 8), North of Heron Pond

Figure 24: Young White Pine - White Spruce - Sugar Maple Mixed Forest (Habitat 9), East of Heron Pond

Figure 25: White Pine Forest (Habitat 10) on Granite Outcrop, Richardson Side Road

Figure 26: Trembling Aspen Scrub and thicket (Habitat S)

Figure 27: Granite Outcrop (Habitat R) in Pasture, First Line Allowance

Figure 28: Sandstone Flats (Habitat R), North Side of Heron Pond

Figure 29: Clearing on Granite Outcrop (Habitat R), First Line Allowance

Figure 30: Mature Meadow (Habitat M) in Old Pasture, Second Line Road

Figure 31: Scrubby Meadow (Habitat M) along Hazeldean Escarpment

Figure 32: Active Pasture (Habitat D), Richardson Side Road

Figure 33: Residential and Farm Buildings, Richardson Side Road

Early Successional Coniferous Forest (10) [White Pine forest] (Figure 25)

Dry, warmer-than-normal, rocky sites along or above the Hazeldean Escarpment support virtually pure White Pine and/or White Cedar stands in the South March Highlands study area, occasionally in proportions large enough to constitute the dominant vegetation. These frequently occur in small sites dominated by other early successional forest cover (especially deciduous forest cover) (Figure 6). While coniferous forest is common here (e.g. south and west of West Pond), it seldom forms stands large and essentially pure enough to form distinctive units. The pine domination is shared with a variety of canopy species from early successional mixed and deciduous forest (Habitats 8 and 9, above), including Trembling Aspen, White Ash, Basswood, Ironwood and Red Oak. Undergrowth is sparse to moderately dense and typically includes species such as the following:

Pteridium aquilinum
Gaultheria procumbens
Danthonia spicata
Vaccinium myrtilloides
Maianthemum canadense
Amelanchier arborea var. laevis
Cypripedium acaule
Aralia nudicaulis
Aster macrophyllus
Agrostis scabra
Diervilla lonicera
Juniperus communis

This habitat will ultimately succeed into late successional deciduous or mixed forest. Like other early successional upland vegetation, however, that process is retarded in the thin, dry, rocky landscape here due to the lingering effect of the fires of 1870.

Extensive examples of this vegetation are no longer common in the Regional Municipality of Ottawa-Carleton and are thus of representational significance when found in reasonably natural condition. The examples in the South March Highlands study area are small and isolated, however, and offer significance only as part of the Provincially Significant landform/vegetation complex in the South March Highlands (*viz*, within Site District 6-12) (Brunton 1992). No species of Regionally Significant flora or fauna have been recorded from this habitat, although Locally Significant Pine Warblers were recorded near the First line Road.

Scrub and Thicket (S) (Figure 26)

The larger examples of this upland habitat results almost totally from human disturbance, either directly from former clearing activities or indirectly as a result of fire. It occurs on a variety of sites on the drier portions of the study area. It represents pasture land and cleared forest areas which are reverting to a forested condition. Accordingly, such areas contain saplings and scattered younger individuals of a wide variety of deciduous tree species as well as remnants of the field vegetation which formerly dominated. Trees such as Red Oak, White Ash, White Cedar, White Birch, Bur Oak and White Spruce occur, usually as scattered individuals or in small clumps. Several species of hawthorn shrubs are common, mixed with the tree saplings, raspberry and a wide variety of herbaceous flora, including:

Hieracium piloselloides	*Potentilla argentea*
Crateagus chrysocarpa	*Rhamnus cathartica*
Malus pumila	*Rumex acetosella*
Aster lanceolatus	*Hypericum perforatum*
Asclepias syriaca	*Geum aleppicum*
Vitis riparia	*Rubus strigosus*
Solidago canadensis	*Juniperus communis*
Amelanchier arborea var. laevis	*Agrostis gigantea*

Early successional forest succeeds this habitat, the form determined by site and seed source conditions. Areas severely affected by the intense fires of the 19th century are rejuvenating more slowly than many of those recovering from former agricultural activity.

This vegetation is well distributed in the Regional Municipality of Ottawa-Carleton and, being significantly affected by human interference, is of low natural environment significance here. The Regionally Significant (Sparse or Rare) White Vervain (*Verbena urticifolia*) was observed in this habitat.

Rock Outcrop (R) (Figures 27, 28, 29)

The edge and top of the Hazeldean Escarpment and the Precambrian-bedrock ridges and outcrops to the east and north support an abundance of this habitat in the study area. It is particularly evident in areas most severely impacted by the fires of 1870 and/or by logging, agricultural practices or other human activity. These sites have hot, very dry microclimates with substrates consisting of a mixture of bare rock, thin moss mats and very shallow soil. Such sites are usually enclosed with Scrub and Thicket (Habitat S, above) and associated with a variety of early successional forest vegetation. A herbaceous cover of native and introduced grasses and herbs of sunny, dry sites characterize the site, with isolated clumps of dry shrubbery and/or tree saplings.
Typical flora includes:

Dryopteris marginalis	*Juniperus communis*
Poa pratensis	*Agrostis gigantea*
Danthonia spicata	*Hieracium piloselloides*
Pteridium aquilinum	*Verbascum thapsus*
Hypericum perforatum	*Solidago nemoralis*
Phleum pratense	*Sedum acre*
Portulaca oleracea	*Rumex acetosella*
Fragaria virginiana	*Vaccinium angustifolium*
Corydalis sempervirens	*Aralia nudicaulis*

Regeneration of such site is very slow due to the virtual absence of soil in much of the habitat and the extreme susceptibility of the vegetation to drought. Many trees and shrubs were killed by the hot, dry summer of 1991.

This vegetation is rare in the Regional Municipality of Ottawa-Carleton (Brunton 1984) and Site District 6-12 (Brunton 1992). It supports a number of Regionally Significant (Sparse or Rare) flora, namely Rusty Woodsia (*Woodsia ilvensis*), Wiry Panic Grass (*Panicum flexile*) and Northern Spikemoss (*Selaginella rupestris*).

This habitat forms a significant element in the Provincially Significant landform/vegetation complex of the South March Highlands (Brunton 1992).

Meadow/Abandoned Cropland (M) (Figures 30, 31)

Human activity, primarily agriculture, accounts for virtually all of this habitat. Old pasture and long-abandoned croplands on thin to moderately deep soil sites are typical. It is a widespread habitat in association with former human activity along the main roads and in association with the railway across the South March Highlands study area (Figure 9).

Non-native vegetation predominates, with only scattered native shrub tree growth.

Typical species include:

Agrostis gigantea	*Phleum pratense*
Bromus inermis	*Rubus strigosus*
Sisyrinchium montanum	*Vicia cracca*
Chrysanthemum leucanthemum	*Cirsium arvense*
Carex pallescens	*Potentilla recta*
Oenothera parviflora	*Oxalis stricta*
Crataegus chrysocarpa	*Crataegus submollis*
Linaria vulgaris	*Malus pumila*
Hypericum perforatum	*Galium mollugo*
Plantago major	*Phleum pratense*

Scrub and Thicket and various early successional forest habitats will relatively rapidly succeed this vegetation unless physical disturbance (land clearing, fire) interrupts the succession. The human-derived, artificial forms of this habitat are widespread in the Regional Municipality of Ottawa-Carleton (cf. Brunton 1984) and are of limited intrinsic natural environment significance. They do, however, provide habitat for some significant wildlife species, such a wintering raptors along the lower slopes of the Hazeldean Escarpment.

Developed/Severely Disturbed Land (D) (Figures 32, 33)

Site conditions have little to do with the development of this form of vegetation cover as it reflects the human history of the site. Accordingly, developed lands are found in various site conditions, although areas with the highest potential for development (deeper soils, level topography, close to existing facilities and road, etc.) tend to experience a greater degree of human impact.

This vegetation is dominated by non-native vascular plants, reflecting the artificial nature of the situation. It includes scattered remnants of the forest cover and former agricultural vegetation.

There are no components of particular natural significance in this vegetation type, with the exception of the Regionally Significant Spotted Spurge (*Euphorbia maculata*) found along the railway.

(3) Flora

The flora of the South March Highlands study area is diverse, with almost 450 species recorded (Appendix 1). It is dominated by species typical of and common in the Regional Municipality of Ottawa-Carleton and southeastern Ontario (cf. Gillett & White 1978). Some exceptional habitat representation, however, has encouraged the presence of unusual species with particular affinities to areas geographically distant from the study area. Other affinities reflect prehistoric events and conditions. Many reflect the activities of man.

a) Northern Affinity

The rugged, Canadian Shield-like landscape of the entire Carp Ridge exhibits northern vegetational, floristic and faunal affinities (Brunton 1992). This is well illustrated in the higher elevation areas of the South March Highlands study area at the southern end of the Ridge. The higher lands along the Hazeldean Escarpment emerged from the Champlain Sea into the cold, subarctic-boreal environment of a time

considerably before lower elevation areas of the South March Highlands. Northern taxa established in those early years may have persisted to the modern day, in part, by virtue of being well established before the competition of taxa of more temperate climates.

The presence of flora more typical of northern areas is also encouraged by the extent of acidic substrate in the South March Highlands study area, particularly in wetland sites; acidic substrates are uncommon to rare in the Regional Municipality of Ottawa-Carleton (cf. Potvin 1979; Renaud 1979).

About half of the northern elements are wetland species. These taxa include:

Dryopteris cristata
Woodsia ilvensis
Spirodella polyrhiza
Lycopodium complanatum
Sparganium fluctuans
Dulichium arundinaceum
Carex echinata
Juncus canadensis
Potamogeton pusillus
Agrostis scabra
Rumex orbiculatus
Selaginella rupestris
Brasenia schreberi
Torreyochloa fernaldii
Glyceria canadensis
Spirodella polyrhiza

Many of these species are more common in the Gatineau Hills of western Quebec (Gillett & White 1978) and on the Canadian Shield of the upper Ottawa Valley (Moore 1978; Brunton 1988).

b) Southern Affinity

Many of the southern floristic elements here are uncommon or rare, as is the case in similar vegetation in nearby Shirleys Bay (Brunton 1980). Most are upland species and reflect a preference for calcareous or circumneutral substrates, often associated with rich hardwood forests.

The southern affinity is the strongest element in the flora, though not so striking as in the adjacent Kanata Lakes study area which supports a more diverse substrate (Brunton 1992b).

The South March Highlands study area was at or very near the shore of the proto-Ottawa River during the warmer hypsithermal period (ca. 7,000 to 4,000 years B.P.), encouraging the establishment of now-southern taxa which were advancing northward along rivershores at that time.

A representation of the almost 30 species with southern affinities includes:

Potamogeton illinoensis
Geum canadense
Wolffia columbiana
Panicum flexile
Carex plantaginea
Hydrophyllum virginianum
Elymus hystrix
Carpinus caroliniana
Carex sparganioides
Carex albursina
Oryzopsis racemosa
Luzula acuminata

Solidago flexicaulis *Hepatica acutifolia*
Menispermum canadense *Triosteum perfoliatum*
Wolffia columbianum *Wolffia borealis*
Acer nigrum *Festuca obtusata*

Of these, several species are typical of those exceptional, sheltered areas in the Regional Municipality of Ottawa-Carleton (usually rivershores) that support relict complexes of southern taxa. These species include:

Wolffia borealis *Menispermum canadense*
Wolffia columbiana *Acer nigrum*

An even richer association of such flora is found in the adjacent Kanata Lakes study area, presumably indicating remnant populations of species migrating into the Regional Municipality of Ottawa-Carleton during the pre-historic hypsithermal period (Brunton 1992b). The longer period since emergence of this area from marine and freshwater submergence may have resulted in a more established northern flora and fewer opportunities for later-arriving southern taxa than in lower elevation areas .

c) Widespread Indicator Species

In addition to this geographic affinity there is a group of plants which are relatively widespread in distribution but which appear to show a strong preference/requirement for older, rich hardwood forests. In the South March Highlands study area these include Silvery Spleenwort (*Athyrium thelypteroides*), Christmas Fern (*Polysticum acrosticoides*), Wild Leek (*Allium tricoccum*), Canada Yew (*Taxus canadensis*) and Cut-leaved Grapefern (*Botrychium dissectum*). These all occur north of Heron Pond.

d) Introduced Flora

The impact of agricultural activity has been particularly important is reducing the extent of natural landscape in the South March Highlands study area since the mid 1800s. Only in the least disturbed portion of the site along the Hazeldean Escarpment and north of the railway are predominantly natural complexes of significant flora remaining.

Upland areas of southern Ontario typically have non-native taxa representing 20 to 27% of their total flora (Brunton and Di Labio 1989). The 83 non-native taxa in the study area (all noted in Appendix 1) constitute only 19% of the total flora. This is one of lowest levels of ‘weed’ species of any large area in the Regional Municipality of Ottawa-Carleton, indicating that the flora of the South March Highlands study area is in uncommonly natural condition for such a large site in a southern Ontario urban area.

Significant floristic species are discussed in Chapter 3: Significant Features (below).

3) Fauna

The fauna of the site reflects a similar pattern to that of the flora, *viz*, a set of common, widely distributed species with a significant northern and southern affinity. Relatively few rare species are known from the area, again reflecting its representative nature.

The fauna of the South March Highlands study area shares much in common with that of Kanata Lakes study area (Brunton 1992b) and with the entire Carp Ridge (Brunton 1992). Most bird species represent seasonal residents and migrants; approximately 75 species have been known to breed in the study area.

Mammals and amphibian and reptile populations are similarly made up of common species, with of more than local significance.

Significant fauna are discussed in Chapter 3: Significant Features (below) and are listed in Appendix 2.

CHAPTER 3: SIGNIFICANT FEATURES ASSESSMENT

The character of the natural environment of the study area and the life science features observed in it have been described in the previous chapter, Resource Assessment (page 13). The significance of these features and particular life science characteristics of the study area will be discussed and evaluated here in order to put the natural environment values of the study area into a larger context.

1) Significant Vegetation

Although significant floral and faunal values are found throughout the South March Highlands study area, relatively few habitats supporting intrinsically significant vegetation are present. Relatively insignificant vegetation can (and does) provide habitat for significant flora and fauna, however, and is considered in the designation of candidate NEAs.

Closely paralleling the Kanata Lakes study area (Brunton 1992b), five habitats in the South March Highlands study area contain significant vegetation, as follows:

Late Successional Deciduous Swamp Forest (Habitat 5)

This vegetation in the study area is Regionally Significant [3]. It is found in only one area of mappable size in the South March Highlands study area, along the First Concession Road allowance near Richardson Side Road. In the Regional Municipality of Ottawa-Carleton there are several large examples of this habitat in lands with conservation zoning, most notably Shirleys Bay, Nepean/Kanata (Brunton 1980) and the Stony Swamp Conservation Area, Nepean (Brunton 1982). The examples in the study area are too small to warrant a high level of attention on their own merits, but as part of a larger complex of significant vegetation, they are of value for representational purposes and as habitat for significant flora and fauna.

[3] 'Regionally Significant' indicates a important example (by virtue of its rarity and/or undisturbed natural state) of a landform-vegetation complex, and/or complex of rare and unusual floral and faunal species, within the context of the Regional Municipality of Ottawa-Carleton. It achieves that by constituting a superior example of a particular landform-vegetation complex, even if that complex is not, of itself, dramatic or the habitat for rare species. If this significance status is maintained beyond the limits of the Regional Municipality of Ottawa-Carleton, it would likely qualify for Provincially Significant status.

Late Successional Mixed Forest (Habitat 6)

and

Late Successional Deciduous Forest (Habitat 7)

These two are relatively undisturbed examples of an increasingly uncommon forest vegetation in the Regional Municipality of Ottawa-Carleton. They are closely connected ecologically and geographically. Habitat 6 occurs in stands too small to map on Figure 9 but always within larger areas of Habitat 7. A substantial number of the significant flora of the South March Highlands study area occur here.

Substantial examples of this vegetation are considered significant in the Regional Municipality of Ottawa-Carleton (Brunton 1984) due to the rarity of natural representation of mature hardwood forest here and throughout Site District 6-12 (Brunton 1992). By virtue of the absence of other comparable areas in southeastern Ontario, such vegetation is considered to constitute a significant part of a Provincially Significant landform/vegetation complex in the South March Highlands study area (Brunton 1992).

Early Successional Coniferous Forest (Habitat 10)

Like the mature hardwood forest vegetation discussed above, this was formerly much more common in the Regional Municipality of Ottawa-Carleton than it is today, both in absolute and relative terms. Extensive examples of this vegetation are rare and have representational significance when found in reasonably natural condition. The examples in the South March Highlands study area are small and isolated, however, frequently blending into other habitats (e.g. with hardwood forest at "Cathedral Grove" along the First Concession allowance). They offer significance primarily as part of a Provincially Significant landform/vegetation complex in the South March Highlands (Brunton 1992).

Bedrock Outcrop (R)

In the Regional Municipality of Ottawa-Carleton this habitat is confined to the Carp Ridge and thus is rare. In the South March Highlands study area most of the habitat has been somewhat affected by past agricultural activity, especially near roadways and along the railway. This habitat is also represented on the Carp Ridge (Brunton 1992) and, to a lesser degree, in the adjacent Kanata Lakes study area, but not with the same complex association with submature forest habitats. Bedrock Outcrop habitat in the study area provides a vital representational contribution to the Provincially Significant landform/vegetation complex which encloses a large portion of southern end of the Carp Ridge (Brunton 1992).

Figure 34 provides a simplified illustration of the distribution of the significant vegetation of the South March Highlands study area which are described above (see also Figure 9, Habitats). It indicates that such vegetation is concentrated north of the railway track and along the Hazeldean Escarpment.

2) Significant Flora

This section provides a more detailed discussion of the particularly significant plant species that are known from the study area. A listing of all species observed is contained in Appendix 1.

The levels of floristic significance are as follows:

PROVINCIAL - a native vascular species listed in Argus *et al*. (1982 - 1987) and/or Argus and Pryer (1990) as rare in Ontario and/or Canada.

REGIONAL - a native vascular plant species considered to be rare, or previously unknown, or ecologically critical within the Regional Municipality of Ottawa-Carleton and/or Site District 6-12.

LOCAL - a native or non-native vascular plant considered rare in this area of the Regional Municipality of Ottawa-Carleton.

The status of individual species in the Regional Municipality of Ottawa-Carleton is determined by reference to regional literature and by examination of specimen collections at the National Museum of Nature, the Biosystematics Research Centre (Agriculture Canada), the Royal Ontario Museum (Toronto) and through personal observations.

a) Provincially/Nationally Significant

No species found in the study area are Provincially or Nationally Significant. Several taxa were found to be significant at a lesser level, as determined by reference to the Ottawa District checklist (Gillett & White 1978) and subsequent up-dates (Darbyshire 1982; Brunton 1985).

b) Regionally Significant

A total of 21 native vascular plants in the South March Highlands study area are Regionally Significant. Initiating the discussion of each taxon is an indication of its local status (in brackets). A brief statement of its affinity and typical habitat are then followed by a summary of its distribution and status in the Ottawa District/Regional Municipality of Ottawa-Carleton. A explanation of other range or significance characteristics completes the treatment.

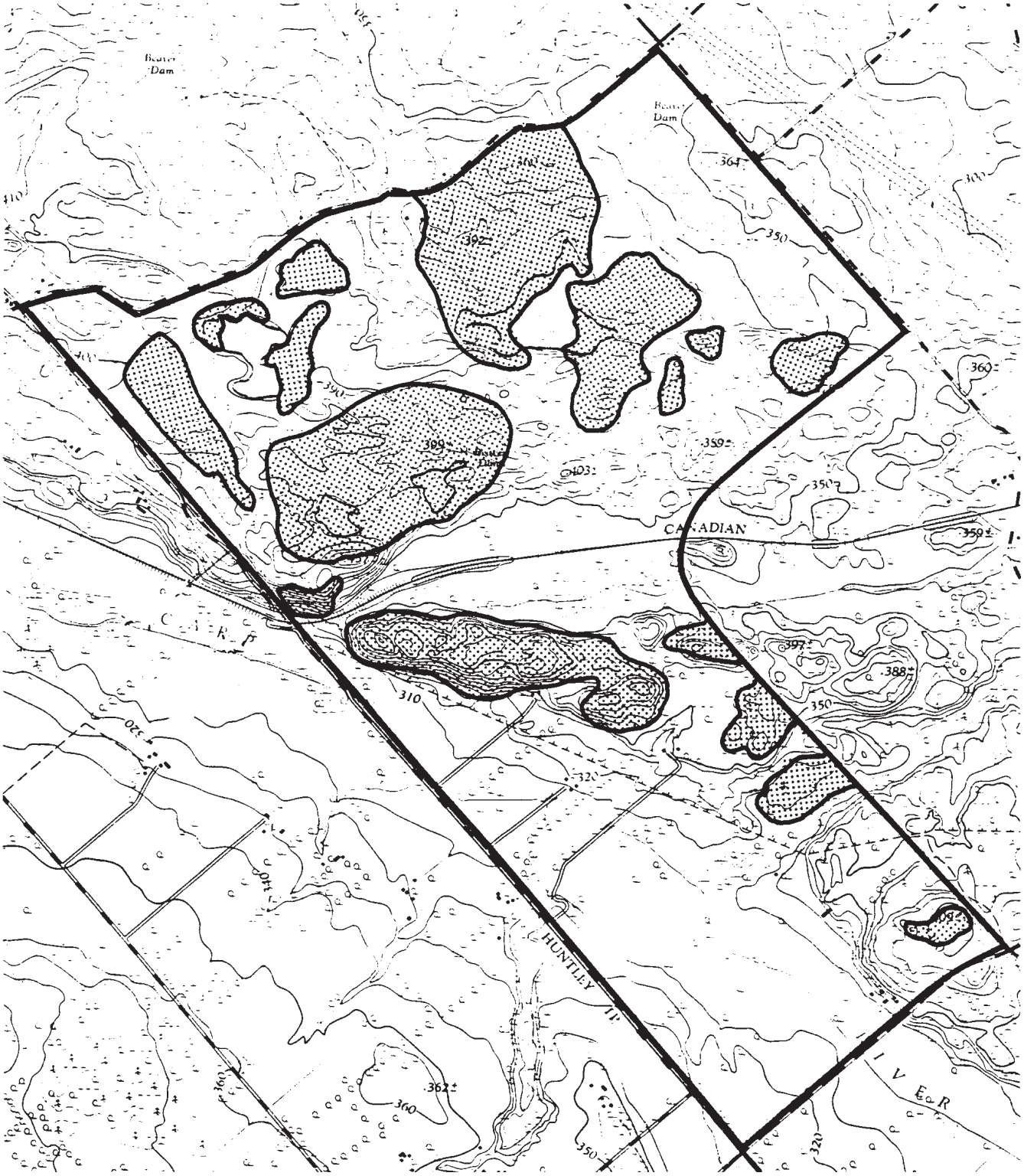

Figure 34: Areas of Significant Vegetation

These taxa, in checklist order (cf. Appendix 1) are:

Lycopodium complanatum L. *(s. st.)* *(Ground Cedar)*

- transcontinental boreal-subarctic species of dry, sandy ground, approaching the southern limit of range here (Cody & Britton 1989).

(Sparse) - scattered across the Regional Municipality of Ottawa-Carleton in suitable habitat, the closest stations being near the village of Carp and at the Burnt Lands (Brunton 1986).

Lycopodium obscurum L. var. obscurum *(Ground-cedar)*

- southern and eastern fern, uncommon in Ontario; approaching the northern limit of its range (Cody & Britton 1989).

(Sparse) - known from scattered wet-mesic, usually sandy, mature maple-hemlock or Red Maple swamp forest in the Region.

Lycopodium tristachyum Pursh *(Ground Cedar)*

- widely distributed, uncommon fern of dry, calcareous or circum-neutral substrates across eastern Canada (Cody & Britton 1989).

(Rare) - known elsewhere in the Region only at Mer Bleue and Stony Swamp Conservation Areas (Brunton 1984b) and Constance Bay.

Selaginella rupestris (L.)Spring *(Rock Spikemoss)*

- widespread Canadian Shield species of open rocky ground and sand, uncommon off the Canadian Shield in southern Ontario (Cody & Britton 1989).

(Rare) - elsewhere found on the Constance Bay dunes, the Burnt Lands, Morris Island and the Carp Ridge (Brunton 1986; pers. obs.); it was reported from the study area in the early 1980s but could not be found during the present study.

Woodsia ilvensis (L.)R. Br. *(Rusty Woodsia)*

- a common transcontinental, boreal fern of acidic bedrock outcrops (Cody & Britton 1989).

(Rare) - known in the Region only from the Carp Ridge where it is locally uncommon on outcrops in the Kanata Lakes study area (Brunton 1992b).

Sparganium chlorocarpum Rydb. *(Green Bur-reed)*

- uncommon eastern Canadian Boreal species.

(Sparse) - known elsewhere in the Region from Shirleys Bay, Stony Swamp, Carleton Place and Mer Bleue Conservation Area (Brunton 1984b).

Sparganium fluctuans (Morong)Robins. *(Floating Bur-reed)*

- a widespread species of oligotrophic lakes across the Canadian Shield (Scoggan 1978-1979).

(Rare) - known elsewhere in the Regional Municipality of Ottawa-Carleton only from two sites along the Ottawa River; likely transported to Heron Pond in the study area by waterfowl.

Potamogeton illinoensis Morong *(Illinois Pondweed)*

- a southern aquatic of fresh, oligotrophic, non-acidic lakes and streams.

(Rare) - much like Sparganium fluctuans (above), this is known elsewhere in the Regional Municipality of Ottawa-Carleton only from two sites along the Ottawa River and a collection from the Rideau River near Billings Bridge (Dobson & Catling 1983); also likely transported to Heron Pond by waterfowl.

Panicum flexile (Gatt.)Scribn. *(Wiry Panic Grass)*

- a prairie species of midwestern North America that is sparingly distributed along the lower Great Lakes shores and inland along the Ottawa Valley (Dore & McNeill 1980).

(Sparse) - common in the Regional Municipality of Ottawa-Carleton at the Burnt Lands (Brunton 1986) and locally abundant at other scattered alvar and limestone flats sites in the western portion of the Region (Dore 1959; pers. obs.).

Torreyochloa fernaldii (Hitchc.)Cronq. *(Fernald's Manna-grass)*

- an uncommon transcontinental boreal grass of acidic, alluvial ooze in thicket swamps (Dore & McNeill 1980).

(Rare) - found elsewhere in the Regional Municipality of Ottawa-Carleton only at Mer Bleue Conservation Area (Brunton 1984b); two previous sites along the Ottawa River destroyed by urban expansion (Dore 1959).

Carex echinata Murr. *(Prickly Sedge)*

- a widespread species of wet, acidic, often boggy ground across the Canadian Shield (Reznicek & Ball 1980).

(Rare) - otherwise known in the Regional Municipality of Ottawa-Carleton only from the Mer Bleue and Stony Swamp Conservation Areas and an old record from southern Nepean (Brunton 1984b).

Carex sparganioides Willd. *(Bur-reed Sedge)*

- southern species of rich, dry-mesic hardwood forests on circumneutral to calcareous substrate at the northern limit of its range (Scoggan 1978-79).

(Rare) - otherwise known in the Region only from elsewhere on the Carp Ridge.

Juncus canadensis J. Gay *(Canada Rush)*

- common aquatic of shallow, boggy shores of oligotrophic lakes across the Canadian Shield on northern Ontario.

(Rare) - known elsewhere in the Regional Municipality of Ottawa-Carleton only from the Mer Bleue Conservation Area (Brunton 1984b) where it is locally common.

Luzula acuminata Raf. *(Wood-rush)*

- common southern rush of rich calcareous to circumneutral soil in hardwood forests.

(Sparse) - otherwise known in the Region (and Ottawa District) from elsewhere in the Carp Ridge.

Brasenia schreberi Gmel. *(Floating-heart)*

- common aquatic of cool, slightly acidic, oligotrophic lakes and quiet streams across boreal and subarctic regions of Canada (Scoggan 1978-1979).

(Rare) - unknown in the Regional Municipality of Ottawa-Carleton other than at Heron Pond but found infrequently in the Gatineau Hills of west Quebec; likely transported here by waterfowl.

Euphorbia maculata L. *(Spurge)*

- uncommon species of open weedy sites across southern Ontario (Mulligan and Lindsay 1978).

(Sparse) - increasingly abundant in recent year (now probably Common) across RMOC (Brunton 1985; pers. obs.).

Verbena urticifolia L. *(White Vervain)*

- southern species of open calcareous woodland edges (Scoggan 1978-1979).

(Sparse) - otherwise known in the RMOC from a scattering of sites in the western portion of the Region.

Galium aparine L. *(Cleavers)*

- common species of rich hardwood forest across Canada (Scoggan 1978-1979).

(Sparse) - known from scattered hardwood sites across the Regional Municipality of Ottawa-Carleton.

Galium circaezans Michx. *(White Wild Licorice)*

- a common species of rocky, calcareous ground found in rich hardwoods in southern Ontario.

(Sparse) - found in a number of dry, rocky maple forest sites across the Regional Municipality of Ottawa-Carleton and perhaps only Uncommon (Brunton 1985).

Galium tinctorium L. *(Dyer's Bedstraw)*

- a common species of wet, cool, acidic substrate in boggy forest and sandy depressions of the Canadian Shield of eastern Canada (Scoggan 1978-1979).

(Sparse ?) - status unclear (Dugal 1982) but apparently found occasionally across the Regional Municipality of Ottawa-Carleton in boggy sites (Brunton 1984b).

Triosteum perfoliatum L. *(Horse-gentian)*

- southern species of rich, rocky southern hardwood forest in calcareous ground.

(Sparse) - widely scattered across the Region in southern associations (Brunton 1982); at the northern limit of its range and probably only Uncommon (pers. obs.).

c) Locally Significant

A significant number of plant species in the study area are considered to be Uncommon native species or Rare or Sparse non-native species and are thus considered to be locally significant. All are indicated in Appendix 1. The Locally Significant **native** species are listed below:

Botrychium dissectum
Botrychium simplex
Athyrium thelypteroides
Adiantum pedatum
Dryopteris cristata
Polystichum acrostichoides
Taxus canadensis
Potamogeton pusillus
Najas flexilis
Agrostis scabra
Alopecurus aequalis
Elymus hystrix
Bromus ciliatus
Oryzopsis racemosa
Bromus japonicus
Bromus tectorum
Elymus hystrix
Festuca obtusa
Glyceria canadensis
Oryzopsis racemosa
Zizania palustris
Carex albursina
Carex plantaginea
Carex platyphylla
Dulichium arundinaceum
Spirodela polyrhiza
Wolffia borealis
Wolffia columbiana
Cypripedium calceolus
Platanthera lacera
Carpinus caroliniana
Boehmeria cylindrica
Polygonum convolvulus
Rumex orbiculatus
Menispermum canadensis
Penthorum sedoides
Sedum hispanicum
Crataegus punctata
Fragaria vesca
Geum canadense
Acer nigrum
Malva neglecta
Epilobium leptophyllum
Cryptotaenia canadensis
Cynachum rossicum
Solanum ptycanthum
Veronica longifolia
Veronica scutellata
Symphoricarpos alba
Viburnum opulus var. americanus
Achillea ptarmica
Gnaphilium uliginosum

Solidago flexicaulis

Figure 35 provides a simplified illustration of the distribution of the significant flora of the South March Highlands study area which are described above. It indicates that most of these taxa are concentrated north of the railway track (especially near Heron Pond) and along the Hazeldean Escarpment.

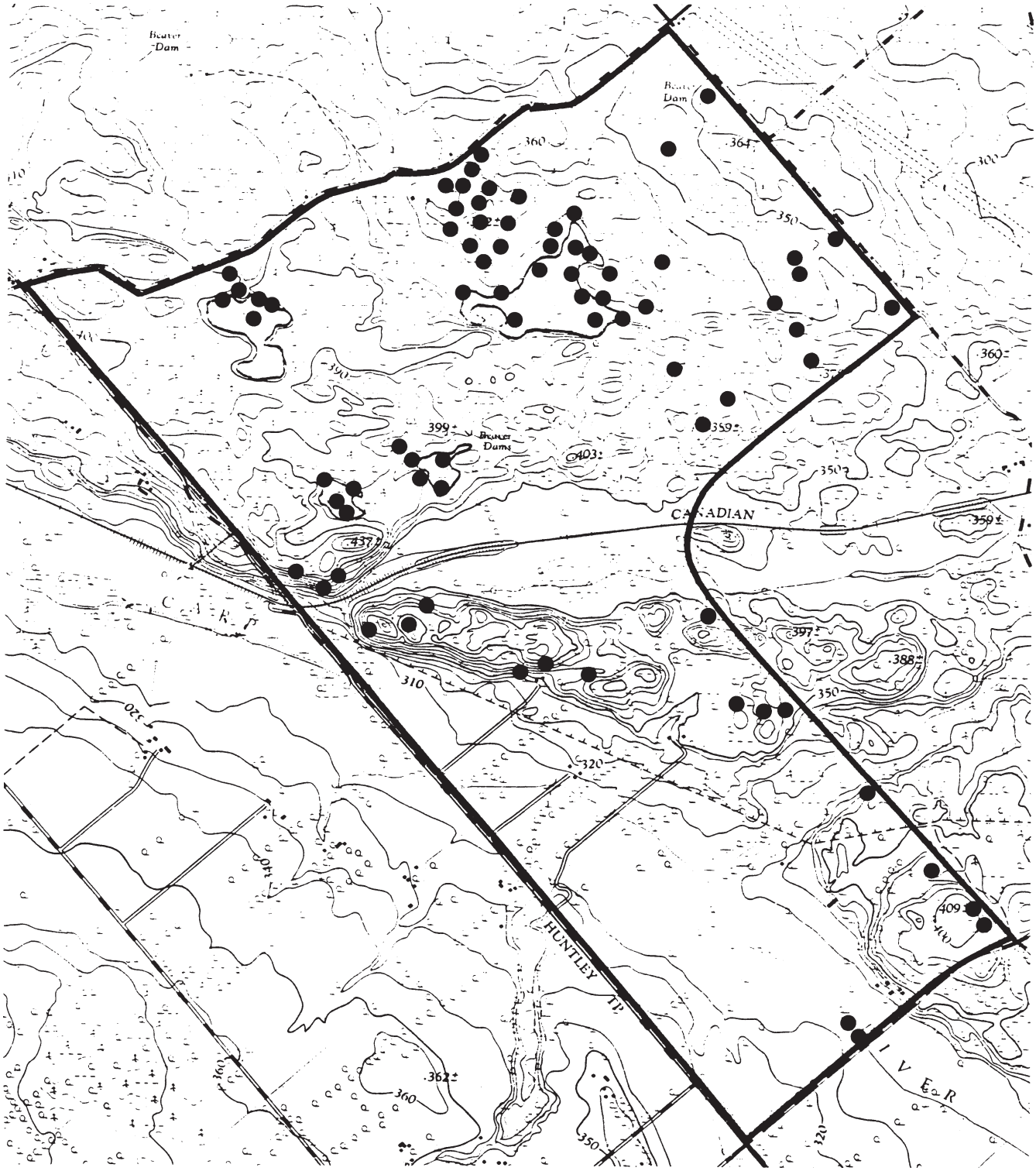

Figure 35: Sites for Significant Flora

3) Significant Fauna

The mammals, birds, amphibians and reptiles observed in the study area are listed in Appendix 2. The degree of significance of each of these faunal groups varies considerably and each will be assessed independently.

a) BIRDS

A number of the birds observed here are considered to be significant by various measures. For the purpose of this study, individuals which were observed moving through the site but having little or no interaction with it will not be considered evidence for significance. They will be listed but not discussed.

Provincially Significant

This includes species listed by the Ontario Ministry of Natural Resources Eastern Region Office (T. Norris, in lit.) as being of provincial significance in this area due to their rarity and/or declining population in Ontario.

Bald Eagle

Seen in migration only; not observed to utilize habitats in the study area.

Cooper's Hawk

Seen in migration only; not observed to use habitats in the study area.

Northern Goshawk

Seen in migration only, although suitable breeding habitat exists north and west of Heron Pond.

Red-shouldered Hawk

Seen in migration only; not observed to utilize resources of the study area.

Great Gray Owl

This rare northern raptor has been seldom observed in the study area and then only in winter time (Brunton and Pittaway 1971). During the winter of 1983/1984 Great Gray Owls were found in local concentration areas in the Ottawa-Hull District in scrubby field and thicket habitat where small mammal prey were common. One of these concentration areas was along the Carp River in the study area where four owls established territories which they maintained for much of the winter, feeding almost exclusively on Meadow Voles (pers. obs.; Figure 36).

A single Great Gray Owl maintained a hunting territory in February and March 1992 in the area between the southernmost 1984 territories (pers. obs.).

In addition to Great Gray Owls on some occasions, this area regularly supports a variable population of other wintering raptors, depending on prey conditions, snow pack, etc. These include Red-tailed Hawks, American Kestrel and Rough-legged Hawk (pers. obs.).

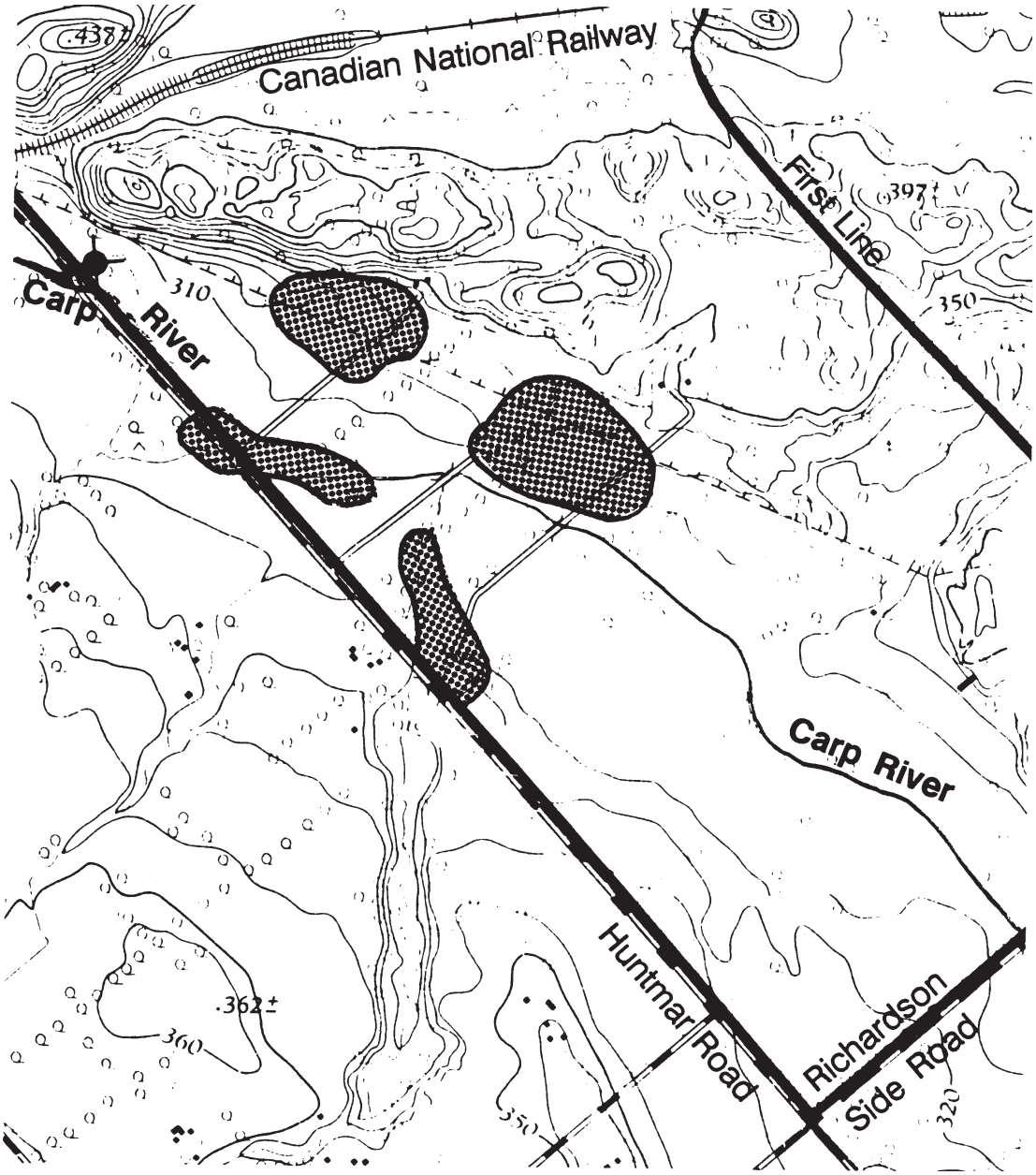

Figure 36: Wintering Territories of Four Great Gray Owls, Jan 1984 (shaded) and Blue-gray Gnatcatcher nesting area, 1986-1990 (dot)

Regionally Significant

This category includes species identified as rare or restricted in the Regional Municipality of Ottawa-Carleton (as described with each). The Ontario Ministry of Natural Resources maintains only a partial list of Regionally Significant bird species based on their Wetlands Classification needs (T. Norris, pers. comm.).

Three Regionally Significant species have been recorded here:

Great Blue Heron (Figures 37, 38)

This is a common species in southern Ontario and the Regional Municipality of Ottawa-Carleton but is rarely found breeding here, known only from the South March - Constance Bay area (Dunn 1987).

Two small colonies are known in the South March Highlands study area, one of ca. 7 active nests along the western shore of Heron Pond and another of ca. 8 active nests at the north end of West Pond. Both are in dead trees left standing when these ponds were flooded by beaver damming activity many years ago. the next closest breeding sites include a large colony northwest of Mud Pond near Shirleys Bay and a tiny (two nest) colony in the National Capital Commission Greenbelt at the Bell Northern Research facility at Moodie Drive, Nepean (pers. obs.). Tiny heronries were formerly known from Innis Point, Shirleys Bay and Moodie Drive, Stony Swamp Conservation Area, but neither apparently has been active since at least 1980 (Brunton 1980; 1982).

The Ontario Ministry of Natural Resources is concerned for the preservation of the nesting colonies of this species and has drawn up a set of management guidelines for the protection of heronries in Ontario to ensure the survival of the Great Blue Heron as a breeding species in the province (Bowman and Siderius 1984). It includes recommendations of a minimum no-development zone of 300 m around heronry.

Boreal Owl

A single owl was observed hunting in the scrubby field area near the gnatcatcher nest site (Figure 36) on 22 February 1992. The bird roosted for much of the day in the large willows on the West Carleton side of Huntmar Road (pers. obs.) - a highly atypical habitat. It undoubtedly had other more typical roosts in conifers along or near the Hazeldean Escarpment to the northwest of where it was observed.

The Boreal Owl is a northern (Boreal) species which only rarely is observed as a winter resident in the Regional Municipality of Ottawa-Carleton (OFNC 1985) and southern Ontario. The conifer stands in mixed forest in the study area, being close to scrubby meadows in which rodent prey can be captured, offer excellent wintering habitat for this species.

Blue-gray Gnatcatcher

This tiny animal is a feature of rich southern hardwood swamp forests but is rare in the Ottawa Valley which is north of its normal breeding range (Godfrey 1986; Sutherland & Garteshore 1985). It has been irregularly observed in the Ottawa area since the early 1960s (Brunton 1981). Breeding was suspected at a site along the Huntmar Road by the Carp River bridge (Figure 36) in 1984 and conclusive evidence (a nest) was discovered here in 1986. That was only the second breeding record for this southern species in the Ottawa Valley (Hanrahan and Di Labio 1986). Gnatcatchers have continued to nest at this site but in alternate years only (Di Labio, pers. obs.).

The first nesting was on the West Carleton side of the bridge area but the birds have utilized habitat in both Kanata and West Carleton. This species shares the sheltered area below the Hazeldean Escarpment with another more-typically southern bird, the Rough-winged Swallow, which breeds beneath the bridge.

Figure 37: Great Blue Heron (Young and Adult) on Nest, Heron Pond

Figure 38: Great Blue Heron (Adult) on Nest, West Pond

Locally Significant

This category includes those listed as uncommon breeding species or resident in the Regional Municipality of Ottawa-Carleton portion of the Ottawa District (cf. OFNC 1985). They include:

Barred Owl - uncommon to rare breeding species in the Region; nested near Shirleys Brook in the Kanata Lakes Study Area (Brunton 1992b) and likely also breeds in the Heron Pond area.

Pileated Woodpecker - uncommon across the Region; formerly very rare and feared to be on the verge of extinction (Billings 1856) but has slowly recovered much of its numbers; frequently observed in the maple woods north of Heron Pond.

Willow Flycatcher - uncommon and very local southern and western species; a small populations breeds in thicket swamp and upland scrub along the Carp River near the Huntmar Road bridge.

Common Raven - uncommon but increasingly more abundant scavenger which breeds in scattered locations across the Gatineau Hills of western Quebec and (very rarely) in the eastern portion of the Regional Municipality of Ottawa-Carleton; suspected of breeding in the Constance Lake area of Kanata - West Carleton (Di Labio and Martin 1989). Individuals or small groups are regularly observed cruising along the Hazeldean Escarpment and less frequently elsewhere in the South March Highlands, although no breeding evidence has been noted to date.

Ruby-crowned Kinglet - common migrant but rare breeding species off the Canadian Shield in southern Ontario (Klinkenberg 1985); breeds regularly in the Ottawa District only in the Gatineau Hills, where it is uncommon (OFNC 1985); found infrequently in the breeding season in cool, conifer-dominated forest north of the railway tracks.

Hermit Thrush - as with the Ruby-crowned Kinglet, above, this is a common migrant but rare breeding species off the Canadian Shield in southern Ontario (Knapton 1985); breeds regularly in the Ottawa District only in the Gatineau Hills where it is uncommon (OFNC 1985); found infrequently in the breeding season in cool, dry, open conifer-dominated or mixed forest north of the railway tracks.

Pine Warbler - an infrequently encountered but locally common species dependent (in the Ottawa area, exclusively) on mature and submature White Pine for breeding sites; probably more common in the past but reduced by the severe reduction in mature pine forest in eastern Canada (Eagles 1985). Although known from the "South March" (Morgan's Grant) area in the 1940s, it is no longer found in the vicinity of Kanata Lakes Study Area (Brunton 1992b); the small population along the First Line allowance at "Cathedral Grove" constitutes the only breeding population known on the Carp Ridge (and in Kanata ?).

b) MAMMALS

No provincially rare mammal species have been recorded in the South March Highlands study area (see Appendix 2). The White-tailed Deer is often considered a significant species because of its attraction as a game species, however. Wintering areas (deer yards) are particularly highly regarded by Ontario Ministry of Natural Resources wildlife managers, especially in non-hunting areas such as the city of Kanata.

Since 1982 White-tailed Deer have benefited from a series of relatively easy winters in the Regional Municipality of Ottawa-Carleton (*viz*, thin snow pack and relatively infrequent bouts of severe weather). This has resulted in a steady increase of the resident deer population in the entire South March Highlands (H. McLeod, MNR, pers. comm.).Deer were commonly recorded throughout the study area during 1991, particularly north of the railway tracks. This northern portion of the site above the Hazeldean Escarpment and west of Heron Pond supports particularly suitable deer wintering habitat and constitutes one of the larger such yards in the Regional Municipality of Ottawa-Carleton (H. McLeod, Ontario Ministry of Natural Resources).

A female Black Bear and two cubs (apparently a yearling and a two-year old) were observed on several occasions in the northwestern portion of the study area (near Huntmar Road) in spring and early summer, 1992 (A. and M. Davidson, pers. comm.). A single animal was reported in the Kanata Lakes area immediately east of the study area in 1991 (Brunton 1992b).

Although bears are regularly reported in parts of Ottawa-Hull, since at least the 1920s they have been seen only rarely south of the Ottawa River (Rand 1945). Sightings in the Regional Municipality of Ottawa-Carleton in recent years are typically autumn observations of passing individuals. The evidence of a family group of Black Bears establishing even a short-term occupancy in the South March Highlands, therefore, is exceptional and indicates the extent and relatively wild character of the study area.

Other larger mammal species such as Beaver, White-tailed Deer and Coyote (Brush Wolf) are often locally considered to be significant from the standpoint of their impact on property and livestock. These species are typically opportunists, taking advantage of an abundance of early successional vegetation and an absence of predation (the Beaver) or an artificially high food supply (White-tailed Deer and Coyote). The latter is a particular problem as a sheep predator; as many as 15 animals (Coyotes and the Coyote-dog hybrids with which they associate) have been observed around the Richardson sheep flock at the south end of the study area (W. Richardson, pers. comm.). Each of these species, while not significance in terms of rarity, can be a significant economic problem in particular situations. Such situations are usually dealt with within the regulations and criteria developed by Ontario Ministry of Natural Resources "nuisance wildlife" programs.

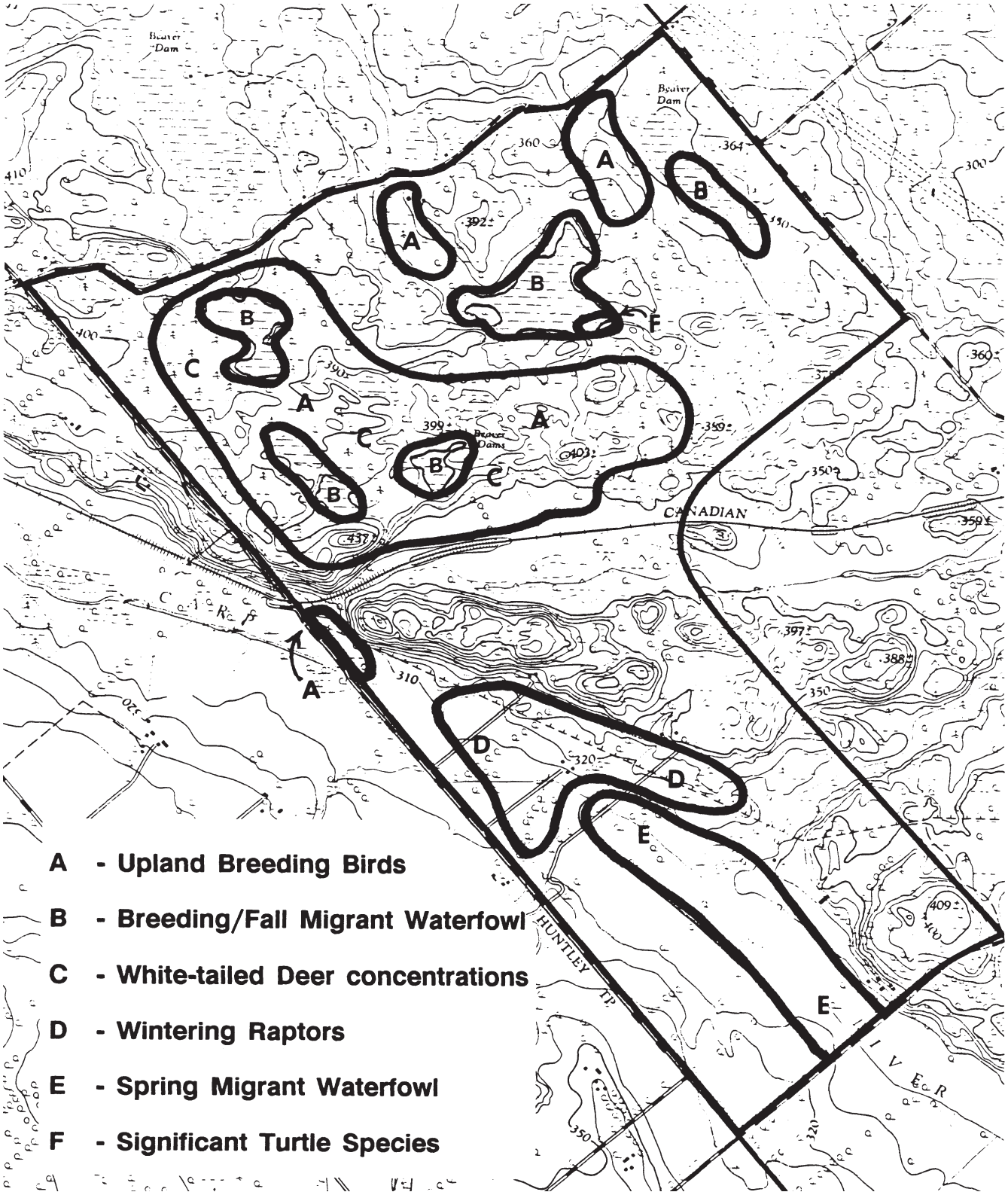

Figure 39: Areas with Significant Fauna

c) AMPHIBIANS and REPTILES

The list of Provincially and Regionally Significant species is derived from the eastern Ontario list prepared by the Eastern Regional office of the Ontario Ministry of Natural Resources (T. Norris, in lit.).

No Provincially Significant species have been recorded.

One Regionally Significant species (*viz*, Uncommon or Rare in the Cornwall - Ottawa-Carleton portion of the Eastern Region) occurs:

Blanding's Turtle

This reptile is a southern species of flooded deciduous swamps and log-choked pools across southern Ontario and is uncommon in the province (McCracken 1988). All Regional Municipality of Ottawa-Carleton records are from Ottawa, Nepean and Kanata (Cook 1981).

One large adult was observed in June 1991 in the Shirleys Brook system (north branch) along the north shore of Heron Pond by its outlet, basking on a log in the company of numerous Painted Turtles (pers. obs.). It is also reported from Watts Creek in the Kanata Lakes Study Area (Brunton 1992b, suggesting that it is widespread but uncommon in the South March Highlands.

Figure 39 provides a simplified illustration of the distribution of significant fauna in the South March Highlands study area. Many of these taxa are concentrated north of the railway track (especially near Heron Pond) and along the Carp River flats (breeding birds, migrating waterfowl, wintering raptors).

4) Significant Areas

An analysis of the significant vegetation, flora and fauna indicates that certain portions of the study area best represent these values. These are illustrated in Figure 40. These measures of significance are the criteria utilized by the Ontario government in assessing the relative ecological merits of candidate ANSI (Area of Natural and Scientific Interest) sites (cf. Lindsay 1986; Macdonald 1987; Brunton 1992), though interpreted more rigorously than typically applied in such studies (cf. Figure 43).

The criteria utilized for assessing ecological significance in the South March Highlands Study Area are as follows:

REPRESENTATION Representation of the characteristic natural features of the larger area within the study area is situated (Kanata; Regional Municipality of Ottawa-Carleton) is of primary importance. Dominant vegetation - landform features are given special emphasis.

DIVERSITY Diversity is evaluated in terms of the number and range of natural landscape features found within a site. A larger number of landscape features increases the value of a site.

CONDITION The degree of past disturbance from human activities such as logging, fire, grazing and drainage is considered, as are on-going impacts such as utility corridors and recreational activities. It is understood that no site is ecologically pristine in southern Ontario.

ECOLOGICAL CONSIDERATIONS Such aspects as size, shape, buffering from adjacent land use and watershed location are considered. Larger sites are preferred to smaller sites because of their greater potential for ecological stability. Where only remnant sites remain,

however, areas clustered together are considered to be of higher significance than others more widely separated and, thus, more affected by adjacent land use. Headwater areas and entire watershed units where some control over environmental inputs can be achieved, are also preferred over downstream sites.

SPECIAL FEATURES Rare and endangered species, colonial bird nesting sites, species of biogeographic interest and critical wildlife habitat are some of the special considerations evaluated. While of secondary importance to the broader, landscape-oriented criteria, sites containing such special features contribute to life science richness.

Figures 34, 35 and 39 offer simplified illustrations of the geographic distribution and extent of significant vegetation, floral and faunal values (respectively). The tendency for significant values in one category to be represented in areas supporting significant values for other categories resulting from this combination in frequently encountered in such investigations. That reflects that ecological processes influence a variety of the natural environment elements of a particular area in a similar manner.

Combining the values indicated in Figures 34, 35 and 39 and providing consideration of other natural environment requirements such as ecological buffers, connecting corridors, etc., is instrumental in the identification of significant areas (Figure 40) and candidate NEAs (Figure 42).

Specific areas may have additional, completely legitimate values which reflect cultural, social or economic criteria pertinent to Kanata and the Regional Municipality of Ottawa-Carleton. It is important to appreciate that it is beyond the scope of a natural environment assessment to assimilate such considerations.

Figure 40 illustrates an amalgamation of various significant floral, faunal and vegetation data and identified the areas which may be considered significant from a variety of floral, faunal and/or vegetation perspectives.

Three broad categories of ecological priority are defined:

HIGH PRIORITY - areas containing Provincially Significant landform/vegetation complexes (e.g. representative and extensive natural habitats, exceptional natural diversity, exceptional floral/faunal assemblages, etc.).

MODERATE PRIORITY - areas containing Regionally Significant landform/vegetation complexes (e.g. somewhat representative, natural habitats, substantial biodiversity, significant floral/faunal assemblages, etc.).

LOW PRIORITY - other valuable floral and faunal, aesthetic, cultural, economicbiological values, usually in a local (e.g. Kanata) context.

Six areas are considered to have the highest level of natural environment significance in the South March Highlands study area (High Priority - Figure 40). All contribute significantly to the proposed South March Highlands ANSI (Brunton 1992). The areas of particular significance (in declining order of natural environment importance) are:

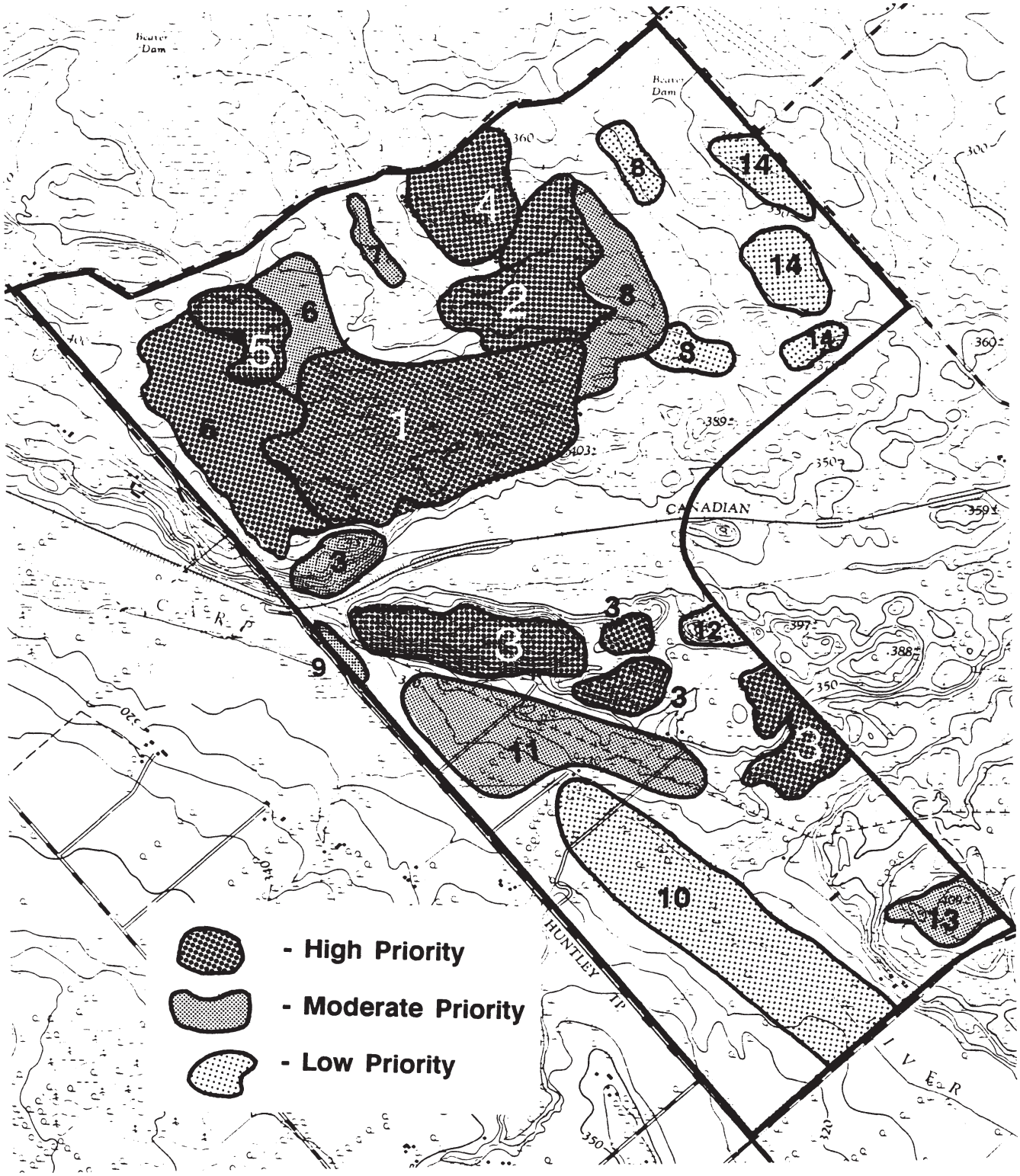

Figure 40: Significant Areas
(Numbers indicate particular significant areas - see text)

1) **Pond and Barrens Complex**

(Including Habitats ow, 2, 8, 9, 10, S, R, M)

- contains the most extensive beaver pond and bedrock outcrop area; relatively little disturbed early successional upland forest and scrub (wildest portion of the study area); ponds heavily utilized by waterfowl and in Class 1 Wetland complex; exhibits a "northern" character rare in the South March Highlands and the Regional Municipality of Ottawa-Carleton; headwaters of Shirleys Brook; core area of major deer yard; critical element of the proposed South March Highlands ANSI (Brunton 1992).

2) Heron Pond

(Including Habitats ow, M, 1, 10, R)

- supports rich and Regionally unique aquatic flora; significant wildlife populations, including Great Blue Heron colony and Blanding's Turtle and in Class 1 Wetland complex; adjacent sandstone rock flats supporting rare flora and unique in Kanata; critical element of the proposed South March Highlands ANSI (Brunton 1992).

3) Hazeldean Escarpment

(Including Habitats 3, 5, 7, 8, 9, R, S)

- unique landscape for Kanata with abundant rock barrens and intermixed upland hardwood forest, including submature maple forest; important year-round hunting and migration route for raptors; stand of large White Pine ("Cathedral Grove") in young Sugar Maple forest; significant flora on slopes and summit; important element of the proposed South March Highlands ANSI (Brunton 1992).

4) Heron Pond Hardwoods

(Including Habitats 3, 4, 7, 8, M)

- submature Sugar Maple forest with richest compliment of significant flora in the study area; within major deer yard area.

5) West Pond

(Including Habitats ow, 2)

- contains significant flora and vegetation and a Great Blue Heron colony; headwaters of Marchhurst Creek and in Class 1 Wetland complex; relatively undisturbed shoreline and backshore area.

6) West Pond Forest

(Including Habitats 3, 7, 8, 9, R)

- core area of major deer yard; complex early successional vegetation with strong "northern" character; contains a portion of the Shirleys Brook headwaters.

The other less significant (Moderate and Low Priority) sites (not in order of significance) are:

- *West Pond area* (7) - relatively undisturbed, "northern" mixed forest in deer yard area between West Pond and the major barrens area and in Class 1 Wetland complex;
- *SE shore of Heron Pond* (8) - rich hardwood and mixed forest habitat with significant flora and significant vegetation and in Class 1 Wetland complex; marsh and thicket swamp habitats;
- *Gnatcatcher swamp* (9) - deciduous swamp forest and thicket swamp by Carp River bridge supporting breeding Blue-gray Gnatcatcher and Willow Flycatcher populations.
- *Carp River flats* (10) - spring-flooding agricultural fields heavily utilized by migratory waterfowl.
- *Raptor feeding area* (11) - hunting territory utilized by wintering raptors (hawks, owls);
- *Old Carp Road mixed forest* (12) - mixed forest supporting "northern" breeding birds and providing shelter for White-tailed Deer;
- *First Line Upland Forest (13)* - dry outcrop forest with conifer dominants;
- *Second Line Uplands* (14) - young upland mixed forests with large White pine element;
- *Second Line Wetland* (15) - large thicket swamp and marsh complex along Shirleys Brook and in Class 1 Wetland complex.