Cold Creek Conservation Area Management Plan

Prepared by:
The Cold Creek Conservation Area Management Plan Advisory Committee
&
Toronto and Region Conservation

December, 2002

Toronto and Region Conservation for The Living City

Humber River

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Cover Photography by Rosemary Hasner

This Vision Statement was developed by the Cold Creek Conservation Area Management Plan Advisory Committee and is accompanied by six values which should guide our actions.

VISION STATEMENT

The Cold Creek Conservation Area is an ecologically diverse and sustainable natural area. It is a model of sustainability that can be achieved by protecting and enhancing the area's natural environment while providing outdoor education, cultural and heritage experiences and recreation. Cold Creek Conservation Area is continually improved and managed through self-sustaining revenues and community-based stewardship.

VALUES

To achieve the vision, we should:

- Ensure that this diverse ecosystem is continually protected, monitored and enhanced.
- Ensure that the lands are accessible to the public and provide a learning opportunity about the natural environment, cultural and heritage resources and sound environmental practices.
- Ensure that public uses do not negatively impact the natural environment.
- Encourage adjacent land use that results in maximum environmental benefits and contributes to the form, function and connectivity of the area.
- Ensure that the principles and goals of the Humber Watershed Management Strategy – ***Legacy: A Strategy for a Healthy Humber*** are supported in the Cold Creek Management Plan and activities and uses contribute to the watershed management mandate.

Photography by Rosemary Hasner

Photography from TRCA Archives

COLD CREEK CONSERVATION AREA MANAGEMENT PLAN

ADVISORY COMMITTEE MEMBERS

C. Angelotti .....Resident
Linda Boak .....Girl Guides
Donna Cain .....Friends of Cold Creek
Marshel Cohen .....Resident
Jacquie Corneman .....Resident
Gordon Craig .....Resident
Judy Craig .....Resident
Don Frigo .....Ontario Bird and Dog Conservation Association
Dennis Ritche .....The Labrador Retriever Club of Ontario
Ralph Glagau .....Humberlea Church of God
Jerry Gorman .....Humber Valley Heritage Trail Association
Ken Hofstetter .....Boy Scouts
Vera Howlett .....Friends of Cold Creek
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Anne Kong .....Resident
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Linda Pabst .....Councillor, Township of King
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Yamile Rijo .....Friends of Cold Creek
Liz Sagermann .....Resident
Brenda and Cliff Smith .....Residents
Susan Swail .....Humber Watershed Alliance
Paul and Sandra Venier .....Residents
Bill Wilson .....Humber Watershed Alliance
Eric Worsley .....Oak Ridges Trail Association

EXECUTIVE SUMMARY

The Cold Creek Conservation Area consists of 190 hectares within the Humber River watershed (a designated Canadian Heritage River). The Area is located on Concession Road 11, three kilometres north of the King Side Road midway between the communities of Bolton and Nobleton in King Township within the Regional Municipality of York. A portion of the property lies within the "Natural Linkage" policy area of the Oak Ridges Moraine. The Conservation Area is significant due to its unique natural features. Existing mixed conifer swamp forest contains black spruce which is rare in Southern Ontario and is home to a wide array of plant and animal species.

Historically, the property was used for outdoor education and recreation programs and included many facilities dedicated to the outdoor sports enthusiast. The Cold Creek Conservation Area was closed to formal public use in 1990 due to financial constraints, resulting from the decision to close the shooting range, and loss of associated revenues as well as other corporate financial pressures.

The Toronto and Region Conservation Authority (TRCA) initiated the preparation of a comprehensive management plan for the Cold Creek Conservation Area in January 2002. This Management Plan includes a description and evaluation of the property based on relevant plans and policies, landscape features and functions, environmental constraints and opportunities. This Management Plan updates our knowledge of landscape features, condition of infrastructure and identifies needs and opportunities in a time of changing financial conditions. The Plan provides a framework for the TRCA to determine priorities for future initiatives including the protection of natural features, habitat regeneration and public uses.

An Advisory Committee was established to undertake the Cold Creek Conservation Area management planning process. The Cold Creek Conservation Area Management Plan is the result of over eight months of work by this committee and TRCA staff. Members of the Advisory Committee reviewed background information and assisted with the development of management zones and resource management recommendations. Residents and stakeholders were also invited to express their concerns, hopes and suggestions for the Cold Creek Conservation Area at two public forums.

Members of the Advisory Committee prepared a vision for the Cold Creek Conservation Area to guide the long term management of the property.

"The Cold Creek Conservation Area is an ecologically diverse and sustainable natural area. It is a model of sustainability that can be achieved by protecting and enhancing the area's natural environment while providing outdoor education, cultural and heritage experiences and recreation. Cold Creek Conservation Area is continually improved and managed through self-sustaining revenues and community-based stewardship".

The Management Zones proposed in this Management Plan present an "environment first" philosophy where the Conservation Area is managed as a natural system and prevention is emphasized over remediation. Cold Creek Conservation Area presents an excellent opportunity for the first-time implementation of the management zone strategy based on TRCA's **Terrestrial Natural Heritage Approach** which emphasizes two principles:

- that rare species protection is not enough for ensuring regional health, and
- that protection of more than "significant sites" is needed to ensure regional health.

Instead of treating natural areas individually (e.g., Environmentally Significant Areas (ESAs), Areas of Natural and Scientific Interest (ANSI), and Classified Wetlands), the Terrestrial Natural Heritage Approach explicitly recognizes the indivisibility and interconnectedness of parts of the natural system. Therefore, the approach evaluates the form and function of the natural cover in the Cold Creek Conservation Area in the determination of the targeted natural system presented in this plan.

Given the current pressures of urbanization affecting the condition of natural cover throughout the TRCA's jurisdiction, it is paramount to approach the management of any natural area in a way that addresses that particular site in the larger regional context. Hence, it is recommended that decisions at the site level be made in context of the larger natural heritage system of which the property is located.

The four management zones for the Cold Creek Conservation Area are Nature Reserve, Natural Environment, Restoration, and Public Use. They are defined as follows:

Nature Reserve:

Existing natural cover supporting Species of Concern or Vegetation Communities of Concern, and interior habitat portions of the "targeted natural system" where the natural system is fully functioning at all levels. (The patch size and shape are providing maximum habitat interior and the surrounding matrix exerts completely natural, positive influences).

Natural Environment:

Existing and targeted natural cover within the targeted natural system, which does not currently meet the criteria of the Nature Reserve Zone.

Restoration:

Primary Restoration: Lands within the Nature Reserve Zone that have been designated for active restoration to achieve the full potential of the "targeted natural system".

Secondary Restoration: Lands within the Natural Environment Zone that have been designated for passive restoration (ecological succession) to achieve the full potential of the "targeted natural system".

Public Use:

Areas with existing or potential recreational and educational uses, facilities, or services.

In comparison to past and existing land uses, the land uses proposed within the Cold Creek Conservation Area Management Plan will result in the amount of natural lands increasing by approximately 10%. This will be achieved by implementing the recommendations related to the Restoration Zones (Primary 16 hectares and Secondary 26 hectares). The forest interior will almost double in size (existing 35 hectares to proposed 66 hectares). In terms of the entire property, the interior forest component will increase by 16% (existing 19% to proposed 35%). Eighteen hectares or 9% of the property have been dedicated to public use as compared to 40 hectares or 21% in the past. This is in keeping with the vision of protecting and enhancing the significant ecosystem in Cold Creek Conservation Area.

The current economic climate is one of continuing fiscal restraint in the public sector. The future public use, operation of facilities, and access to lands at Cold Creek must respond to these conditions. Reduced financial support by traditional funding sources for public use of Conservation Authority lands means new revenue generating initiatives and partnerships that will need to be created in order to achieve the vision of a self-sustaining Cold Creek Conservation Area.

Proposals for public use alternatives in designated zones will be invited. Each proposed use will be thoroughly reviewed to ensure it complies with the vision and is in accordance with the recommendations of the Management Plan.

It is anticipated that Cold Creek Conservation Area will become a model of sustainability that will be achieved by protecting and enhancing the area's natural environment while providing environmental, recreational and outdoor educational benefits to the community through self-sustaining revenues and community stewardship. Hence, it is imperative that the management of the property be based on sound environmental management principles, collaboration with partner municipalities, interest groups and the local community.

The Management Plan provides guidance to local, regional and provincial governments, and the TRCA in making land use decisions in such a manner that it ensures the long-term health and integrity of the natural system is maintained.

This plan also provides direction on appropriate recreation or other public uses and community stewardship. Establishment of a Community Stewardship Committee is recommended to assist with the implementation of this Management Plan. This committee could assist in the review of proposed public uses and related activities for the property. Another important role of the Community Stewardship Committee will be to assist the Authority in planning and implementing site maintenance and environmental protection and restoration activities.

The Cold Creek Management Plan will undergo a review every five years. If major revisions are necessary to reflect changing environmental, social, or economic conditions, they will only be done after consultation with affected groups and individuals. Revisions will be in keeping with the original stated vision and objective of the Plan to protect the natural, recreational and educational values of the property.

Finally, to help ensure that planning of future development within the Cold Creek Subwatershed proceeds in an environmentally sound manner, and to ensure the long-term sustainability of the significant natural features of the property are protected and enhanced, the Cold Creek Management Plan recommendations will be integrated into the process for developing a Cold Creek Subwatershed plan in the future.

Equisetum scirpoides – dwarf scouring rush (L3 species)
Photography by Natalie Iwanycki

CHAPTER 1
INTRODUCTION

1.1 TOWARDS A LIVING CITY REGION

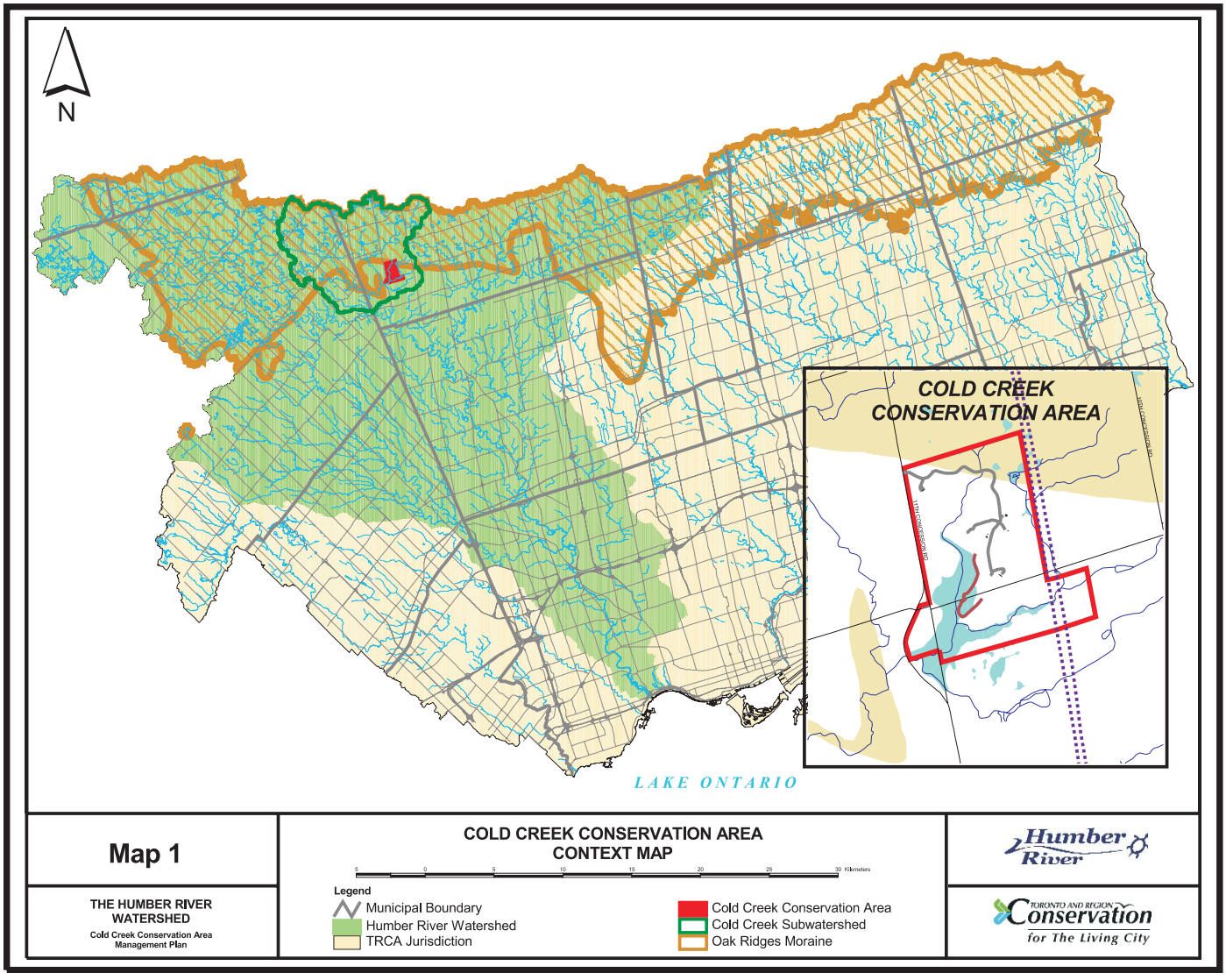
Through their mission and mandate to address a Living City Region, Toronto and Region Conservation (TRCA) is committed to community partnerships with all sectors of society, to encourage environmental stewardship and build on innovative thinking about environmental health, social responsibility and sustainable economies.

TRCA's vision of a Living City Region has three objectives:

1. **Healthy Rivers and Shorelines** – safe, clean, vibrant rivers and shorelines within nine watersheds of the region.
2. **Regional Biodiversity and Greenspace** – a rich variety of animals and plants that thrive in a network of greenspace.
3. **Sustainable Living through Education** – People engaging in environmentally friendly practices.

The Cold Creek Management Plan strives to achieve the TRCA Living City Program's objective through the application of practical initiatives such as the Terrestrial Natural Heritage Approach and providing direction to guide actions for the long-term sustainability of the property.

TRCA's **Terrestrial Natural Heritage Approach** that has been applied to this Management Plan recognizes the implications of rapid conversion of natural and



Sarracenia purpurea- pitcher plant (L1 species)
Photography by Jeremy Ind

agriculture cover into urban expansion areas in the Greater Toronto Area. This approach is based on two principles:

- that rare species protection is not enough for ensuring regional health, and
- that the protection of more than "significant sites" is needed to ensure regional health.

Instead of treating natural areas individually (e.g., Environmentally Significant Areas (ESAs), Areas of Natural and Scientific Interest (ANSI), and Classified Wetlands), the **Terrestrial Natural Heritage Approach** explicitly recognizes the indivisibility and interconnectedness of parts of the natural system. Therefore, the approach evaluates the form and function of the natural cover in the Cold Creek Conservation Area in the determination of the targeted natural system presented in this plan. Furthermore, the approach is based on the relationship the Cold Creek Conservation Area has with the Cold Creek Subwatershed and the Humber Watershed. It recommends that decisions at the site level be made in context of the larger natural heritage system of which the property is located.

1.2 THE TRCA AND CONSERVATION LANDS

The goal of TRCA in managing conservation lands is:

"To ensure the environmental stewardship of Authority lands and to continue to bring into ownership additional conservation and hazard lands essential for achieving a healthy regional environment and sustainable communities" (Business Plan of the TRCA 2002-2006)

Currently, Authority lands are managed under the following categories:

- Management Agreements
- Special Agreements and Rentals
- Conservation Parks
- Field Centres
- Conservation Easements
- Resource Management Tracts and other Authority Lands

The objectives that the TRCA will aim to achieve when planning for resource management and public uses at Cold Creek are to:

1. Provide environmental protection and regeneration of the natural heritage system.
2. Provide the community with opportunities to use and enjoy the greenspace system.
3. Use and manage the land and its resources in an environmentally responsible way.
4. Foster awareness, understanding and commitment to environmental stewardship.
5. Develop and implement programs and partnerships that protect and enhance the form, features and functions of the Oak Ridges Moraine (ORM), i.e., groundwater, natural heritage, land securement, headwater protection and policy framework.
6. Increase revenue from program and service fees and compatible uses.
7. Work effectively with member municipalities, the provincial and federal governments and the Conservation Foundation and other stakeholders to manage the property.

1.3 COLD CREEK CONSERVATION AREA

The Cold Creek Conservation Area (CCCA) consists of 190 hectares[1] within the Humber River watershed (a

1. By legal summary, the property is 182 hectares. The area has been slightly over-estimated in this plan due to the methodology used for field survey.

Aerial view of Cold Creek Conservation Area. *Photography by Rosemary Hasner*

designated Canadian Heritage River). The Area is located on Concession Road 11, three kilometres north of the King Side Road midway between the communities of Bolton and Nobleton in King Township within the Regional Municipality of York.

Cold Creek is a headwater tributary of the Humber River that flows from the Oak Ridges Moraine into the main Humber River south-west of the Conservation Area. The property is part of the larger Cold Creek subwatershed. The majority of the Cold Creek subwatershed is located on the Oak Ridges Moraine and serves a vital groundwater recharge function. The Conservation Area is significant due to its unique natural features. Existing mixed conifer swamp forest contains black spruce which is rare in Southern Ontario.

Historically, the property was used for outdoor education programs and included many facilities dedicated to the outdoor sports enthusiast. It was closed to the general public in 1992. At the time of preparing this Management Plan in 2002, a portion of the property was leased to the Humberlea Church of God and was used for passive outdoor recreational activities.

Cold Creek Conservation Area is a small ecosystem which is part of several larger significant natural systems such as the Cold Creek Subwatershed, The Oak Ridges Moraine, and the Humber River watershed. Watershed components are all inter-related and interdependent. Consequently, the health of upstream components directly determines the health and functions of areas downstream. Watershed health is achieved when all watershed components are managed together in an integrated and complementary fashion in cooperation with residents and stakeholders.

The Cold Creek Management Plan will contribute to the on-going implementation of the Humber Watershed Management Strategy – ***Legacy: A Strategy for a Healthy Humber***. This Management Plan also looks beyond the Cold Creek Conservation Area property into subwatershed level management issues and opportunities such as maximizing natural cover, increasing landscape connectivity, protecting hydrological recharge areas and ground and surface water quality. This is important in supporting a healthy and sustainable regional ecosystem.

This Management Plan is intended to guide collective decision-making respecting future growth and resource management in the headwater areas of the Humber River within the Township of King.

CHAPTER 2

DEVELOPING THE MANAGEMENT PLAN

Surrounding Cold Creek are rural residential communities and businesses that are concerned with the long-term health and viability of the area. Together with the local and regional municipal governments, these groups have all expressed interest in being involved with the planning and management of Cold Creek. They see a need for a wider variety of protection and ecological regeneration projects, as well as outdoor recreation and education programs at Cold Creek Conservation Area.

2.1 TRCA DIRECTION TO PREPARE THE COLD CREEK CONSERVATION AREA MANAGEMENT PLAN

At meeting #8/01 held on October 12, 2001, the TRCA approved Resolution #A203/01 which states in part:

> *"THAT staff be directed to establish a Community Advisory Committee including local residents, community groups, business representatives, agency staff, and area councillors to assist with the development of a Management Plan to guide future uses of the Cold Creek Conservation Area."*

The Toronto and Region Conservation Authority initiated the preparation of a comprehensive management plan for the Cold Creek Conservation Area in January 2002.

2.2 PURPOSE

The TRCA manages nine watersheds and a 52 kilometre stretch of the Lake Ontario shoreline. To do this, the TRCA uses an integrated watershed management approach. Its mandate emphasizes proper environmental management, ensuring that there is long-term health and sustainability.

In the past few years, the Authority has received proposals for several projects for the Cold Creek Conservation Area lands. In order to effectively deal with competing interests and prepare for changes, we need to plan now so that we can preserve the Humber River's environmental and heritage legacies for future generations. We also need to plan so that the public may enjoy the area through appropriate land use protection, recreation and other uses. A management plan is needed to be used as a framework to determine priorities for future initiatives. It will enable us to update our knowledge on landscape features, condition of infrastructure and identify needs and opportunities in a time of changing financial conditions.

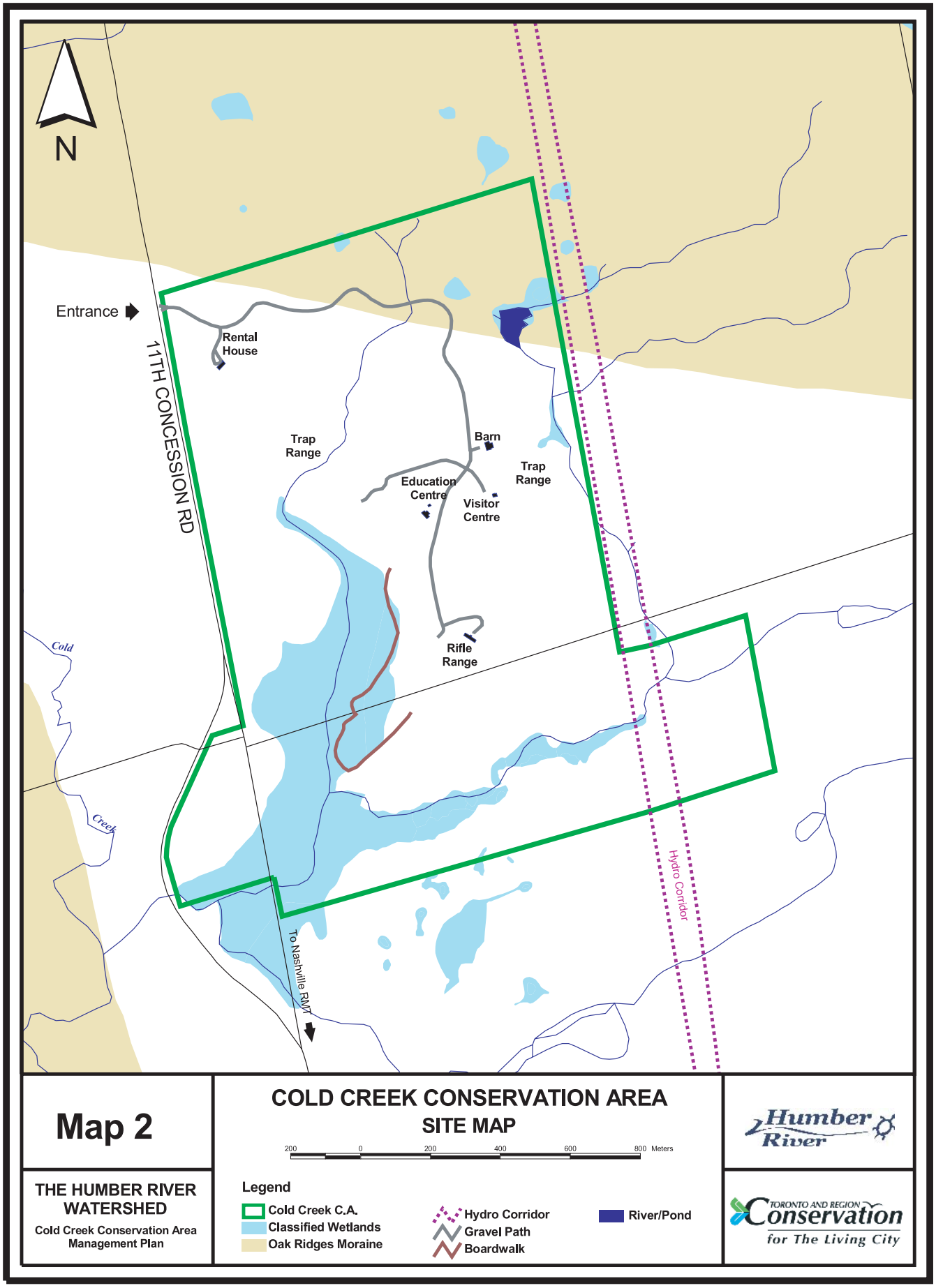
The Management Plan includes a description and evaluation of the property based on relevant plans and policies, landscape features and functions, environmental constraints and opportunities. The Plan will identify specific management zones within which a certain type of activity may be undertaken. For example, within a Natural Environment Zone, habitat creation work may occur; within a Public Use Zone, passive recreation activities may be recommended. The Plan will provide a framework for the TRCA to determine priorities for future initiatives including the protection of natural features and habitat regeneration. The Management Plan will also determine the ecological appropriateness of any proposed public use and ensure that the integrity and diversity of the area are maintained.

The Mission Statement for the TRCA states that "Toronto and Region Conservation Authority is a partnership organization committed to the protection, restoration and celebration of Toronto and Region's natural environment through the development and application of watershed plans, innovative environmental science and education programs."

The Authority acts in the community's interest through advocating and implementing watershed management programs that:

- maintain and improve the quality of the region's lands and waters
- contribute to public safety from flooding and erosion
- provide for the acquisition of conservation and hazard lands
- enhance the quality and variety of life in the community by using its lands for inter-regional outdoor recreation, heritage preservation and conservation education.

Planning efforts have shown that residents and community groups have grown more concerned with the impact of land use change on the remaining natural landscapes within the GTA. At the same time, user groups, businesses and municipalities have expressed a growing interest in using public lands for a variety of outdoor recreation, ecological restoration and other activities. The provision of public uses on TRCA land must consider economic factors (i.e., budgets, expenditures, benefits), the needs of the community and the needs of the natural landscape to ensure it is protected and managed properly. This Management Plan will strive for the full support of all levels of government, and will seek the commitment of


N
Entrance
Rental House
11TH CONCESSION RD
Trap Range
Barn
Education Centre
Visitor Centre
Trap Range
Rifle Range
Cold
Creek
Hydro Corridor
To Nashville RMT
Map 2
COLD CREEK CONSERVATION AREA
SITE MAP
200 0 200 400 600 800 Meters
THE HUMBER RIVER WATERSHED
Cold Creek Conservation Area Management Plan
Legend
Cold Creek C.A.
Classified Wetlands
Oak Ridges Moraine
Hydro Corridor
Gravel Path
Boardwalk
River/Pond
Humber River
Toronto and Region Conservation
for The Living City

the community and volunteer organizations to establish relationships and work cooperatively to protect, restore, and celebrate the Cold Creek Conservation Area.

The objective of the Cold Creek Conservation Area Management Plan is to provide guidance to local, regional and provincial governments and the TRCA in making land use decisions in such a manner that ensures the long-term health and integrity of the natural system is maintained. This Plan will also provide direction on appropriate recreation or other public uses and community stewardship.

2.3 LOCATION, SITE DESCRIPTION AND LAND USE

The Cold Creek Conservation Area is located on Concession Road 11, three kilometers north of the King Side Road within the Township of King midway between the communities of Bolton and Nobleton.

The planning area consists of 190 hectares of conservation lands within the headwater area of the Humber watershed. A portion of the property lies within the "Natural Linkage" policy area of the Oak Ridges Moraine. Two intermittent streams traverse the area. Cold Creek flows permanently, supports coldwater habitat, and discharges into the main branch of the Humber River south-west of the property. Cold Creek Conservation Area has been designated as an Area of Natural or Scientific Interest (ANSI), and a Biological Environmentally Sensitive Area (ESA). The coniferous swamp in Cold Creek is designated as ESA 54. The landscape surrounding Cold Creek is either agriculture or rural residential.

The Cold Creek Conservation Area was originally developed to provide outdoor recreation and education opportunities. The facilities developed at Cold Creek include an education centre, rifle range and a trap range. In 1979, the construction of a control building adjacent to the trap range provided washrooms, warming area, ammunition storage and limited refreshment facilities. Also included was a range for archery and a man-made pond used for dog training. A 300 metre long elevated boardwalk was also constructed in the wetland, which permitted visitors to view the wetland without severely impacting the area.

In the winter months, Cold Creek was utilized for husky dog sled trials and cross-country skiing. The Cold Creek Conservation Field Centre, which was established in

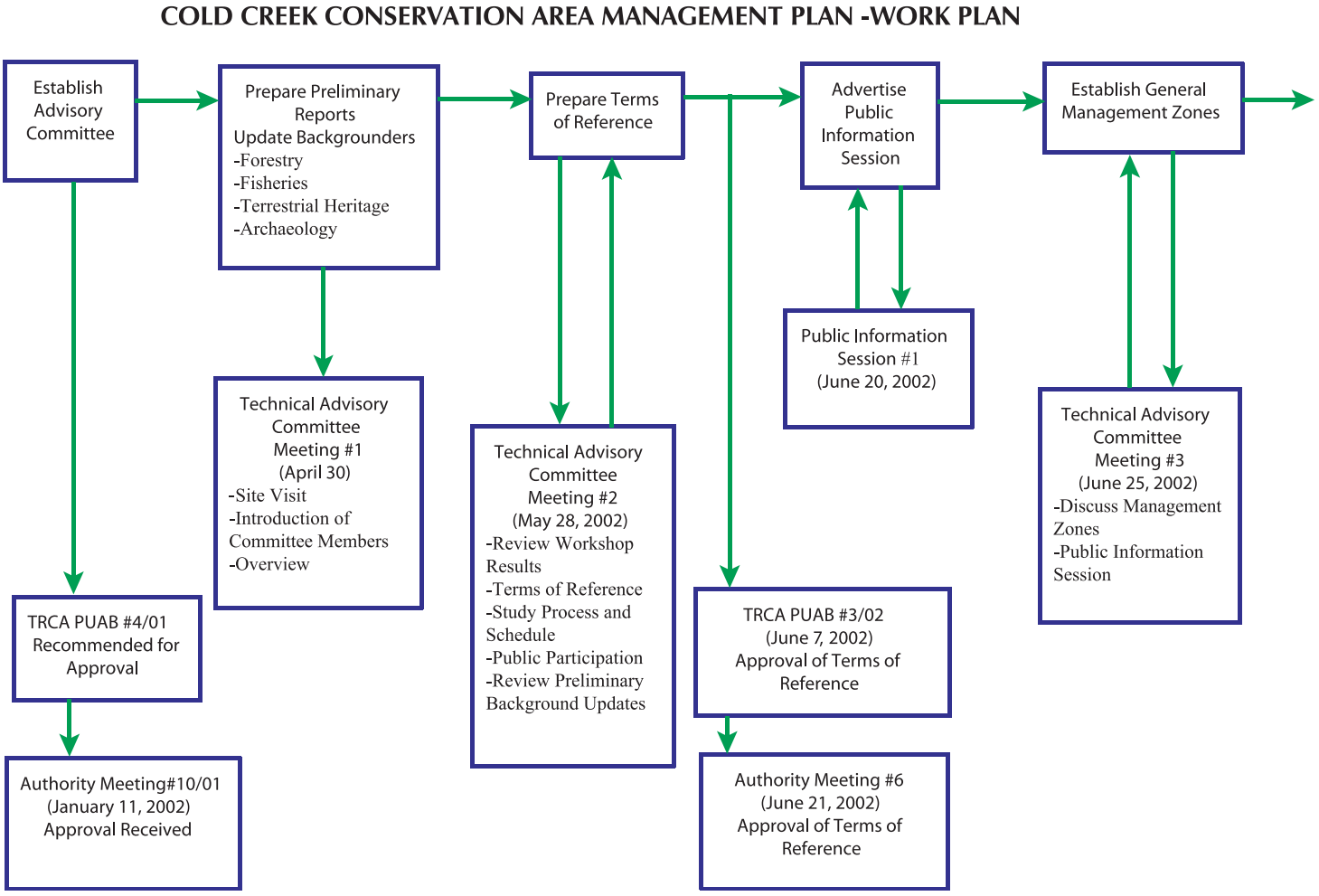


Figure 1: Management Plan Development Process.

September, 1968, was set up to accommodate school classes on a day use basis during the week and to provide a meeting place on weekends for sports clubs such as the Toronto Anglers and Hunters.

The Cold Creek Conservation Area was closed to formal public use in 1990 due to financial constraints resulting from the decision to close the shooting range and loss of associated revenues, as well as other corporate financial pressures.

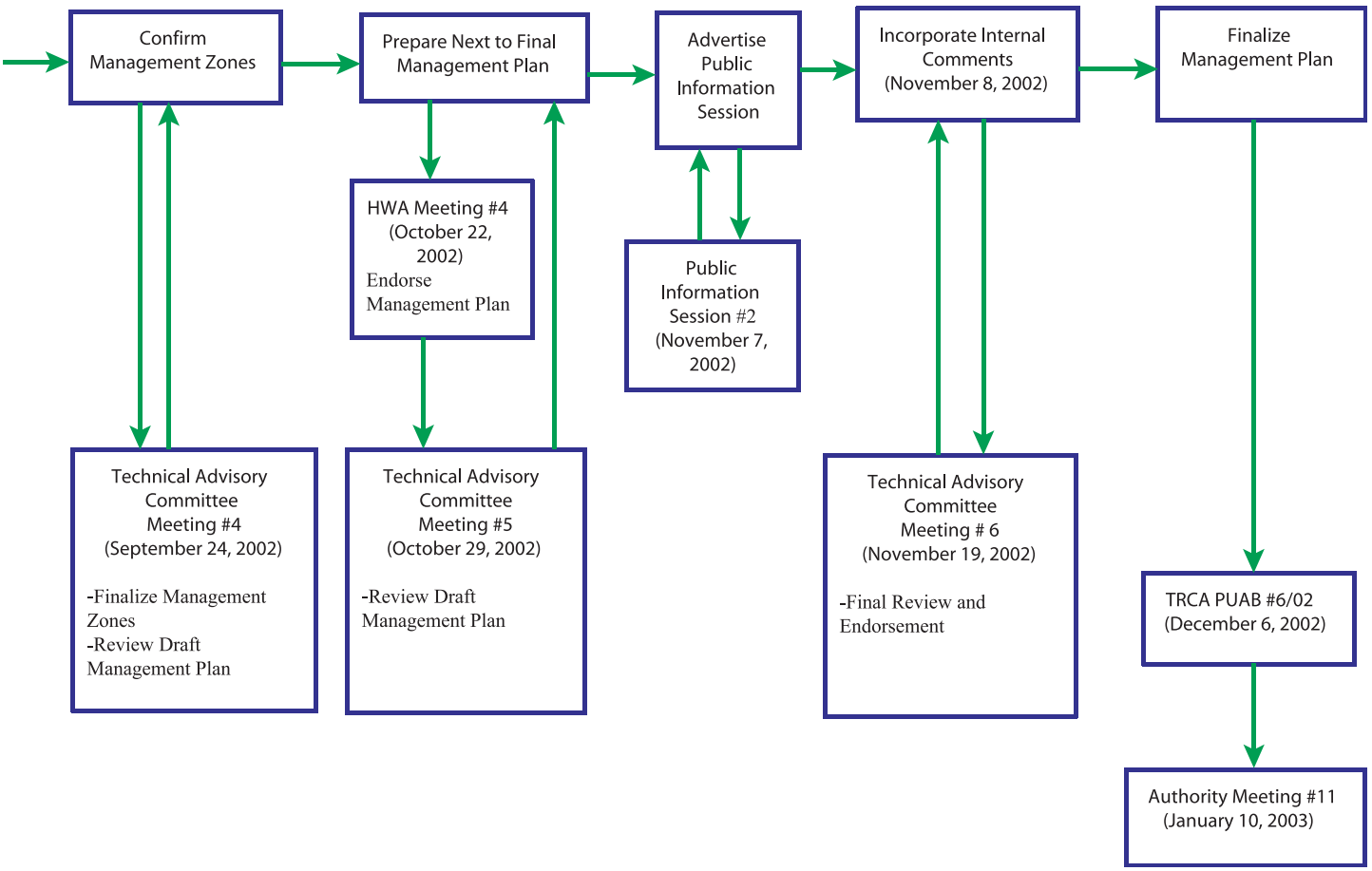
In 2001, a portion of the property was leased to the Humberlea Church of God for outdoor recreational activities. Informal public use of the area has continued for passive recreation purposes.

2.4 PROCESS FOR DEVELOPING THE MANAGEMENT PLAN

The Management Plan was undertaken in two phases. Phase I included background studies of existing resources and facilities and establishment of general management zones for the property. The Advisory Committee was also established in Phase I to assist TRCA staff with the development of a vision statement for the Plan, finalize the project Terms of Reference, develop management zones and recommendations, and to help facilitate public input. Detailed site specific recommendations were developed during Phase II. The Management Plan was also presented to the Humber Watershed Alliance prior to being taken to the full Authority for approval and endorsement during Phase II.

2.5 THE ADVISORY COMMITTEE

Representatives from the following agencies, groups and the general community participated on the Cold Creek Conservation Area Management Plan Advisory Committee: Township of King-Elected Officials, Girl Guides of Canada, Boy Scouts Canada, Ontario Bird and Dog Conservation Association, The Labrador Retriever Club of Ontario, Humber Watershed Alliance, Humberlea Church of God, Humber Valley Heritage Trail Association, Oak Ridges Moraine Trail Association, Action to Restore a Clean Humber, Friends of Cold Creek Conservation Area, Community Residents, Chairman TRCA, and Authority Staff.



The Advisory Committee was responsible for the following:

1. Provide technical expertise, monitoring information and advice to the TRCA throughout the development of the Management Plan.

2. Ensure that appropriate staff and members at their respective municipalities/agencies/associations are adequately informed throughout the process.

3. Provide comments and input to suggestions brought to the Advisory Committee.

4. Assist in the identification of issues involving the Cold Creek Conservation Area and make suggestions of appropriate ways to resolving them.

5. Assist the TRCA in presentations and public forums, where appropriate.

The Cold Creek Conservation Area Management Plan is the result of over eight months of work by this committee and TRCA staff. The management zones and management recommendations that are described in Chapters 5 and 6 were developed through this planning process.

2.6 PUBLIC CONSULTATION

The eventual development and use of Cold Creek Conservation Area will be important to area residents and consequently, they must have a meaningful way to provide input to the planning process. To facilitate a wide range of opportunities for input, many techniques were used to generate a high level of awareness.

The public consultation component of developing the Management Plan included the following:

- Discussions with groups and members of the public.
- Local media stories to generate public interest and seek participation.
- Information sessions and fact sheet, to identify needs and opportunities for the area.
- Public meetings to present the background information, the vision, proposed management zones, and management recommendations.

In general, the public response to the proposed Management Plan was favourable. They indicated that they would like to keep most of the planning area protected and preserved. Specifically, members of the public asked for the protection and preservation of the significant black spruce swamp and maintenance of the existing boardwalk. Other members of the public suggested that they would like to see educational opportunities and non-intrusive recreational uses (i.e., facilities and services for families, school groups and nature activities; dog training opportunities; fishing; cross country skiing; horseback riding and group camping). In general, people wished to see the Conservation Area open to the public with recreational facilities for learning and enjoyment.

2.7 APPROVAL OF THE MANAGEMENT PLAN

At meeting #11/02, held on January 10, 2003, The Toronto and Region Conservation Authority approved resolution #A282/02, stating:

"THAT the Cold Creek Conservation Plan, dated December 6, 2002, be approved.

THAT horseback riding in the Cold Creek Conservation Area be added to the list of permitted potential activities, but such use not be authorized until appropriate provisions for management of the activity are in place, and such use be in accordance with the recommendations of the Cold Creek Management Plan and any other terms and conditions as may be established by the Authority;

THAT staff be authorized to invite proposals from businesses, groups or individuals for uses of the Cold Creek Conservation Area that are compatible with the Authority's mandate, and are in accordance with the recommendations of the Cold Creek Conservation Area Management Plan;

THAT an environmental audit be undertaken on the former trap and rifle ranges to determine what, if any, remedial measures are needed for the areas, and the results of this audit be brought back to the Authority;

THAT staff encourage interested stakeholders to establish a Cold Creek Conservation Area Stewardship Committee made up of interested citizens, interest groups and organizations, to continue to help the Authority in the planning and implementation of the Management Plan;

THAT letters be sent to the members of the Cold Creek Conservation Area Advisory Committee thanking them for assisting in the preparation of the Cold Creek Conservation Area Management Plan;

AND FURTHER THAT copies of the Cold Creek Conservation Area Management Plan be sent to the members of the Cold Creek Conservation Area Advisory Committee, King Township, York Region and other appropriate agencies, groups and individuals with a request that the document be used in future land use planning and other watershed management decisions."

CHAPTER 3

BACKGROUND STUDIES, STRATEGIES, POLICIES & LEGISLATION

3.1 TRCA PLANNING STUDIES, POLICIES AND LEGISLATION

1) The Greenspace Strategy (1989)

This Strategy outlines the importance of watershed management in the Greater Toronto Region. It proposes that the TRCA act as the coordinator between the province and municipalities in greenspace conservation efforts.

In 1989, The TRCA adopted the following mission statement:

Toronto and Region Conservation, with one third of Ontario's population within its area of jurisdiction, acts in the community's interest through advocating and implementing watershed management programs that:

- *Maintain and improve the quality of the region's lands and waters;*
- *Contribute to public safety from flooding and erosion;*
- *Provide for the acquisition of conservation and hazard lands; and*
- *Enhance the quality and variety of life in the community by using its lands for inter-regional outdoor recreation, heritage preservation, and conservation education.*

2) Authority Policy for the Disposal of Land

Parcels of Authority-owned land proposed to be sold or otherwise disposed of for other than road widening or other routine public purposes, at nominal consideration, must first be brought to the attention of the TRCA's Executive Committee and processed in the following manner:

(a) A detailed technical review is to be carried out by the Authority's technical staff. Appropriate terms and conditions are to be prepared by the technical staff dealing with any technical concerns, including the potential impact or mitigation requirements relating to remaining Authority holdings.

(b) The proposed disposition is to be circulated to the local and regional municipalities.

(c) All sales are to be at market value, with agreements to include provisions for all Authority objectives to be met.

Where the land proposed to be disposed of is of significance, other than small fragments offered to abutting owners in exchanges of land, minor sales or resolution of encroachment problems, the following additional steps are to be taken:

(d) The Authority's intention to consider disposal of the lands be duly publicized, including adequate newspaper publication in at least one local and one major Toronto region newspaper.

(e) At least one public open house information session be held in the vicinity of where the lands proposed to be disposed of are situated.

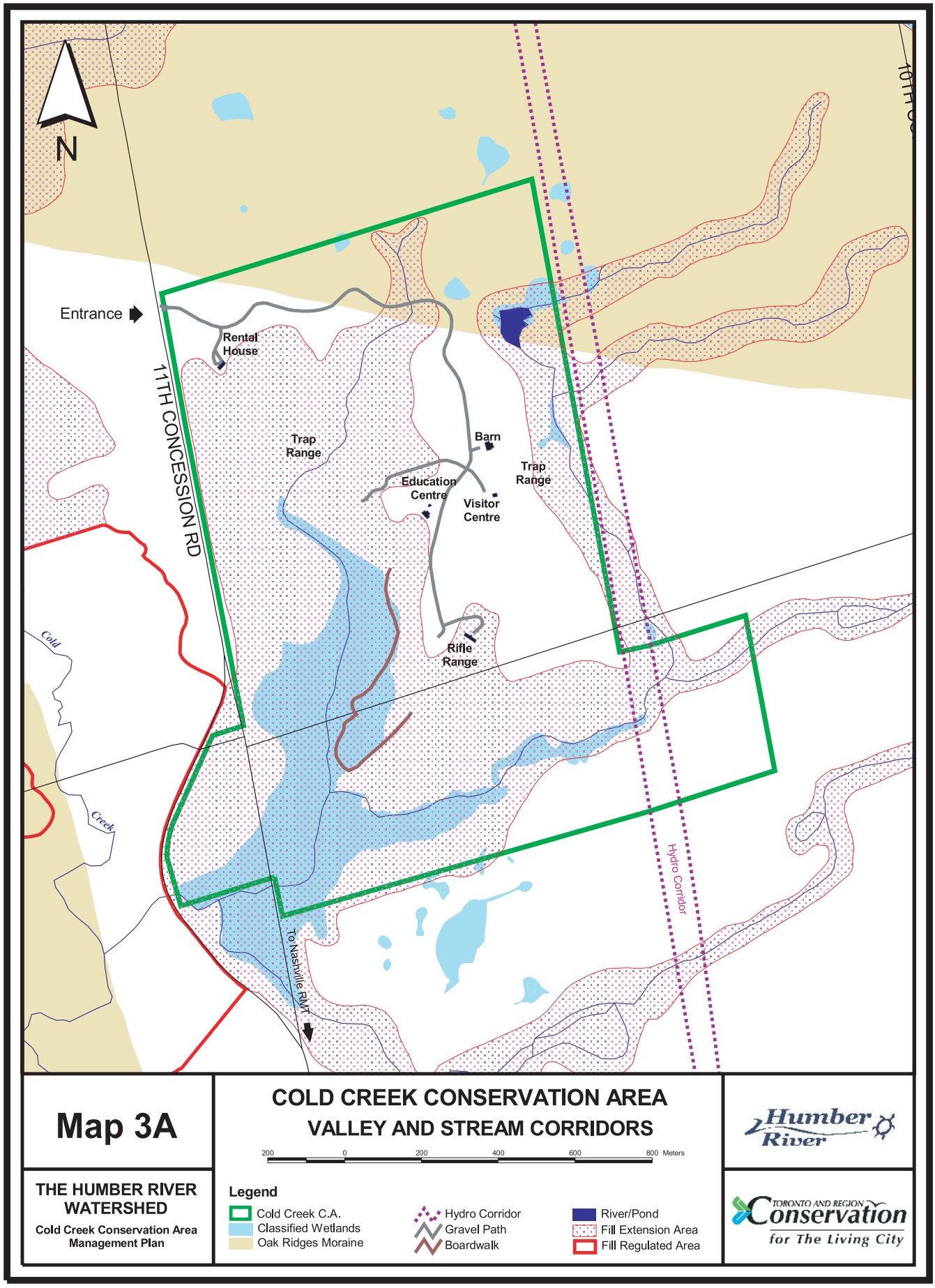
(f) The general public and any other interested parties be invited to make submissions, either verbal or written, to the TRCA's Executive Committee prior to a final recommendation being made with respect to disposal.

(g) At such time as a final recommendation is made with respect to disposal, staff provide to the members of the Authority details of the recommended disposition including commission rates and any other specific information relating to the transaction.

3) An Archaeological Master Plan for TRCA (1990)

The master plan provides the Authority with a heritage inventory protocol which helps facilitate future developments on its lands and is a means by which the Authority can comply with the heritage requirements of the *Ontario Environmental Assessment and Heritage Acts*.

The guidelines define general archaeological requirements to be applied to all TRCA undertakings, land severances,



Map 3A

COLD CREEK CONSERVATION AREA
VALLEY AND STREAM CORRIDORS

200 0 200 400 600 800 Meters

THE HUMBER RIVER WATERSHED
Cold Creek Conservation Area Management Plan

Legend

- Cold Creek C.A.
- Classified Wetlands
- Oak Ridges Moraine
- Hydro Corridor
- Gravel Path
- Boardwalk
- River/Pond
- Fill Extension Area
- Fill Regulated Area

Humber River

Toronto and Region Conservation for The Living City

and externally generated projects. The specific requirements may vary from situation to situation and therefore will be recommended by the TRCA Project Archaeologist.

4) Valley and Stream Corridor Management Program (1994)

This program provides policy direction to reduce risks to life and property from flooding, erosion, and valley slope instability; to protect or restore the ecological health and integrity of valley and stream corridor systems; and to provide opportunities for public use and enjoyment that are compatible with these systems. The Valley and Stream Corridor Management Program gives effect to the strategic direction of the 1989 MTRCA Greenspace Strategy.

The Program identifies valley and stream corridor boundaries in order that they can be appropriately identified in municipal planning documents and zoned in appropriate Open Space categories. Generally, the boundaries of valley and stream corridors are determined on a site specific basis and are accompanied by technical analysis such as a flood study or a geotechnical analysis. The Program defines these corridors as follows:

Valley Corridor

- 10 metres inland from the stable top of valley bank; or
- If the valley corridor is not stable, 10 metres inland from the predicted long term stable slope projected from the existing stable/slope toe (base) of the slope, or from the predicted location of the toe of the slope as shifted as a result of stream erosion over a 100 year period.

Stream Corridor

- 10 metres inland from the Regulatory Flood Plain; or
- If the watercourse has a drainage area of less than 125 hectares, 10 metres from the predicted meander belt of the watercourse, expanded as required to convey the major system flows and/or to maintain riparian stream functions.

Where a Significant Area, such as a designated Environmentally Significant Area (ESA) or Area of Natural and Scientific Interest (ANSI) is within and/or adjacent to a valley or stream corridor, the corridor boundary is extended to include the Significant Area and a minimum of 10 meters inland.

5) Ontario Regulation 158

Pursuant to Section 28 of the Conservation Authorities Act, the Province enacted Ontario Regulation 158. To comply with Ontario Regulation 158, a permit is required from the Authority prior to various works taking place (e.g., diverting or interfering with the existing channel of a watercourse, constructing any building in or on a pond or swamp, or filling or regrading in a regulated area). A permit could be refused if, in the opinion of the Authority, the work affects the control of flooding, pollution, or the conservation of land.

Section 28 of the Conservation Authorities Act has undergone revisions. Under the revised Section 28, Conservation Authorities may make regulations applicable in the area under its jurisdiction:

(a) Restricting and regulating the use of water in or from rivers, streams, inland lakes, ponds, wetlands and natural or artificially constructed depressions in rivers or streams;

(b) Prohibiting, regulating or requiring the permission of the Authority for straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream or watercourse, or for changing or interfering in any way with a wetland;

(c) Prohibiting, regulating or requiring the permission of the Authority for development if, in the opinion of the Authority, the control of flooding, erosion, dynamic beaches or pollution or the conservation of land may be affected by the development.

6) Greenspace Protection and Acquisition Project 1996-2000

The Greenspace Protection and Acquisition Project is an essential component of the Authority's Greenspace Strategy and other strategic initiatives. The Authority and its partners have been involved in a number of greenspace protection and acquisition projects since 1957. These projects are the legal vehicles with which the Authority raises funds to pursue its protection and acquisition objectives.

The Authority protects Greenspace using different types of ownership and methods of acquisition:

- fee simple
- easements
- covenants
- leases and agreements
- stewardship agreements
- the land planning and development process
- projects and donations
- exchanges
- municipal lands
- expropriation

Lands to be protected and acquired through various means must meet the Authority's conservation objectives as expressed in policies such as the Valley and Stream Corridor Management Program.

7) The Strategy for Public Use of Conservation Authority Lands (1995)

The purpose of this Strategy is to provide guidelines on where and how public outdoor recreation and education uses will be considered on TRCA land. To manage the community's growing interest in Conservation Authority lands, a clear set of goals, guiding principles and objectives have been identified that permit the Authority to focus on outdoor recreation and education uses.

In the watersheds managed by the Authority, the provision of public uses on conservation lands must balance the needs of the community with the protection and enhancement of the natural environment. The Strategy provides a framework for decision making that can achieve that balance and sustain our natural resources for years to come.

8) Forest Management: Practices, Performance and Proposed Operations for TRCA Lands (July 1996)

The objectives of the TRCA's forest management program are to:

- Implement and maintain a program of forest resource inventory and analysis to aid in the prioritization of management activities and the preparation of multi-year operating plans for Authority owned woodlands.
- Carry out management activities aimed at maximizing the protection and enhancement of forest functions and associated benefits (e.g., water management, soil erosion and sediment control, fish and wildlife habitat, public education and recreation, aesthetics and products).
- Ensure that operational practices are based on sound forestry principles.
- Ensure that management activities are integrated and compatible with other TRCA programs and policies and are supportive of other public agency resource management objectives.

Land acquisition, reforestation/tree planting, forest cutting/tending operations and technical advisory services are all components of an effective program of forest management. These activities are directed toward establishing and maintaining a diverse and healthy forest cover.

9) The Humber River Watershed Management Plan (1997)

The TRCA prepared a Humber River watershed management plan titled, *Legacy: A Strategy for a Healthy Humber* in 1997. The Humber River management plan sets out policies, actions, criteria and stewardship initiatives that will help with proactive management of the significant resources in the watershed. The Cold Creek Management Plan will be in conformance with the principles and objectives of *Legacy: A Strategy for a Healthy Humber*.

10) Report Card on the Health of the Humber River Watershed (2001)

The *Report Card on the Health of the Humber River Watershed* is a document which assesses the state of the Humber River watershed every three years, according to a variety of indicators. The Cold Creek Management Plan must strive to contribute to achieving the targets established by the first Humber watershed report card.

11) Humber River Watershed Fisheries Management Plan (Draft 1998, updated 2002)

The Plan is a resource document used to develop and implement regeneration projects and as a tool in the Plan Input and Review process. It contains biological, physical and chemical characteristics about the watershed. Based on these characteristics, the watershed is divided into seven aquatic habitat categories. Human influences on the watershed led to the creation of management zones which are based on the aquatic habitat categories. Management direction to achieve the targeted fish community for each management zone is provided on a subwatershed basis. Example management recommendations include in-stream barrier mitigation, riparian zone planting, stormwater quantity and quality controls, and in-stream habitat creation. A draft plan was completed in 1998, with a final Plan anticipated by the end of 2002. Aquatic habitat management in the Cold Creek Conservation Area will be guided by the Humber River Fisheries Management Plan

12) Terrestrial Natural Heritage Approach (2002)

TRCA's Terrestrial Natural Heritage Approach has been applied to the Cold Creek Conservation Area. The approach considers the site within the context of the region and regional pressures. It provides clear and detailed direction for gathering and analyzing information about natural habitats, vegetation communities, species, and forms the basis for developing strategies for protection and restoration.

3.2 MUNICIPAL LAND USE PLANNING

Land use planning in Cold Creek Conservation Area is affected by several local, and provincial plans and studies. The Municipal Land Use Planning Studies set the stage for future land uses. The Official Plans set the vision of the future municipal land uses, and the comprehensive zoning by-laws identify specific uses and sets restrictions on site-specific land uses. Since Cold Creek Conservation Area is located in King Township, the property is subject to the Regional Municipality of York's Official Plan and The Township of King's Official Plan and Comprehensive Zoning By-laws .

1) York Region Official Plan (July 1999)

Cold Creek Conservation Area has been designated as an "Environmental Policy Area" within the Regional Greenlands System in the York Region Official Plan.

The following Sustainable Natural Environment Goal and Objectives of the York Region Official Plan applies to Cold Creek:

Goal
"To conserve and improve the natural environment for this and future generations so that it will sustain life, maintain health and provide an improved quality of life."

Objectives
1. To identify, protect and restore the Regional Greenlands System composed of natural areas and connecting links as an essential structural component of the Region.

2. To ensure that significant environmental features and functions are preserved.

3. To ensure no loss of wetland function or wetland area in significant wetland areas in the Region.

4. To protect forested areas of regional significance and to encourage reforestation to provide environmental, social and economic benefit to the residents of York Region.

5. To increase forest cover to a minimum of 25% of York's total land area from the current 18%.

6. To encourage and support the conservation of significant landscapes, views and vistas.

7. To maintain and improve water quality and flow of lakes, rivers, streams and groundwater and to protect headwater areas from land use that may have the potential to contaminate downstream water systems.

8. That the natural functions and processes of the Oak Ridges Moraine be managed to provide a balance between the natural environment and growth expectations.

The York Region Official Plan is currently undergoing a review. This review deals with environmental policy areas, wetlands and forest cover. It is anticipated that the revised Official Plan will significantly complement the programs, policies and on-going initiatives of the Authority. The Cold Creek Management Plan will contribute to the overall objectives of the Regional Greenlands System. The Official Plan acknowledges that the Regional Greenlands system will be continuously preserved based on on-going studies of the Authority and others.

2) The Township of King Official Plan (October 1997)

Goals and Objectives
"The Township of King strives to be a prosperous, vibrant community, proud of its rural traditions and committed to balancing benefits of accessibility with the values of its natural environment."

The fundamental principles on which this plan is based apply to the future of Cold Creek Conservation Area. For example, the OP states that:

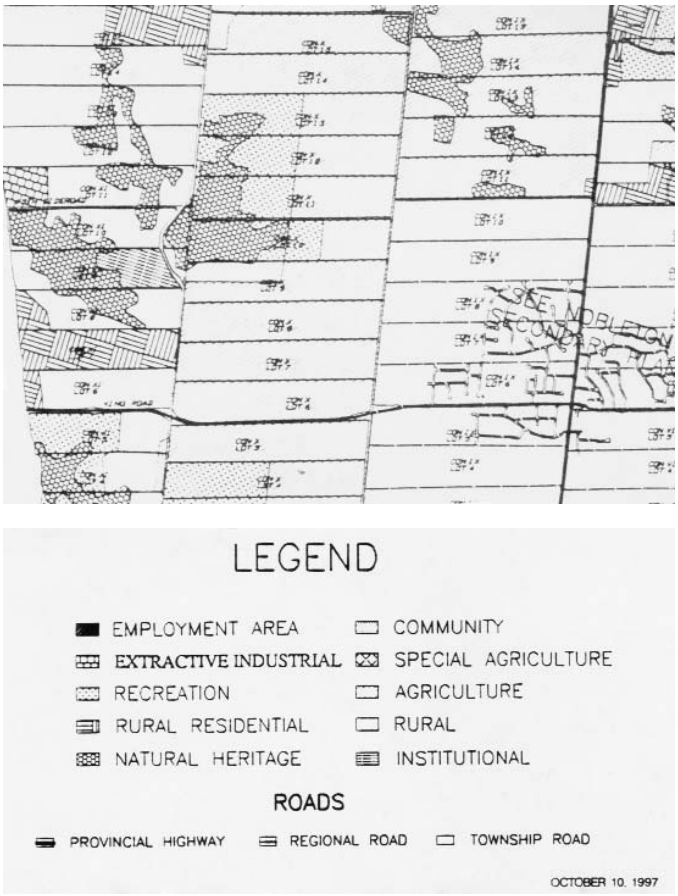
1. The rate of growth in the rural areas over the next twenty years will be similar to what has occurred in the past 20 years. New growth will be directed primarily to the serviced communities of King City, Nobleton and Schomberg.
2. New development will preserve the quality of life and the quality of the environment. These features of the Township should remain largely untouched over the next 20 years.
3. The financial health of the Township and economic opportunities for present and future inhabitants will be enhanced through the environmental and growth management policies of the Official Plan.

Official Plan Land Use Designations

Shown in *Schedule A: Land Use and Transportation (1997)*, and *Schedule B: Resource Protection (1997)* maps from the King Township Official Plan are the land use designations for Cold Creek Conservation Area and the areas surrounding Cold Creek in King Township. There are a number of designations to note:

a) Cold Creek Conservation Area's land use is classified as Recreation or Natural Heritage.

b) Cold Creek is surrounded by rural and agricultural land, and there is a portion of land designated as



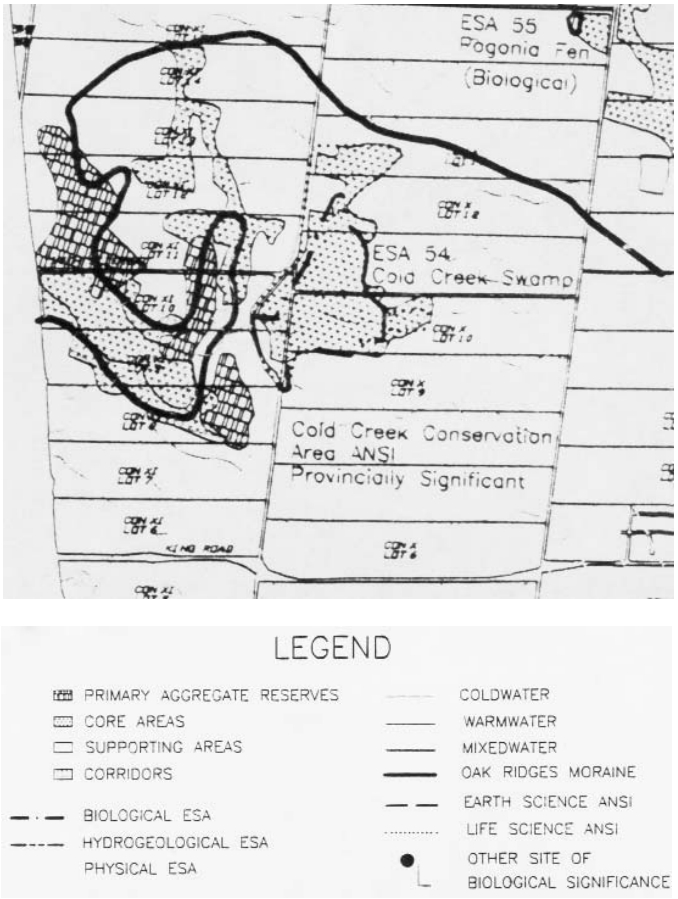


Figure 2: Land use Designations, Township of King Official Plan, Schedule A and B.

"institutional" (YMCA property) to the south-west of the area. An aggregate resource area has been identified on the west side of the property on the Albion-King townline.

Permitted Uses in "Recreation" designated areas include:

- Public parks including fairgrounds on land owned or under the control of government authorities.
- Private recreational areas for passive and active recreational activities, but excluding activities involving motorized vehicles, including golf courses, private sports fields, ski facilities, private clubs and campgrounds.
- Ancillary commercial uses providing goods and services to the patrons of the recreational facility and meeting or conference facilities.

Permitted Uses in the "Natural Heritage" designated areas include:

- Passive recreation uses such as nature viewing and trail activities, except the use of motorized vehicles, that do not require buildings or structures and do not adversely affect the environment, soil or topography or impact on nearby agricultural uses.
- Essential transportation and utility facilities, forest, wildlife and fisheries management and archaeological activities.
- Essential watershed management and flood and erosion control projects carried out or supervised by a public authority.

Resource Protection

Schedule B shows the areas designated as Natural Heritage in greater detail as Core Areas, Supporting Areas and Corridors.

1. Cold Creek Swamp is designated as a Biological Environmentally Sensitive Area (ESA 54).

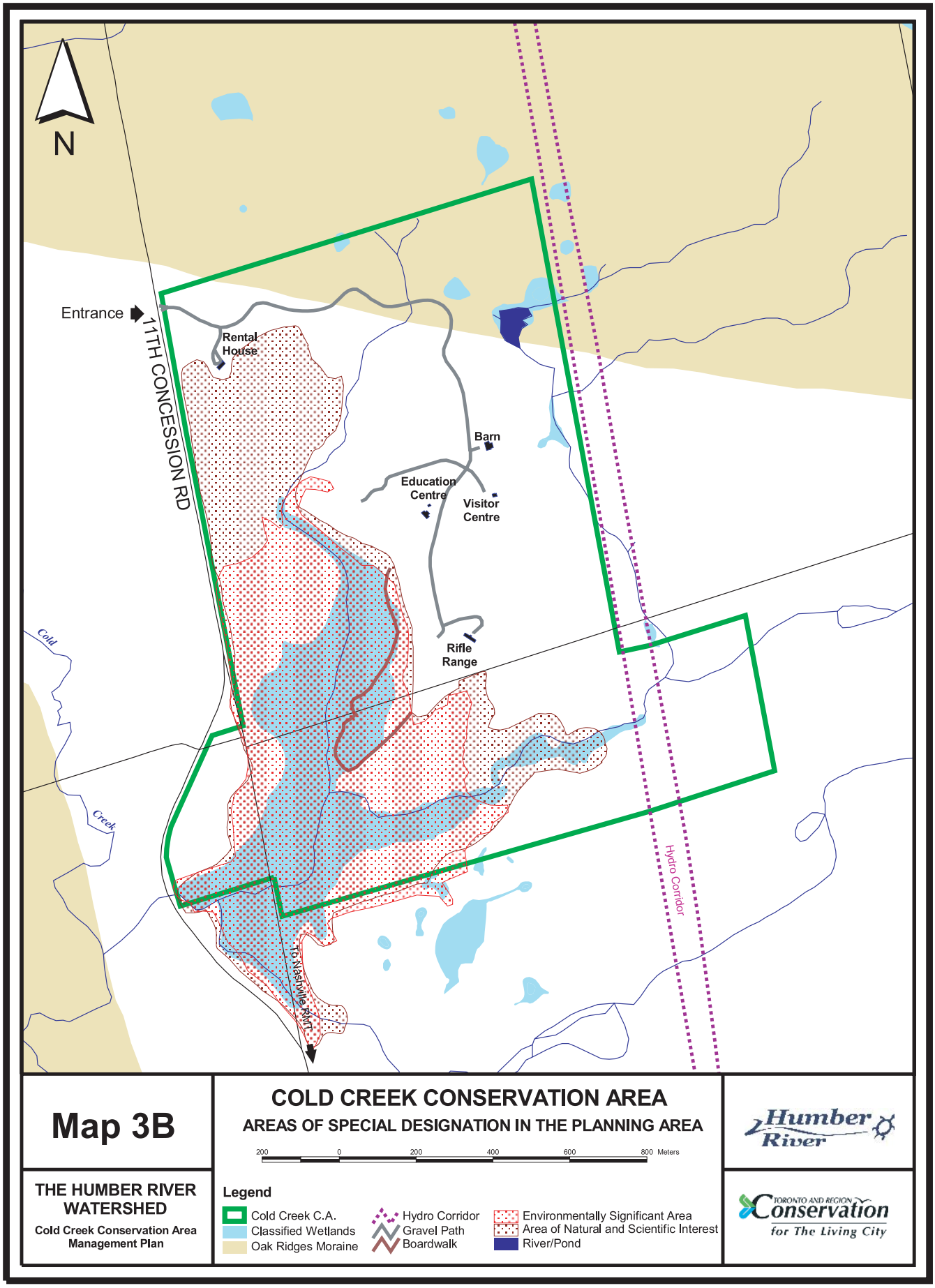
2. A large portion of land within Cold Creek is designated as "Core Areas".

3. A portion of Cold Creek Conservation Area is listed as an Area of Natural or Scientific Interest (ANSI).

4. The surrounding land within and around the Conservation Area is classified as "Supporting Areas".

Specific Planning Policies applied to Core Areas:

- Core Areas are the most important Natural Heritage System features which reflect the presence of a mix of important functions, attributes and linkages.



Map 3B

COLD CREEK CONSERVATION AREA

AREAS OF SPECIAL DESIGNATION IN THE PLANNING AREA

200 0 200 400 600 800 Meters

THE HUMBER RIVER WATERSHED

Cold Creek Conservation Area Management Plan

Legend

- Cold Creek C.A.
- Classified Wetlands
- Oak Ridges Moraine
- Hydro Corridor
- Gravel Path
- Boardwalk
- Environmentally Significant Area
- Area of Natural and Scientific Interest
- River/Pond

Humber River

Toronto and Region Conservation for The Living City

- Development shall not be permitted within significant wetlands and significant habitat of endangered and threatened species.
- Where development is proposed on or within 120 metres of a wetland, 50 metres of other core areas or 30 metres from fish habitat within core areas, an impact assessment shall be prepared to the satisfaction of the Township and other appropriate approval authority.

Specific Planning Policies applied to Supporting Areas:

- Council will place a high level of priority on protection, enhancement and restoration of Supporting Areas within the Natural Heritage System.
- Council will require an Environmental Impact Assessment when development is proposed within a Supporting Area or within 30 metres of the boundary of a Supporting Area.
- Where development occurs within or adjacent to a Supporting Area, Council will encourage innovative design which allows development without adverse impact on the functions, attributes and linkages within Supporting Areas.

3) Township of King Zoning By-Law 74-53

The Township of King's Zoning Bylaw 74-53 zones Cold Creek Conservation Area as Open Space and Conservation (O). Permitted land uses in the areas zoned Open Space and Conservation – O include:

No person shall within an Open Space and Conservation (O) zone, change the use of any building, structure or land or erect and use any building or structure except in conformity with the following uses:

- bird or animal sanctuaries
- cemeteries
- golf courses
- market gardens or general agriculture uses
- nurseries
- pavilion, band shells and museums
- public and private recreation centres and parks
- walking trails
- parking lots incidental to open space uses
- lands owned by or under the control of a conservation authority established by or under the Conservation Authorities Act, 1968, or a predecessor of this Act
- a conservation area primarily for the location of flood control, bank stabilization or erosion protection structures or projects.

Permitted uses are subject to site specific regulations and restrictions.

3.3 PROVINCIAL PLANS AND OTHER STUDIES

1) Oak Ridges Moraine Conservation Plan

Since a portion of the Cold Creek Conservation Area lies within the Oak Ridges Moraine, it is important to highlight some of the policies of the newly developed Oak Ridges Moraine Conservation Plan (ORMCP) that are applicable for any future land uses within and surrounding Cold Creek Conservation Area.

The north-east portion of the Cold Creek Conservation Area property has been designated as a "Natural Linkage Area" in the ORMCP. This area is defined in the ORMCP section 10 (1) as "areas forming part of a central corridor system that supports or have potential to support movement of plants and animals among the Natural Core Areas, Natural Linkage Areas, river valleys and stream corridors".

The purpose of Natural Linkage areas is to maintain, and where possible improve or restore, the ecological integrity of the Plan Area, and to maintain, and where possible improve and restore, regional-scale open space linkages between Natural Core Areas and along river valley and streams corridors, by:

(a) Maintaining, and where possible, improving or restoring the health, diversity, size, and connectivity of key heritage features, hydrological sensitive features and the related ecological functions.
(b) Maintaining, and where possible, improving or restoring natural self-sustaining vegetation over large parts of the area to facilitate movement of plants and animals.
(c) Maintaining a natural continuous east-west connection and additional connections to river valleys and streams north and south of the Plan Area.
(d) Maintaining the quantity and quality of groundwater and surface water.
(e) Maintaining groundwater recharge.
(f) Maintaining natural stream form and flow characteristics.
(g) Protecting landform features.

The following uses are permitted with respect to land in Natural Linkage Areas:

1. Fish, wildlife and forest management
2. Conservation projects and flood and erosion control projects
3. Agricultural uses
4. Transportation, infrastructure, and utilities, but only if the need for the project has been demonstrated and there is no reasonable alternative
5. Home business
6. Home industries

7. Bed and breakfast establishment
8. Farm vacation homes
9. Low-intensity recreational uses
10. Unserviced parks
11. Mineral aggregate operation
12. Wayside pits
13. Uses accessory to the uses set out in paragraphs 1-12

Some Key Land Use Policies relevant to Cold Creek include:

- New transportation and utility corridors or facilities shall only be allowed in Natural Core Areas and Natural Linkage Areas if they are shown to be necessary and there is no reasonable alternative. They shall have to meet stringent review and approval standards.
- The Oak Ridges Moraine Trail shall provide non-motorized recreational access (this will be important in future if connecting Cold Creek Conservation Area to the ORM trail is considered as a recreational opportunity).
- An application for a transportation, infrastructure or utilities use with respect to land in a Natural Linkage Area shall not be approved unless:
  a) the need for the project has been demonstrated and there is no reasonable alternative; and
  b) the applicant demonstrates that the following requirements will be satisfied, to the extent that is possible, while also meeting all applicable safety standards:
     1. The area of construction disturbance will be kept minimal.
     2. Right of way widths will be kept to the minimum that is consistent with meeting other objectives such as stormwater management and with locating as many transportation, infrastructure, and utility uses within a single corridor as possible.
     3. The project will allow for wildlife movement.
     4. Lighting will be focused downwards and away from Natural Core Areas.
     5. The planning, design and construction practices adopted will keep any adverse effects on the ecological integrity of the Plan Area to a minimum.

2) Walkerton Report

Part 2 of the Walkerton Inquiry, A Strategy for Safe Drinking Water, was released by the Ontario Government on May 23, 2002. The Walkerton Inquiry was established in June 2000 to investigate the E. Coli contamination of the water supply in Walkerton. The recommendations particularly relevant to Conservation Authorities include:

1. Preparation of watershed-based source protection plans.

2. Source protection planning should be done at a local watershed level by those most directly affected.

3. All large or intensive farms and all farms in areas designated as high risk in the source protection plan should develop binding individual farm water protection plans.

Since most of the area surrounding Cold Creek is either agriculturel or rural, the Cold Creek Management Plan recommends that potential agriculture source contamination areas be identified by employing the Agriculture Non-Point Source Protection Model and implementing management options to address any source protection issues.

3) Highway 427 Extension Study

The Ministry of Transportation (MTO) is currently undertaking a Transportation Need Assessment Study to address the future north-south travel demands for Highway 427 north to the Collingwood/Barrie area. An individual environmental assessment study, under the Ontario Environmental Assessment Act, will be carried out for the recommended area for new transportation facilities.

Cold Creek Conservation Area lies within the study area and, immediately adjacent to Cold Creek Conservation Area, is a hydro corridor that could be a potential route for this highway. This hydro corridor traverses through the Natural Linkages Area of the ORM Conservation Plan that states (policy 41 (2) (b) #2) as an objective, to locate within a single corridor, as many transportation/ infrastructure/utility as possible.

Any environmental assessment for the extension of Hwy 427 should consider and supply all options to protect ecologically sensitive areas in and around the Cold Creek Conservation Area. More information on the study is available on the MTO website at www.mto.gov.on.ca/ english/engineering/427extend/index.html

Aerial View of Cold Creek Subwatershed *Photography by Rosemary Hasner*

CHAPTER 4

RESOURCE INVENTORY AND ANALYSIS

After reviewing the background information and relevant plans and policies, the next major step in developing the Cold Creek Conservation Area Management Plan was to inventory and analyze the Cold Creek property. The natural heritage, human heritage, recreation and education resources were examined and mapped.

4.1 NATURAL HERITAGE

A Natural Heritage System refers to the interactions and dependencies between and among the physical, chemical, and biological elements of the environment. It is these interactions that control the hydrologic cycle and the quality of habitat for plants and animals. For the purpose of this Management Plan, only landform, water, and aquatic and terrestrial habitats have been investigated.

4.1.1 Landform

1. ORM and South Slope: The planning area lies primarily within the Oak Ridges Moraine (ORM) and South Slope. The ORM is one of the most important natural resources in the TRCA jurisdiction in terms of its historical, hydrological, topographical and geological significance.

The ORM complex was formed about 13,000 years ago when meltwaters of the withdrawing Wisconsinan glacier deposited till materials (silt, sands, gravels, clay and boulders) between two lobes of the glacier, thus forming the 'interlobate' moraine. The terrain of the ORM varies throughout the Greater Toronto Area but many portions are characterized by a hummocky or hilly appearance, referred to as "knob and kettle" topography. The glacial

drift forms the knobs and the dry depressions or glacial lakes are known as kettles or kettle lakes.

The South Slope, or Till Plain, is located south of the ORM and is a band 10 to 11 kilometres in width running parallel to the length of the Moraine. Almost 90% of Cold Creek Conservation Area lies within the South Slope. The South Slope was formed during the same geologic period as the ORM, approximately 13,000 years ago. The area is important for its agricultural capacities.

2. Valley and Stream Corridors: The valley and stream corridors are the critical areas for protecting the aquatic and terrestrial habitats of the Cold Creek Conservation Area. These are natural environment corridors that provide linkages between aquatic and terrestrial habitat areas.

As shown in Map 3A, these corridors for Cold Creek Conservation Area were determined through a review of the TRCA fill line mapping and fill line extension mapping. The fill line mapping relates to the fill regulation component of Ontario Regulation 158 (see Chapter 3).

The total land area that comprises the valley and stream corridor in Cold Creek is 120 hectares. The valley and stream corridor widths in Cold Creek vary from seven metres to 90 metres.

4.1.2 Ground and Surface Water

The quality and quantity of water flowing within and in the surrounding areas of Cold Creek are important elements to consider when developing a management plan for the area. An impairment in the quality or quantity of water in a river system can affect aquatic habitats; alter the diversity and abundance of plant, animal, and aquatic species; reduce enjoyment of natural areas; affect human health; and change flows downstream.

1. Groundwater

Geology: A north/south cross-section through the Conservation Area is presented in Figure 3. The surficial geology comprises of up to 20 metres of clayey silt to silt till (Halton Till), with thin fluvial sand and gravel deposits in the stream valleys. The Halton Till is thickest to the south of Cold Creek and is thinnest at the base of the creek valley. The Halton Till is underlain by 20 to 40 metres of sand and gravel (Oak Ridges Moraine Complex), which are in turn underlain by 20 to 30 metres of clayey silt till (Newmarket Till). The Oak Ridges Moraine Complex thickens to the south. Beneath the Newmarket Till is the Lower Sediment Complex, which comprises two fluvial/lacustrine deposits (Scarborough and Thorncliffe Formations) separated by a clay till (Sunnybrook Till). The thickness of the Lower Sediment Complex ranges from less than 10 metres at the south end of the Study Area to more than 40 metres at the north end of the Study Area. Overall, the overburden thickness ranges from 60 metres underneath Cold Creek to 100 metres beneath the adjacent tablelands.

The bedrock within the Study Area comprises interbedded limestone and shale of the Georgian Bay Formation (Ontario Division of Mines, 1976)[2]. The bedrock surface slopes gently to the south at a rate of approximately four metres per kilometres. A shallow (approximately 20 to 40 metres deep) bedrock valley is assumed to be present to the south of the Conservation Area.

Hydrogeology: Hydrogeology is a science that describes the movement of water beneath the ground surface (groundwater) and its interaction or connection with water which moves upon the ground surface in rivers, lakes and streams. Inflow to the groundwater system (recharge) occurs as infiltrating precipitation in the form of rain fall or snowmelt. Outflow from the groundwater system takes place as discharge to streams (baseflow) and springs, as evapotransportation and as groundwater pumping from wells. The quantity and rate of groundwater flow is dependent on the nature of the geologic material through which it flows.

A perched water table is present within the Halton Till at an average depth of approximately five metres below grade. The groundwater flow direction in this unit is primarily downwards, but because of the low permeability of the Halton Till, the rate at which water infiltrates into the soil in the spring is greater than the rate at which the water flows through the till into the aquifer below. Therefore, the excess water "pools" in the till. The upper surface of this "pooled" water is a subdued reflection of the surface topography. Because the rate of infiltration varies seasonally, the perched water surface fluctuates, with a range of about 0.5 metres close to the streams and ponds and a range up to five metres in the adjacent tablelands. A minor component of the flow in the till is horizontal towards the ponds and streams.

The true water table occurs in the Oak Ridges Moraine Complex (Oak Ridges Moraine Aquifer), at depths up to 25 metres below grade (Romano, 1998)[3]. The aquifer is recharged via a combination of vertical groundwater flow through the Halton Till and horizontal flow through the aquifer. The groundwater in this aquifer flows primarily horizontally to the south.

2. Ontario Division of Mines. 1976. *Paleozoic Geology*, Bolton, Southern Ontario, Map 2338, Scale 1:50,000

3. Romano, CG. 1998. *Groundwater-Surface Water Interaction: A Comparison of Modelling Tools.* Unpublished MSc Thesis, University of Waterloo, Waterloo, Ontario, Canada.

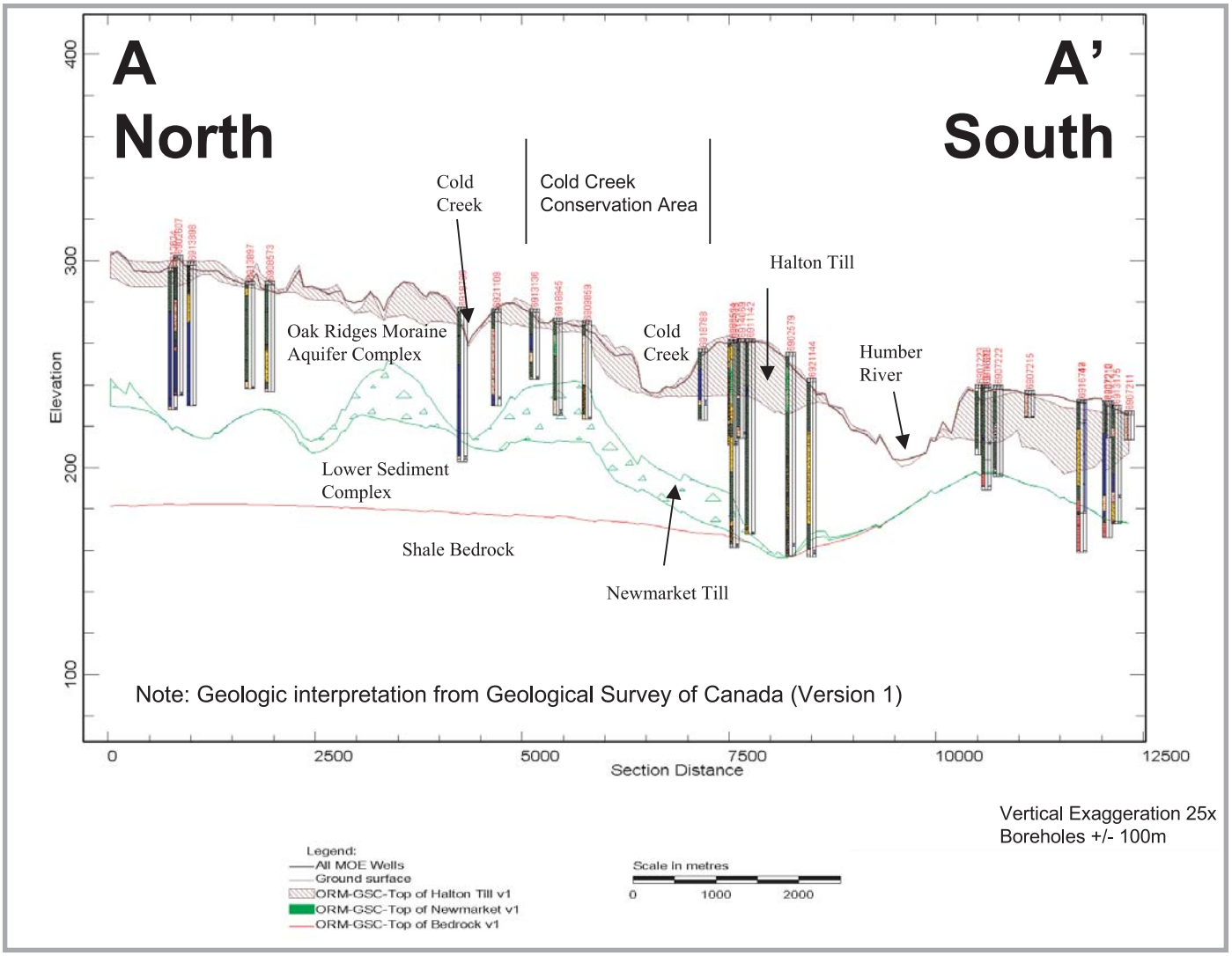


Figure 3 Hydrogeology: Cold Creek North-South Cross Section

Deeper aquifers are present in the Lower Sediment Complex. Groundwater flow in these aquifers is primarily to the south, with discharge occurring to the lower reaches of the Humber River Watershed.

Recharge/Discharge: Local recharge occurs in the tablelands, with a minor local discharge component into Cold Creek. The estimated amount of groundwater recharge ranges from 118 mm/year to 193 mm/year (Romano, 1998). Most of the observed groundwater discharge is associated with reaches of Cold Creek west and southwest of the Conservation Area (Don Haley, TRCA, personal communication). In these reaches (Map 4), it is assumed that the Oak Ridges Moraine Complex is exposed in the streambed.

Groundwater Resources: Most of the local water wells within the Cold Creek Subwatershed rely on the Oak Ridges Moraine Aquifer, although some penetrate into the lower sediments (Figure 3).

2. Surface Water Quality

Water quality data from the Ministry of the Environment's Provincial Water Quality Monitoring Network (PWQMN) provides a statistical basis for assessing the surface water quality in the Cold Creek Subwatershed. Water quality data have been obtained from a monitoring station located north of King Road within the Cold Creek Subwatershed (See Map 4). Data from 1971 have been compared to the 2002 water quality samples. Eight water quality parameters were selected for assessment, based on their relevance to common water use. These eight included: phosphorous, nitrogen compounds, suspended solids, chlorides, bacteria, biological oxygen demand, dissolved oxygen and temperature.

Table 1 compares mean and median concentrations of selected constituents collected monthly from 1969 to 1971 with the mean concentration of two samples collected in June and July, 2002. With the exception of chloride, concentrations of all constituents were similar during the two periods of observation. Although only

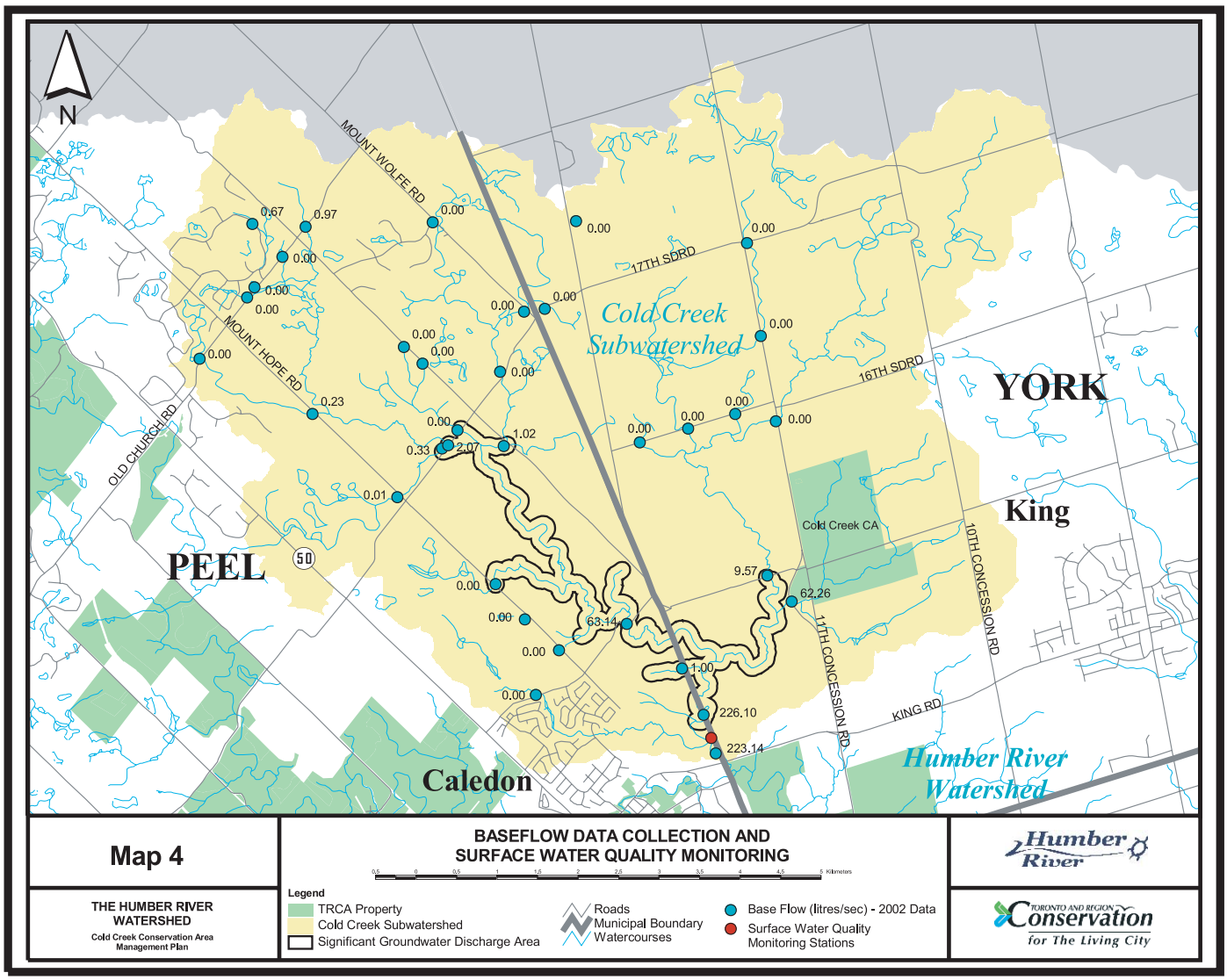


Table 1: Water quality data from Cold Creek from 1969 to 1971 and during the summer of 2002

Parameter	1969-1971			Summer 2002		Guideline
	# obs.	Mean	Median	# obs.	Mean[1]	
Chloride (mg/L)	21	10.8	7	2	18.2	250
Conductivity (uS/cm)	21	497	483	2	501	-
Dissolved Oxygen (mg/L)	21	5.9	5	2	9.9	6
Nitrate (mg/L)	21	0.29	0.18	2	0.24	0.3
Nitrite (mg/L)	21	0.01	0.008	2	0.018	-
TKN (mg/L)	21	0.43	0.33	2	0.38	-
Phosphate (mg/L)	21	0.03	0.01	2	0.015	-
Total Phosphorus (mg/L)	21	0.09	0.04	2	0.05	0.03
Total Suspended Solids (mg/L)	21	19.8	10	2	17.1	25[2]

1. Since there are only two observations, the mean and median in 2002 are the same.
2. Approximate background level.

summer data were available in 2002, concentrations of chloride were generally higher, possibly reflecting a higher density road network (and hence road salt applications) in the area compared to 1971.

Metals were not analyzed during the 1969-1971 period. During the summer of 2002, mean concentrations of copper, zinc, nickel and lead were well below Provincial Water Quality Objectives/Guidelines for these constituents.

The temperature of the water appears to have changed very little since 1971. Water temperatures in June and July during both periods were between 12 and 18 degrees Celsius, which are well below the 21 degree Celsius maximum threshold commonly designated for cold water fisheries.

Total coliforms were not sampled in 2002, but in 1969 to 1971, the average density was 3042 counts/100ml, which compares to the former Provincial Water Quality Objective (for human contact) for this constituent of 1000 counts/100ml.

Total phosphorous exceeded the PWQO for phosphorous (0.03mg/L) during both periods. Concentrations of nutrients typically increase during wet weather and snowmelt conditions. Phosphorous and nitrates come from lawn, garden and agriculture fertilizers as well as eroded soils from construction sites, stream banks and agricultural fields. A detailed investigation of potential nutrients and sediment sources (practical summer rain event) is being carried out through the TRCA's Agriculture Non-Point Source Modeling technique (AGNPS).

3. Rural Water Quality Modeling

The event-based (rainfall and snowmelt) AGNPS model is a tool for rural point and non-point source pollution identification and mitigation. It provides a tool for farmers, municipalities and TRCA to fulfill obligations under the Nutrient Management Act by employing cost effective strategies for implementing Best Management Practices.

The AGNPS model was developed by the U.S. Department of Agriculture in the late 1980's as a decision support tool for designing rural water quality improvements. Application of the AGNPS model in Southern Ontario has been advanced by the Provincial Ministry of Environment and Environment Canada. Through technical support from the Ministry, the utility of the AGNPS model for application in TRCA watersheds was established.

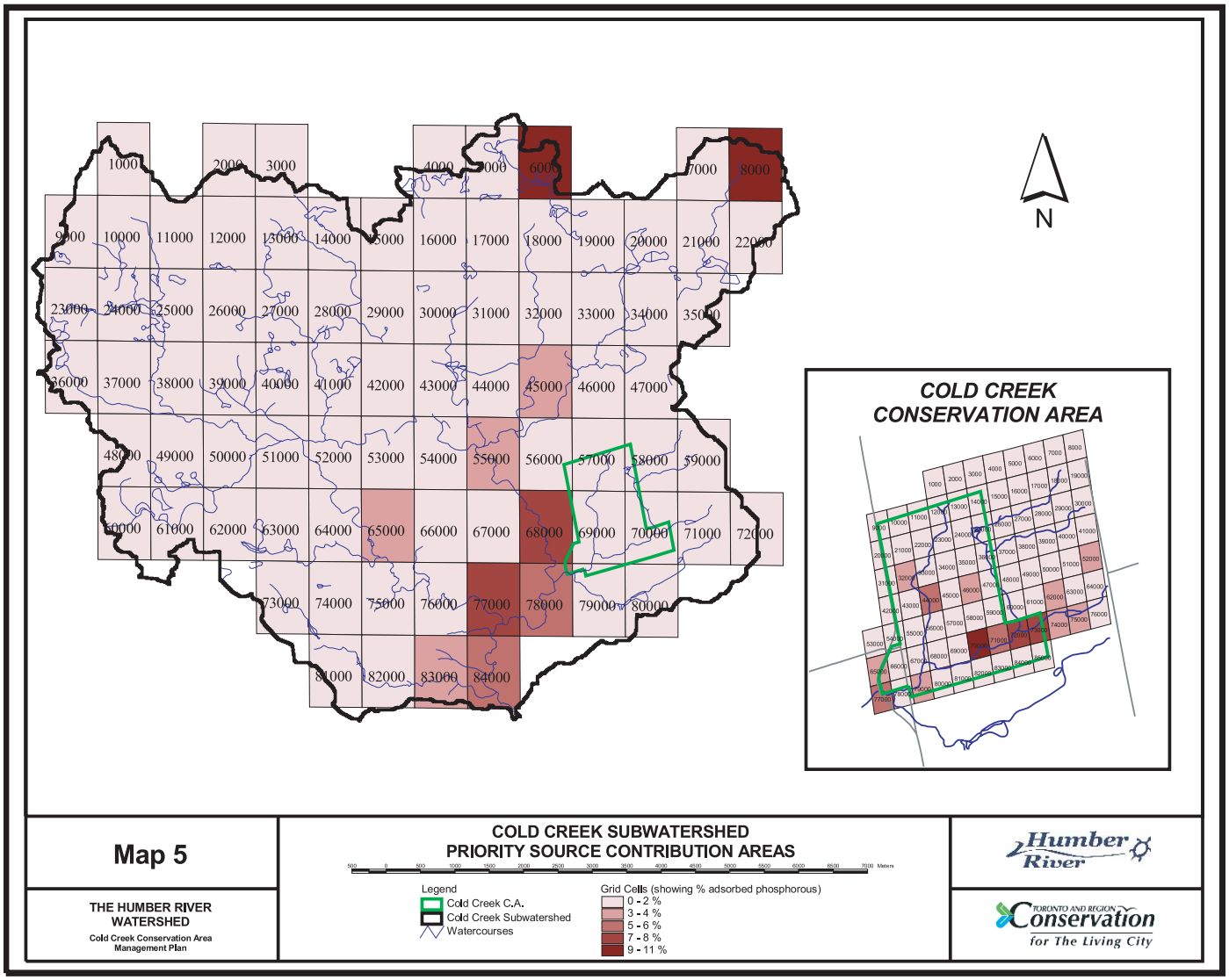
The AGNPS model predicts water quality conditions as a function of topography (slope), soil conditions and land use. Information on fertilizer use (potential source of pollution) and precipitation patterns are entered into the model using proven algorithms for soil transport, channel erosion and water quality predictions. The model's performance in comparison to monitoring programs is very good. As a result, our limited program sources can be directed towards implementation.

The objective of modeling the Cold Creek Subwatershed was to identify, at a subwatershed scale, priority areas for targeting the TRCA rural water quality improvement program. With limited resources and the recognized need to focus our efforts, the model helps staff establish priorities for field level inventories and grant funding. In addition, model runs for the subcatchment draining the Cold Creek Conservation Area served to verify that the Authority property is generally well-managed and is not a significant source of pollution at the subwatershed scale. Detailed runs for the Cold Creek Conservation Area (20 acre grids) revealed a few "local priorities" for follow up investigation by TRCA staff (Map 5).

Results for the model are shown in Table 2, which compares, for a typical summer rain event, the relative pollutant contributions of the tributary draining Cold Creek Conservation Area with the sediment, nitrogen and phosphorus contributions to the Humber River from the Cold Creek Subwatershed.

Table 2: Relative Pollutant Contributions – Cold Creek Subwatershed.

Watershed ID	Cold Creek Conservation Area	Cold Creek Subwatershed
# Total Cells	85	84
Area Base Cells	12	198
Drainage Area	1020	16632
Precipitation	1	1
Runoff Volume	0.04	0.09
Peak Rate	0.46	174.45
Sediment Yield	22.33	524.06
Nitrogen-Sediment	0.14	0.19
Nitrogen-Runoff	0	0.03
Phosphorus-Sediment	0.07	0.09
Phosphorus-Runoff	0	0
COD-Runoff	0.12	0.55
Nitrogen Concentration	0.47	1.7
Phosphorus Concentration	0.02	0.16
COD Concentration	13.48	27.74



Using the model's trace source contribution module, priority areas for follow up action by staff were identified for the Cold Creek Subwatershed and the Cold Creek Conservation Area (see Map 5). Sites within the Cold Creek Conservation Area are not significant sources at a subwatershed or watershed scale.

4.1.3 Aquatic Habitats

Within Cold Creek Conservation Area, there are two permanent watercourses and a number of intermittent streams (Map 6). The permanent streams provide year-round habitat while the intermittent streams have a water attenuation function, woody and organic material contribution and likely provide seasonal habitat for aquatic species.

1. Baseflow

Based on flows recorded from the stream gauge on Cold Creek at the 11th Concession, the ratio of baseflow to total annual flow is approximately 38%, suggesting a fair to good potential for salmonid production.

Base flow data collection stations located on the two main tributaries and at the 11th Concession Road crossing showed that permanent flow in the western tributary begins at the cedar swamp and this stream has a higher baseflow than the eastern one.

2. Water Temperature

Water temperature data suggests the western tributary is the colder of the two and likely receives more ground-water than the southern tributary. Even after the two

streams meet, the influence of the western tributary is evident in the low temperature recorded at station 5 (See Table 3).

3. Instream Barriers

Instream barriers are either natural ie., beaver dams or log jams or a result of human activities such as dams, weirs, bridges or culverts. These barriers may impact the aquatic community by eliminating passage, allowing for the establishment of a headpond and subsequent warming of the water and reducing sediment transport. The culvert located at the 11th Concession Road is slightly perched and has a shallow flow through it. It may be a barrier to fish passage during low flow periods. Other culverts do not substantially impact the aquatic community.

4. Riparian Vegetation

Riparian vegetation is defined as any woody or herbaceous plant abutting a watercourse. Ecologically, riparian vegetation slows the rise in water temperature by shading the stream. Riparian vegetation also serves to maintain bank stability (and therefore decrease erosion), contributes organic material and woody debris to the watercourse and provides cover for aquatic organisms. Finally, insects living in vegetation overhanging a river often fall into the water and provide food for fish. Riparian vegetation plays a more important role in stream shade in the smaller first, second and third order streams which are generally narrow and can be shaded almost completely.

In the CCCA, most of the length of permanent watercourses has riparian cover, except for some of the middle reaches of the eastern tributary. In areas where these two tributaries are intermittent, such as the western trap range and downstream of the wetland in the northeastern section of the property, riparian vegetation is insufficient (Map 6).

5. Fish Community

Cold Creek has been sampled numerous times over the years at the crossing with the 11th Concession Road. Data collected has included fish, benthic invertebrate and algal species. Identification and analysis of the algal species data has yet to be completed. Algal species are good indicators of water quality.

Fish species information, dating as far back as 1946 is available for Cold Creek downstream of the 11th Concession Road (Table 4). A total of 11 species have been captured at the two sampling locations (Map 6).

Station HU027WM is downstream of the confluence with the Conservation Area branch of Cold Creek and the more western tributary of Cold Creek outside the property. The larger size of this watercourse may account for the increase in the number of fish species captured, as well as the addition of some fish species that have not been found previously. The fact that a number of the species captured were not found previously and are generally warmwater species is noteworthy and indicates that the warmwater contributing reach located west of CCCA may be slightly warmer than historically and exerting a greater influence.

The presence of coldwater species such as mottled sculpin and brook, rainbow and brown trout at the downstream sampling locations suggests a healthy coldwater community within the Cold Creek Conservation Area. It is likely that some warmwater species such as northern redbelly dace, fathead minnow and pumpkinseed would not be found in the CA and as such, the fish community would be made up of more typical coldwater species.

No significant change has been noted in the quality of habitat found in and immediately adjacent to CCCA in the past 20 years.

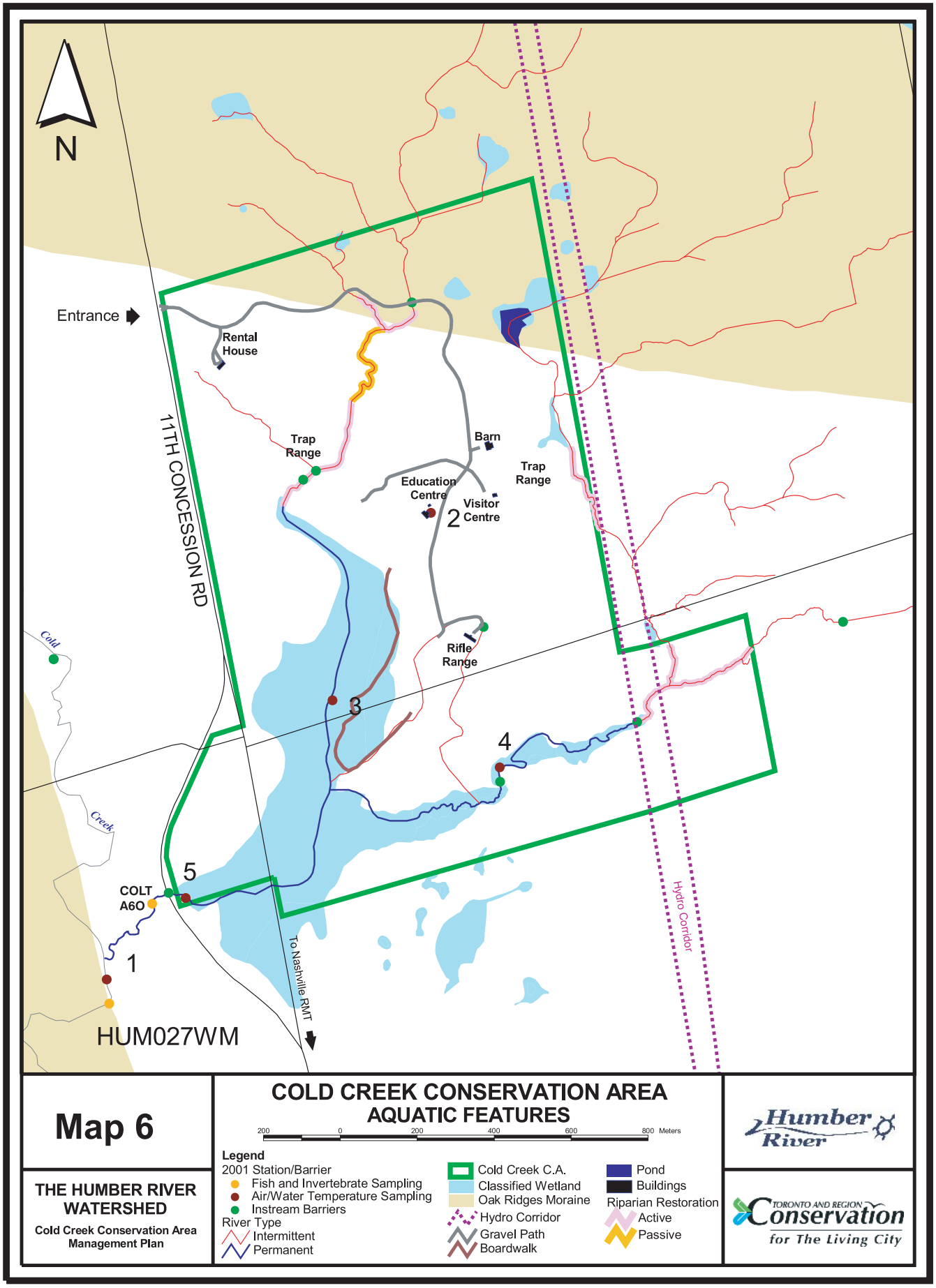
6. Benthic Invertebrates

Species and associated analyses are available for the 1999 and 2001data collection (Appendix 1).

A number of the species found at Station COLT in 1999 and HU0027WM in 2001, including Stempellinella sp. and Trissopelopia sp., are considered riverine species and are typically associated with good water and habitat quality. The relatively higher Hilsenhoff Biotic Index (BI) found at Station HU0027WM indicates higher nutrient conditions which is likely a function of it being found

Table 3: Results of Temperature Sampling.

Time Sampled	Station	Air Temperature (oC)	Water Temperature (oC)
Aug. 13/01 at 3:45	1	26	14.5
1:10 pm	2	28.5	Not taken
1:15 pm	3	27	13.5
1:55 pm	4	28.5	20.5
2:30 pm	5	30	14



Map 6

THE HUMBER RIVER WATERSHED

Cold Creek Conservation Area Management Plan

COLD CREEK CONSERVATION AREA
AQUATIC FEATURES

200 0 200 400 600 800 Meters

Legend

2001 Station/Barrier
- Fish and Invertebrate Sampling
- Air/Water Temperature Sampling
- Instream Barriers

River Type
- Intermittent
- Permanent

- Cold Creek C.A.
- Classified Wetland
- Oak Ridges Moraine
- Hydro Corridor
- Gravel Path
- Boardwalk
- Pond
- Buildings

Riparian Restoration
- Active
- Passive

Humber River

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Table 4. Fish Species Captured Near Cold Creek Conservation Area (CCCA).

Fish Species	1946	1983	1999	2001
American brook lamprey	-	-	-	HU027WM*
rainbow trout	-	-	COLT*	HU027WM
brown trout	-	present	COLT	HU027WM
brook trout	A60*	-	-	HU027WM
white sucker	A60	-	-	HU027WM
northern redbelly dace	-	-	-	HU027WM
brassy minnow	-	-	-	HU027WM
fathead minnow	-	-	-	HU027WM
blacknose dace	A60	-	-	HU027WM
creek chub	A60	-	COLT	HU027WM
pumpkinseed	-	-	-	HU027WM
mottled sculpin	A60	present	COLT	HU027WM

* - Fish and invertebrate sampling station number from the original survey. (See Map 6)

downstream of the confluence with the warmwater tributary and subject to greater impacts from agricultural runoff.

Overall, the benthic invertebrate community at both stations is reflective of a relatively unimpaired system[4].

4.1.4 Terrestrial Habitats

The Terrestrial Habitat Inventory and analysis for Cold Creek Conservation Area has been carried out according to the criteria of Toronto and Region Conservation's Terrestrial Natural Heritage Approach[5]. The study area is described below, under six headings, which link together the various criteria of the Natural Heritage Approach as they apply at the landscape, vegetation community, and species levels (See Table 6). The headings are:

- Quantity of Natural Cover
- Distribution
- Matrix Influence
- Patch Size and Shape
- Landscape Connectivity
- Bio-diversity

The Terrestrial Natural Heritage Approach moves beyond the contemporary model of defining natural heritage systems based on a series of cores and corridors. It recognizes that all habitat patches have some value and make a contribution towards ecological health across the landscape. This Approach enables us to evaluate the Conservation Area's contribution at three levels: 1) the entire TRCA jurisdiction; 2) other defined areas of planning units such as the subwatershed and watershed; and 3) the ORM and other municipal areas.

A key component of the TRCA Terrestrial Natural Heritage Approach is the scoring and ranking of vegetation communities and fauna species, reflecting primarily resistance to urbanization and human encroachment. Species are ranked based on local distribution or local (L) ranks. These L ranks are in some way analogous to the provincial (S) and global (G) ranks assigned to vegetation communities, flora and fauna. The ranks range from L1 to L5. Generally, L1 to L3 species or vegetation communities are of regional conservation concern (i.e., within TRCA jurisdiction).

A complete list of species and vegetation communities for the CCCA, with their associated scores and L-ranks, can be found in Appendices 2 and 3.

1. Quantity

a) Landscape – Total Natural Cover

The Cold Creek Study Area is located in the upper reaches of the main Humber River in the Township of King. The Humber watershed is 90,800 hectares in size with 26,928 hectares (30%) of natural cover, of which 18,959 hectares (21%). is forest and wetland. The CCCA occupies 190 hectares and is almost entirely natural cover of some sort.

The health of the natural system in any region ultimately depends most directly on the total quantity of land that has natural cover. The loss of natural cover directly affects the health of the broader natural system. More specifically, the loss of natural cover leads to diminishing proportions of various natural vegetation communities

4. For more information, see *Status of the Aquatic Community in Cold Creek Conservation Area*, TRCA , July 2002.

5. TRCA, 2002. *Cold Creek Conservation Area- Biological Inventory and Impact Assessment*.

Red Shouldered Hawk
Photography © Cornell University

and reduced populations of native species. These become rarer and eventually may be at risk of extirpation. Rarity or (to put it positively) abundance has conventionally been the major criterion for assessing the conservation concern of a species or an element of natural heritage. If rarity is the rationale for protecting species, then there is no protection for species until they are rare. To move beyond rare species, the TRCA has developed a method of using species to determine the broader function of habitats and the positive or negative influences on them. The TRCA has ranked every fauna and flora species and all vegetation communities native to its jurisdiction according to their abundance, sensitivity and habitat needs.

b) Vegetation Community Abundance

Vegetation communities which score at 4 or 5 under the criterion of Local Distribution are considered rare in the TRCA jurisdiction (Appendix 3). Regionally-rare vegetation communities at CCCA may be restricted to particular geophysical situations that occur here but not commonly across the TRCA jurisdiction, such as clay barrens (CBO1); or they may have been largely eliminated by development, such as broad-leaved sedge organic meadow marsh (MAM3-6); or they may be unusual associations of common and uncommon species, such as a fresh-moist poplar mixed forest (FOM8-1) which in this case has the association of trembling aspen and balsam fir. In each case, the cause of the rarity needs to be investigated in developing a conservation strategy. Conserving habitat only is not sufficient enough to maintain rare communities.

c) Flora Species Abundance

Those plants which are scored four or five under the criterion of Local Occurrence are relatively rare in the TRCA jurisdiction (Appendix 4). This rarity could be the result of natural factors such as limited habitat or range, or it could be due to loss or alteration of habitat due to development pressures. Most of the rare or declining plants found in the Cold Creek Conservation Area have factors associated with their status that are related to habitat dependence or sensitivity. As noted above, using rarity as the sole rationale for protection is insufficient and leads to environmental degradation. Due to urbanization, the direct loss of habitat and the experience of the TRCA jurisdiction natural system, it is assumed that most native plants in the TRCA jurisdiction are undergoing at least slight declines.

d) Fauna Species Abundance

Ten fauna species found at Cold Creek – pied-billed grebe, red-shouldered hawk, Cooper's hawk, golden-crowned kinglet, yellow-rumped warbler, Blackburnian warbler, black-throated green warbler, clay-coloured sparrow, purple finch and striped chorus frog – are considered regionally rare. As is the case with flora, most regionally rare fauna species have other associated factors which explain their vulnerability which need to be taken into account in conservation strategies.

2. Distribution

a) Landscape – Distribution of Natural Cover

Natural cover performs innumerable functions, ranging from supporting native biodiversity to providing recreational and aesthetic opportunities for people, to water-related benefits. If natural cover is distributed evenly across the landscape, then those functions are provided evenly. In the TRCA jurisdiction, habitat cover is weighted

Cold Creek Conservation Area
Photography by Rosemary Hasner

Table 5: Terrestrial Natural Heritage Approach

Objective	Indicator	Measure (analysis)	Scale of Detail (data collection)
Promote the percent natural cover to a quantity which provides targeted biodiversity	Quantity	Total Natural Cover Vegetation Community Abundance Species Abundance	Landscape Vegetation Community Species (Flora and Fauna) Levels
Distribute natural cover to maximize opportunities for intraspecific variation	Distribution	Distribution of Natural Cover in relation to the TRCA Region Distribution of Vegetation Communities of Concern (L1-L3) Distribution of species of Concern (L1-L3)	Landscape Vegetation Community Species (Flora and Fauna)
Improve habitat patches to provide for species needs and promote population variability	Size and Shape	Habitat Patch Size Patch Shape Habitat Interior Area-Sensitivity	Landscape Landscape Landscape Species (Fauna)
Improve the opportunities for species to move safely across the landscape	Connectivity	Natural Cover Connectivity Vegetation Type Connectivity Community Species Mobility	Landscape Vegetation Species (Fauna)
Protect the natural system quality and function from the influence of surrounding land uses	Matrix Influence	Matrix Influence Scores Sensitivity to Development	Landscape Species (Flora and Fauna)
Protect and restore all native vegetation community types and species to adequate levels	Biodiversity	Vegetation Type Representation Geophysical Requirements Species Representation Habitat Dependence	Vegetation Community Vegetation Community Species (Flora and Fauna) Species (Flora and Fauna)

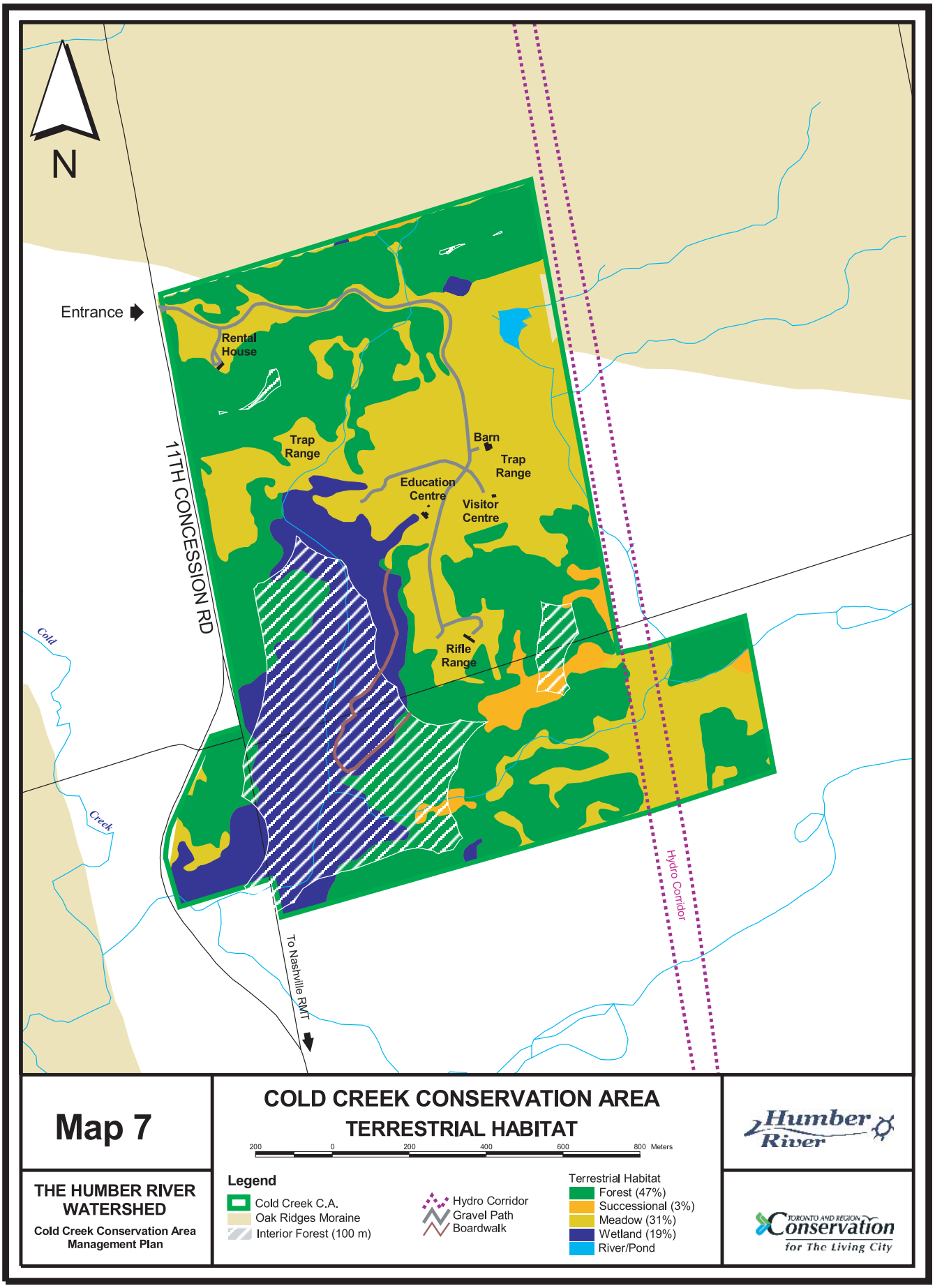
progressively to the north, with a serious deficiency to the south. This means that the northern part of the jurisdiction, including the Cold Creek Conservation Area, bears the burden of ensuring maximum biodiversity for the region as a whole since the largely urbanized southern portion cannot support most of the highly sensitive species.

b) Distribution of Vegetation Communities of Concern

High-ranking vegetation communities are those with ranks L1-L3. The ranks are based upon a combination of two criteria: local distribution and geophysical requirements. This more integrated assessment of conservation concern replaces the more-or-less strictly abundance-related criteria which have hitherto been used.

A total of six of the 42 vegetation communities at the Cold Creek Conservation Area are considered to be of regional concern, with ranks ranging from L1 to L3. Three of these are ranked L2 and the other three are ranked L3. A complete list of the vegetation communities found at Cold Creek, together with their ranks, appears in Appendix 3.

The communities of concern in the Cold Creek Conservation Area consist of four types of wetlands, a clay barren community and a mixed forest community. The most noteworthy of these communities is the large coniferous swamp (SWC3-2 White Cedar-Conifer Organic Coniferous Swamp) ranked L3. The other communities of regional concern are: SWT3-5 Red-osier Organic Thicket Swamp (ranked L3), MAM3-6 Broad-leaved Sedge Organic Meadow Marsh (ranked L2), MAS3-4 Broad-leaved Sedge Organic Shallow Marsh (ranked L3), CBO1



Map 7

COLD CREEK CONSERVATION AREA
TERRESTRIAL HABITAT

200 0 200 400 600 800 Meters

Legend

- Cold Creek C.A.
- Oak Ridges Moraine
- Interior Forest (100 m)
- Hydro Corridor
- Gravel Path
- Boardwalk

Terrestrial Habitat
- Forest (47%)
- Successional (3%)
- Meadow (31%)
- Wetland (19%)
- River/Pond

THE HUMBER RIVER WATERSHED

Cold Creek Conservation Area Management Plan

Humber River

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Open Clay Barren Ecosite (ranked L2) and FOM8-1 Fresh-Moist Poplar Mixed Forest (ranked L2). Descriptions of many of these communities appear in the biodiversity section below.

Cold Creek's vegetation communities, particularly the swamp and mature forests, make an important contribution to the regional natural heritage system. Most of the conifer swamps have long disappeared from the southern portion of the jurisdiction, having been drained for agriculture and/or replaced by urban development. Conifer swamps are now largely restricted to seepage areas along the Oak Ridges Moraine and some associated with the Iroquois shoreline in the eastern part of the jurisdiction.

c) Flora Species of Concern

The distribution of flora and fauna species of concern in the TRCA jurisdiction shows a concentration of occurrences in the northern parts of the watersheds, corresponding to the distribution of natural cover. In order to protect the full complement of native plants and animals that occur in the region, including those that cannot survive within an urban matrix, it will be necessary to protect the natural heritage system in the northern, rural part of the jurisdiction.

Eighty two of the 341 flora taxa found on the site are native species of regional concern ranked L1 to L3. Locations of these are shown on Map ($7A_1$) and a complete list of the flora species found on the site and their ranks can be found in Appendix 3. These ranks are a summary of the species' scores for four criteria: for sensitivity to development (see under Matrix Influence below) and habitat dependence (see under Biodiversity below) as well as rarity and population trend (see under Quantity above). Species of concern are not necessarily rare plants. However, because of their sensitivity to development and restriction to certain habitats, they are of conservation concern. Many of them are locally rare and/or have declining populations. Current trends are such that they are heading in the direction of rarity. Conservation efforts need to be exercised before a species becomes rare.

Varga. (1997)[6] identified 289 vascular plant species in the Cold Creek wetland complex which included some wetlands in the area surrounding the Conservation Area. Please refer to Appendix 4 for a complete list of the flora species found. Separate columns show the findings of TRCA and Varga.

Creeping snowberry, found in the CCCA, is given the highest rank of L1, is an excellent example of a highly vulnerable plant in the TRCA jurisdiction. This plant of

Coniferous Swamp – Cold Creek Conservation Area
Photography by Rosemary Hasner

cool, coniferous swamps used to occur in Toronto in places such as Mount Dennis (Faull, 1913)[7]. Now it is only found in a handful of swamps on the moraine. Most of its habitat has been eliminated and it is vulnerable to indirect impacts from nearby land uses.

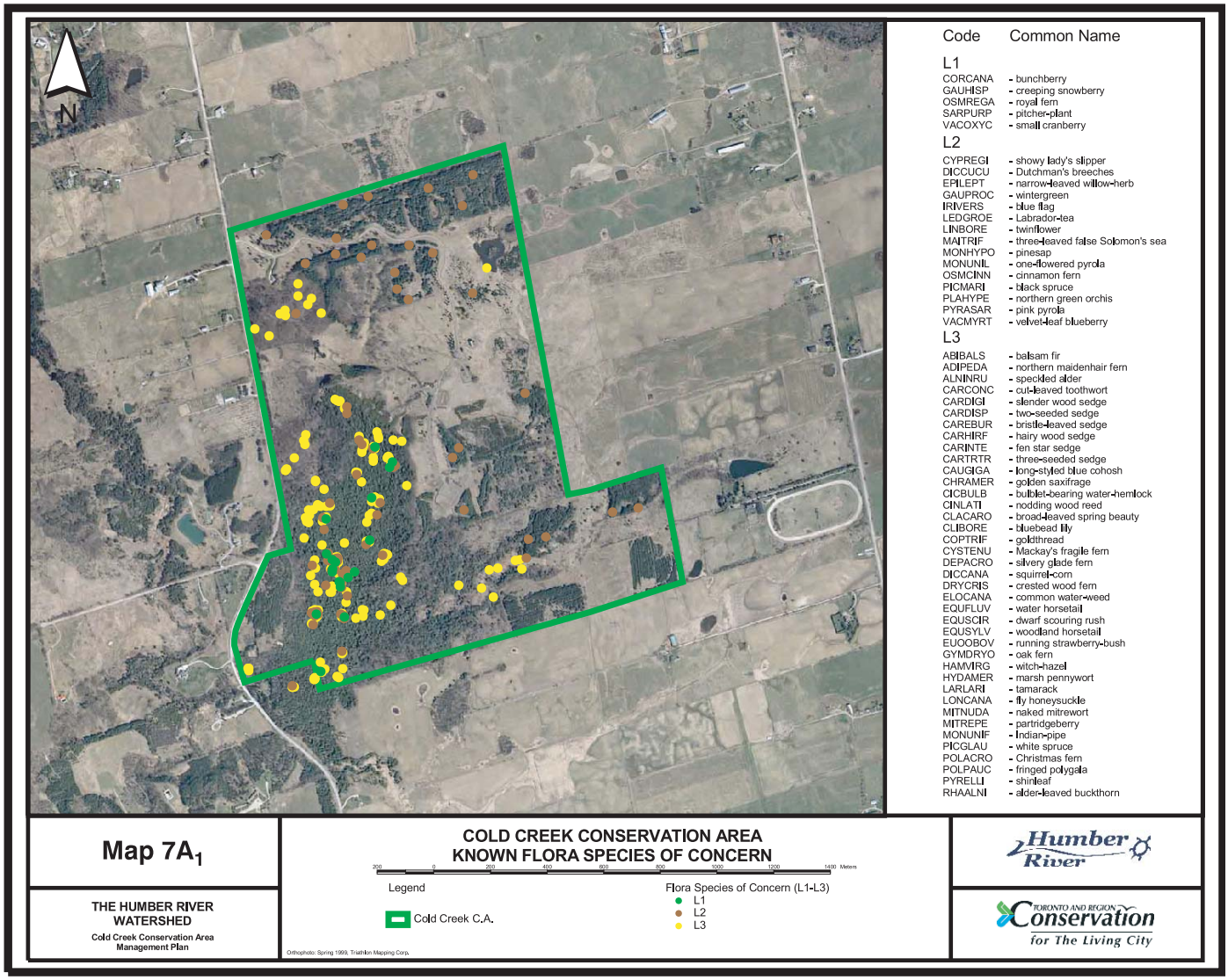
d) Fauna Species of Concern

In the 2002 summer survey, a total of 29 L1-L3 bird species were recorded consisting of one L1 species (red-shouldered hawk), four L2 species (pied-billed grebe, Cooper's hawk, wood thrush and black-throated green warbler) holding 16 potential breeding territories, and 24 L3 species holding 97 potential territories. Surveys in previous years had also documented black and white warbler. The four species of frog recorded at Cold Creek (three L2 and one L3) bring the total of fauna ranked L1-L3 to 34 species. Locations of these fauna species of concern are depicted on Map $7A_2$.

Almost all of the 34 species of concern that occur at CCCA have a distribution very much weighted to the north of the TRCA jurisdiction, outside of the southern, more urbanized portion. Loss of any one of these species at Cold Creek would tend towards an overall reduction in the distribution of that species in the northern part of the region, continuing a trend towards the undesirable level of distribution that presently exists in the southern portion of the region. Species as varied as black-throated green warbler, scarlet tanager and field sparrow have already been almost completely extirpated from the southern portion of the region and are now effectively restricted to the outer reaches of the TRCA jurisdiction and some of the better ravine systems.

6. Vagra, Steve.1997. *Ontario Ministry of Natural Resources Wetland Evaluation Data.*

7. Faull, J.H. 1913. *The Natural History of the Toronto Region.* Toronto: Canadian Institute.



Osmunda regalis – royal fern (L1 species)
Photography by Jeremy Ind

3. Matrix Influence

a) Landscape Matrix Influence

Surrounding each habitat patch in the TRCA region is a matrix of land uses including natural, agricultural and urban. Each of these land uses has an influence on the ecological function of the system. Adjoining natural cover are beneficial agricultural uses (as well as golf courses) which exert a moderately negative influence, while urban uses exert a strongly negative influence. The negative impacts include hydrological changes, incursions by opportunistic fauna such as increased raccoon populations and cats roaming from backyards, invasive exotic plant species, trampling, and collection. The result is varying levels of habitat quality and biodiversity depending on the matrix, irrespective of whether the habitat is "protected" in a park or reserve.

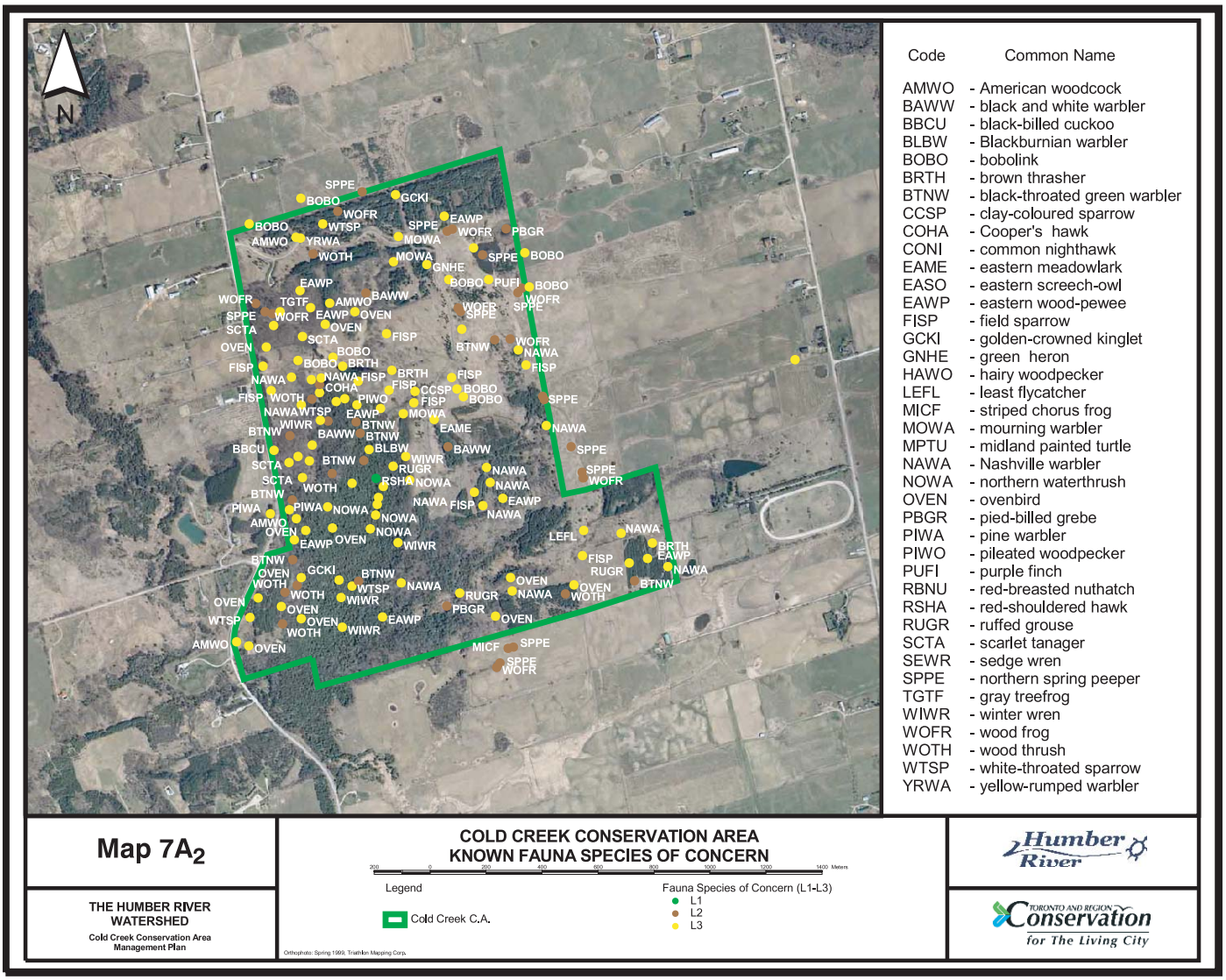
The present land uses surrounding the natural area at Cold Creek are largely a matrix of agricultural and old fields resulting in an overall matrix influence score of

Maianthemum trifolium – three teared taled solomon's seal (L2 species)
Photography by Jeremy Ind

three points (out of a possible five points, see Map 7B) or a "fair" matrix influence. In fact, the landscape analysis assumed agricultural uses on a larger area than is actually the case, as much of the open land is actually old-field natural cover.

b) Species Sensitivity to Development

Regardless of whether or not a habitat is protected, many species are of concern because of their vulnerability to specific impacts that come with adjacent land uses, especially urbanization. The CCCA site contains a significant number of sensitive species (see Appendix 2). Tolerant species include both invasive exotics, such as garlic mustard, and aggressive or tolerant natives ranked L5 such as Virginia waterleaf or tall goldenrod, in the case for flora, and American robin and blue jay as examples of tolerant fauna species. These are wildlife examples that might be expected to persist indefinitely without protection and/or habitat management in the region.



Black-throated Green Warbler
Photography from TRCA Archives

c) Flora

Specific development impacts on flora species include: changes in hydrology and surficial conditions; trampling with its associated plant tissue damage and soil compaction; competition from invasive exotic species that readily move into disturbed or fragmented habitats from gardens or trails; picking and collection; herbivory by increased populations of opportunistic fauna such as Canada geese or squirrels which thrive in fragmented landscapes; soil, water and air pollution.

Many of the 82 species of concern (ranking L1-L3), show a high sensitivity to development, scoring greater than or equal to three points in the sensitivity to development category (see Appendix 3 for a complete list of flora species found at CCCA). Some of the possible impacts and species vulnerable to those impacts are discussed below.

Wetland flora species, especially those associated with swamps, are highly vulnerable to changes in hydrology. Examples of such species at CCCA include creeping snowberry, twinflower, golden saxifrage, cinnamon fern, goldthread and tamarack. Many of these require a steady seepage of cold ground water as they are typical of conifer swamps. Hence, interference with the ground water seepage through drainage or diversion will have a serious impact on these species. Other species, though not restricted strictly to swamps, such as oak fern and hemlock which ranks as L4, require a moist, sheltered environment and would suffer from increased drying especially with canopy opening and exposure to wind and sun.

A number of the flora species of concern identified at CCCA have delicate stems and root systems and are not able to withstand trampling and soil compaction. These include species such as Mackay's fragile fern and star-flower. Other species, notably many of the showy-flowered monocots such as blue-bead lily, only produce one set of leaves per growing season and will not replace them if they are broken off by trampling. The sensitivities of these species should be considered when planning trail development and user allowances (for example, off-leash dogs in areas containing these species could be detrimental to their survival).

Invasive species such as European buckthorn, which is present in a few areas of the Cold Creek site, can often out-compete native species, especially if the latter are small in stature, slow-growing and if there is even slight disturbance. For example, balsam fir is likely to be replaced as a component of understorey regeneration in moist successional forests by European buckthorn and spring ephemerals such as squirrel-corn and broad-leaved spring beauty are liable to be ousted by garlic mustard on the forest floor. Garlic mustard has not yet been found in the Cold Creek Conservation Area but is a region-wide problem that could invade Cold Creek from surrounding lands. Disturbance facilitates the spread of invasive species, while large, intact natural habitats tend to inhibit them.

Forest management can disrupt the natural dynamics of woody debris accumulation or wind-throw mounding. Saprophytes, such as Indian pipe, require an intact forest floor with its intricate litter food web whereas pinesap appears to require dense, young stands of conifers such as fairly young plantations or stands of cedar. These are things to consider when planning the management of the forests or plantations at CCCA.

Elevated numbers of herbivores associated with settlement patterns can result in the decline of certain plant species (Sauer, 1998)[8]. This is due to the fragmentation of the large areas of habitat required by higher-order predators that normally control herbivores, as well as the provision of ample food sources for herbivores with "edge" habitat. White-tailed deer have had a serious impact in some areas of the U.S. and in some southern Ontario parks such as Rondeau. They are a particular concern with woodland herbs such as white trillium and young trees. There is some concern that deer may become a moraine-wide issue although they are not a specific concern at CCCA at this time.

Increased usage of the area may lead to increased pressure for picking and collection of showy plants as people try to transplant them to their gardens. Eye-catching flowers such as the showy lady's slipper or trillium species and unique plants such as the pitcher-plant are prime targets for collectors. Attractive ferns such as Christmas fern may also face some pressure.

Pollution and other forms of chemical alteration of habitat may affect certain plants. While air pollution tends to be a regional rather than a site-specific issue, alterations to soil and groundwater are a frequent threat arising from development, both on-site and on adjacent lands. For

8. Sauer, Leslie. 1998. *The Once and Future Forest.* Washington D.C.: Island Press.

example, run-off from adjacent agricultural lands, existing and proposed golf courses, lawns, roads and/or bridges is often highly concentrated with pesticides, nutrients, oil and road salt. This run-off enters the nearby wetlands and other natural habitat patches and can potentially alter the physical and chemical composition in an unfavourable manner. Many native plants, especially those of wetlands, require natural water input which is relatively low in silt and nutrients. Subsoil and concrete that are dumped in fill are usually highly alkaline, and the resultant alterations in soil chemistry would be harmful to plants requiring low-nutrient or acidic conditions such as pyrolas and their relatives, Labrador tea or wintergreen found in the CCCA on organic soils. Wetlands with altered chemistry, especially high levels of nutrients and silt, tend to be taken over by aggressive species that take advantage of the high fertility, such as reed canary grass.

d) Fauna

At CCCA, 24 of the 34 fauna species that are ranked L1-L3 score three or more points (out of a possible five) in the Sensitivity to Development category and are currently at this site because the surrounding matrix is largely natural and agricultural. These sensitive species can be divided approximately into two groups: those species that prefer forest-interior or closed habitat-types (19 of the 24 species); and four species that require relatively open habitat (brown thrasher, field sparrow, eastern meadowlark and striped chorus frog); leaving one open-water/wetland obligate species, pied-billed grebe. A deterioration of Matrix Influence would adversely affect these species.

Several of the bird species found at Cold Creek nest in low in-the-ground vegetation or on the ground. As such, they are highly susceptible both to increased predation from ground-foraging predators (house cats, raccoons) and to repeated flushing from the nest (by pedestrians, off-trail bikers and dogs) resulting in abandonment and failed breeding attempts. Such sensitive forest-bird species include ruffed grouse, veery, ovenbird, black-and-white warbler and white-throated sparrow. Two of the more open habitat bird species, field sparrow and eastern meadowlark, and Nashville warbler (an inhabitant of open woodland and edges) are ground-nesters (or sometimes slightly elevated in the case of field sparrow; brown thrasher also frequently nests at ground level) and would be severely affected by any increase in pedestrian, vehicular or dog traffic within their habitat. At current local population levels, it appears that sensitive ground-nesting species are able to exist relatively unmolested and undisturbed (note in particular the high number of Nashville warblers noted on the site).

4. Size and Shape

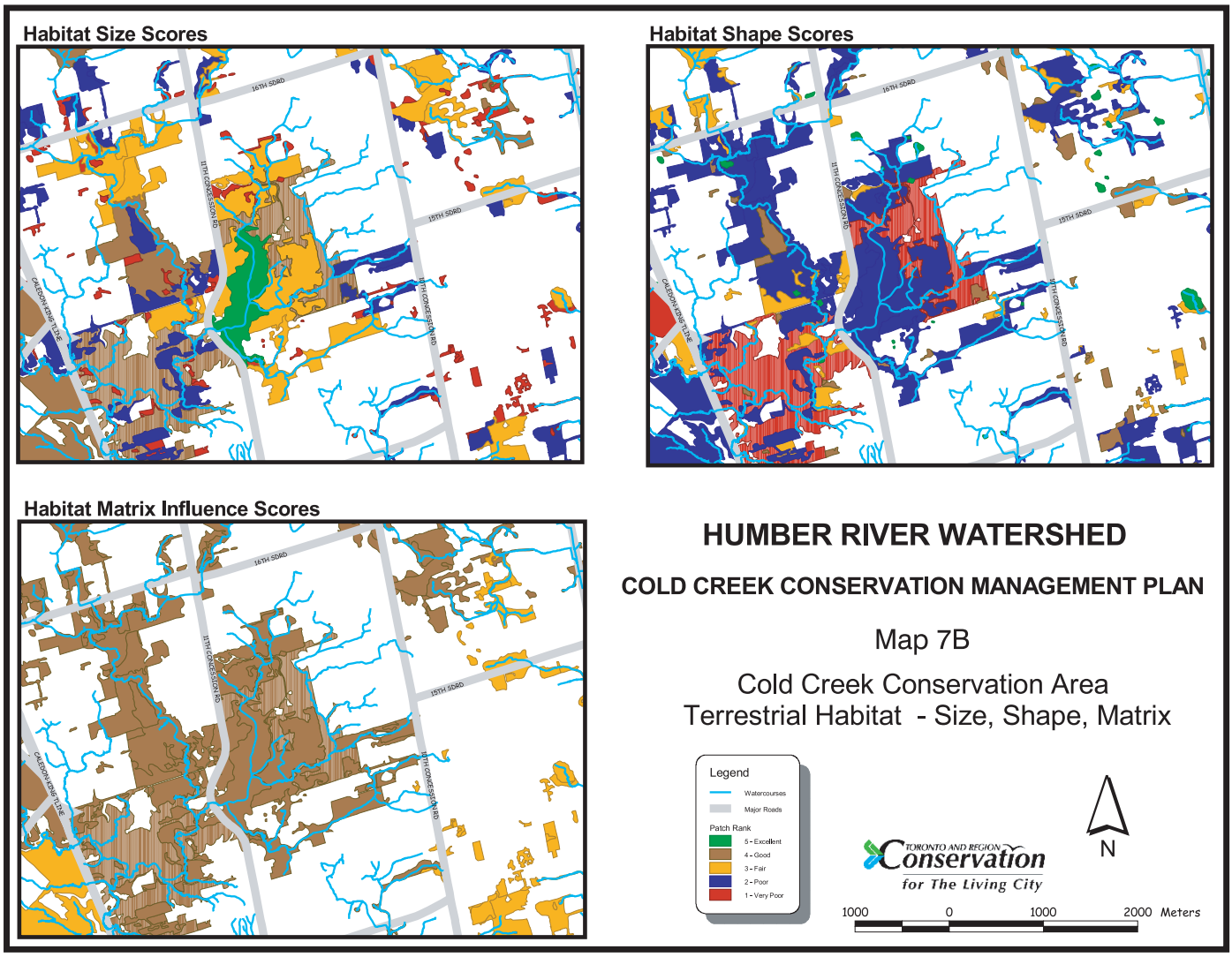
Generally, the function of a habitat patch is exponentially related to its size and shape (Map 7B). Larger and rounder is better, partly because size and shape dictate the amount of habitat interior conditions.

Interior conditions are not found (or restored) everywhere, so a second concept, area-sensitivity, is important to consider. Area-sensitivity, or the need for habitats of a certain minimum size, varies between fauna species along a gradient. (This concept does not apply to flora in a direct way, although exposure to the elements and invasive species incursions is scored under sensitivity to development.) In other words, some fauna (i.e., grey catbird, indigo bunting) can survive in very small forests. Others (i.e., eastern wood-pewee, wood thrush) can use medium-sized forest patches, while species with high scores such as hermit thrush and ovenbird require large forest blocks.

a) Habitat Interior

The term “interior” is applied to those parts of the habitat patch that are greater than a certain distance from the edge. The numerical definition is usually set at 100, 200 or 300 metres from any edge, but even in smaller patches, larger and rounder is better. Forest interior provides shaded, moist, cool conditions and some refuge from external effects, the conditions needed for numerous native plants and animals.

Much of the forest at the CCCA site is somewhat fragmented and only scores three out of a possible five points (“fair” rating) for patch size, and even lower in terms of shape. On the other hand the coniferous swamp, considered a wetland as opposed to forest, scores considerably higher for size (five points out of a possible five!). The rather low patch-size scores of the forest cover are somewhat surprising but can be readily explained by the fact that the large patch of swamp forest in the south-west corner of the site effectively divides the otherwise high scoring woodland patch. This same habitat patch similarly masks the real occurrence of forest interior at Cold Creek since, again, this large habitat patch is considered wetland rather than forest and hence diminishes the apparent forest interior. In fact, if the coniferous swamp was treated as forest cover the south-west quarter of the site would hold an extensive area of 100 metres forest interior and the site’s only area of 200 metres interior. For the purpose of calculating forest interior, the swamp will be considered as forest instead of wetland. To illustrate this, treed swamp appears as a separate category under wetlands on Map 7C.



b) Area Sensitivity

Twenty-four of the 34 L1-L3 ranked fauna species that occur at CCCA are considered area sensitive (i.e., require at least five hectares of preferred habitat), with three species – red-shouldered hawk, least flycatcher and black and white warbler – requiring in excess of 100 hectares of forest. Nine species (including winter wren, black-throated green warbler, Blackburnian warbler, pine warbler, ovenbird and scarlet tanager) require at least 20 hectares of forest habitat; the remaining 12 area-sensitive species (including Cooper's hawk, Nashville warbler, northern waterthrush, white-throated sparrow and the four frog species) require at least five hectares of continuous habitat.

5. Connectivity (Linkage)

Connectivity of natural habitats facilitates the movement of flora and fauna across the landscape. Natural corridors play an important role in maintaining ecological functions by allowing for the genetic flow of plants and animals. For example, connectivity prevents genetic isolation and inbreeding in plant and animal populations by allowing genetic exchange to occur between habitat patches, and it allows fauna to move between areas of crucial habitat. Many species of fauna and flora are habitat specialists and require corridors consisting of their preferred habitat type. The wider a corridor, the greater the opportunity is for habitat specialists. Habitat generalists (more tolerant species) will use virtually any habitat to move, but even they can be thwarted by roads and houses and other facets of development.

a) Landscape Connectivity

All native species in our region are adapted to a highly-connected landscape with complete natural cover. Fragmented landscapes with isolated habitat patches, separated by artificial barriers, have only occurred in the last two centuries. Efforts should be made to link the habitat patches in Cold Creek Conservation Area with patches in the surrounding area to increase connectivity and create wildlife corridors.

White Throated Sparrow
Photography by Rosemary Hasner

b) Species Mobility

While connectivity is a habitat issue for flora species in terms of the dispersal of seed or other propagules across a fragmented landscape, the scoring of this criterion is hard to assess because the sensitivity of flora to inbreeding, for example, varies enormously from species to species. The need of fauna species for habitat connectivity is better understood, and treated below.

Thirteen of the 34 L1-L3 ranked fauna species that are found at CCCA show a requirement for continuity of habitat to facilitate mobility; for example, adults foraging for food during the nesting and fledgling stage of the breeding season.

Perhaps more sensitive to this issue than any of the bird species are the frog species. Spring peepers and wood frogs migrate seasonally, moving to breeding pools in the spring (a variety of permanent and vernal water bodies - ponds, swamps, bogs, lakes and ditches), then returning to woodland habitat for the summer. Grey treefrogs, similarly, breed in permanent or vernal pools, and migrate to forage in moist woodlands for the summer months. If any obstacle to such migrations is imposed on the frog's habitat, their breeding cycle is interrupted and, thus, the population is endangered. To avoid such an impact, it is important to maintain safe corridors between habitat blocks (see: Sensitivity to Development section under Matrix Influence). New roads can expose migrating frogs to predators (as the frogs cross unprotected ground) and the chance of roadkill.

Currently, connectivity, both within the site and between the site and its immediate surroundings, is good with very few physical obstacles to impact on the mobility of various fauna species. This is attested to by the large number of frog breeding sites in and around CCCA. Any development or management proposals should seek to maintain this level of connectivity, thereby protecting the high biodiversity of the site.

6. Biodiversity

According to the TRCA's Terrestrial Natural Heritage Approach, biodiversity is described by vegetation type, flora species, and fauna species representation. Representation is essentially the presence or absence of a species at a site. Traditionally this has been deemed an adequate measure of the quality of a site but this ignores the idea of viability and vulnerability. It is important to tie representation to abundance such that an ideal situation is one where each species represented on a site is present in numbers high enough to maintain its local population, a situation which is only likely to exist where those species' specific habitat requirements are met.

a) Vegetation Community Type Representation

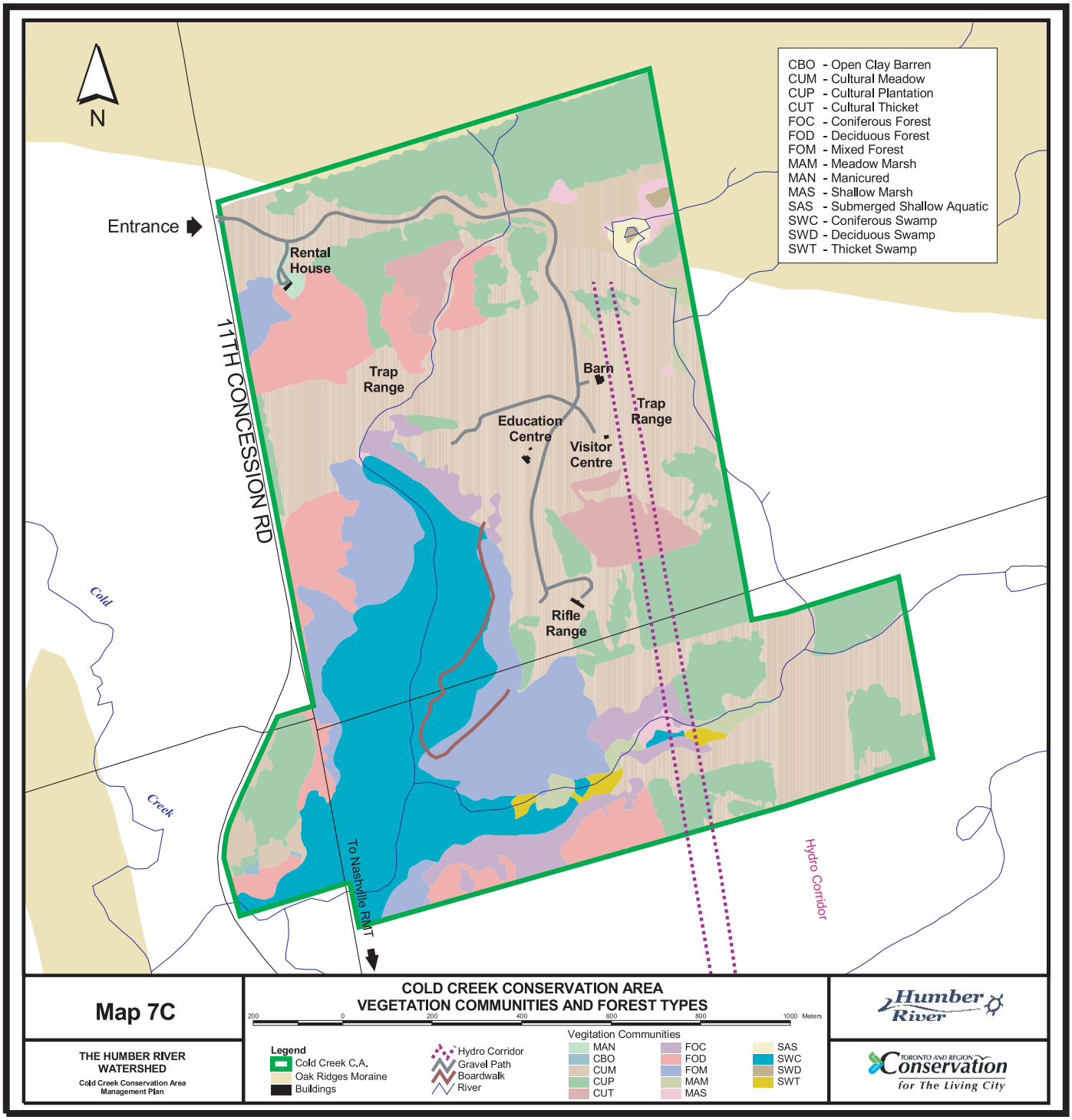
All of the vegetation communities identified in the 2002 field season in CCCA are listed in Appendix 3 together with their scores and ranks. These communities are illustrated on Map 7C. Forty-seven different vegetation community types were observed including 10 that were only represented as complexes or inclusions which occupy areas of less than 0.5 hectares. A small manicured area near the house was not counted. A description of the vegetation community types that were found in the CCCA is provided below.

a.1) Forests

At CCCA there are two broad categories of forests: those that are a result of natural succession processes having taken place (forests of natural origin) and those that result from planting (plantations).

Forests of Natural Origin
There are 15 natural forest community types existing at CCCA. Mature, deciduous forest communities on-site are usually dominated by sugar maple with beech, white ash, basswood and ironwood acting as secondary associates. A

Grey Tree Frog
Photography by Rosemary Hasner



number of mixed forest community types were also present, including Fresh-Moist Sugar Maple – Hemlock Mixed Forest, Fresh-Moist White Cedar – Sugar Maple Mixed Forest and Fresh-Moist Poplar Mixed Forest. A few stands of conifer forest also occur on the site. These comprise mostly pure cedar stands although on a few of the moister sites there is hemlock mixed with the cedar. Most of the forests in CCCA are located adjacent to the swamp and provide a buffer that allows much of the swamp to be considered "interior habitat." Many of these forest communities are ranked L4 or L5 but may be of high quality due to their maturity and rich ground flora. Some of the noteworthy natural forest community types are described here.

Dry-Fresh Sugar Maple Deciduous Forests

These forests are dominated by sugar maple also referred to as hard maple. This species is shade tolerant, being able to regenerate beneath its own shade. These forests have a range of age-classes growing within the same compartment. Growing in association with the hard maple are other tolerant and mid-tolerant tree species such as American

Photography by Rosemary Hasner

beech (FOD5-2 Dry-Fresh Sugar Maple – Beech Deciduous Forest), basswood (FOD5-6 Dry-Fresh Sugar Maple – Basswood Deciduous Forest), white ash (FOD5-8 Dry-Fresh Sugar Maple – White Ash Deciduous Forest) and ironwood (FOD5-4 Dry-Fresh Sugar Maple – Ironwood Deciduous Forest). Other hardwoods common to the Great Lakes/St. Lawrence forest region and Deciduous forest region also occur in these forests. This type of natural compartment is referred to as a climax forest where regeneration of the forest occurs under a developed canopy (favouring tolerant species) and in small openings in the forest canopy. These mature sugar maple forests are noteworthy for their rich ground flora, especially their carpets of spring ephemerals. Many of these spring ephemerals are regional species of concern including cut-leaved toothwort, squirrel-corn, and broad-leaved spring beauty which are all ranked L3 and Dutchman's breeches which is ranked L2.

Fresh-Moist Poplar Mixed Forest

This community is located next to the organic cedar swamp near the southern boundary of the Conservation Area and is of regional concern with a ranking of L2. This mixed forest has trembling aspen and balsam fir as the dominant species in the canopy growing in association with paper birch and cedar. Balsam fir is itself ranked as an L3 species and its inclusion as a dominant species in this forest type partially explains why this community is of regional concern. This forest acts as an important buffer to the swamp and also provides habitat for other regional species of concern such as oak fern and fly honeysuckle both ranked L3.

Plantations

There are 10 plantation community types occurring at CCCA. Seven of these plantations are coniferous, two are mixed coniferous-deciduous and one is deciduous. It should be noted that although the deciduous plantation is actually coded as a natural forest (FOD4-c Dry-Fresh Black Locust Deciduous Forest), it should be considered a plantation as it is dominated by black locust which is an exotic species that propagates by growing suckers from the original planted trees.

The vast majority of the plantations at CCCA are softwood (coniferous) plantations. Softwood plantations have been widely planted on the TRCA properties as part of the land management and conservation programs. Plantation establishment in general has taken place over the past 50 years. Plantations at CCCA are multi-aged and in various stages of maturity and management. Specific recommendations for the management of these plantations

are provided in Chapter 6. The most common plantation types found are dominated by white pine, white spruce, or a mixture of native and exotic coniferous tree species.

a.2) Wetlands

There are 13 wetland community types found at the Cold Creek Conservation Area. Of these communities, the largest and most significant is the White Cedar – Conifer Organic Coniferous Swamp. Thicket swamps, dominated by red-osier dogwood or slender willow and many different types of marsh communities, are some of the other wetlands present at the Cold Creek Conservation Area. A description of the conifer swamp follows.

White Cedar – Conifer Organic Coniferous Swamp:
This large conifer swamp is located in the southeast corner of the site and exhibits old-growth characteristics. Organic soils greater than one metres in depth indicate centuries of uninterrupted accumulation. Growing in association with white cedar is a mix of balsam fir, white spruce, tamarack and occasional hardwoods such as black ash and yellow birch. The relative composition of different areas within the swamp varies according to levels of soil moisture. The swamp at CCCA also supports a component of black spruce which is rare to this area of Ontario. The black spruce remaining in the swamp are considered overmature and a remnant of an earlier community type. Shade tolerant balsam fir and white cedar are generally replacing the black spruce. The lack of disturbance in the forest understory has impeded the ability of the black spruce to reproduce on this site and, without intervention, this species will not have a long term future at CCCA. One possibility for maintaining the black spruce component involves planting plugs of black spruce in windthrows that have created natural openings in the canopy (see Chapter 6 for more information about this recommendation). The sensitivity of this ecosystem should not be under-estimated. A large number of regional species of concern were found here, many of which are highly sensitive to trampling and other impacts. Although this community should be considered a wetland, it is shown as a forest community in Map 7C. This was necessary for the calculation of 100 metres forest interior.

a.3) Open and Successional Communities

Six community types found at Cold Creek Conservation Area can be considered open or successional. Among these communities are the dry, open meadows referred to as “old field” that occur on agricultural fields or pasture lands that are out of use. These old fields may contain established species such as hawthorn and wild apple. Regeneration in old field communities creates other, less open, successional communities. Regeneration will occur from surrounding forest tree species. Shade intolerant and mid-tolerant species like white cedar, white ash, white pine and poplars are seeding into the old field areas and

The Boardwalk at Cold Creek Conservation Area
Photography by Rosemary Hasner

may colonize and become established if conditions for their survival are favourable. These habitats can provide variety to the landscape and increased opportunities for some wildlife species. These areas, if left undisturbed, will allow for natural succession to shape the future communities in the Conservation Area. One successional community is classified as Exotic Cultural Thicket (CUT1-c) due to the presence of European buckthorn, an invasive exotic species. If such species are not removed from the site, natural succession could mean future communities will be dominated by such aggressive exotics, thus reducing their quality.

A few small areas of clay barren community are also found at the site. This community type is of regional concern and contains minimal vegetation. The species that are found here include stunted cedar trees, hawkweed species and gray goldenrod.

b) Vegetation Type Geophysical Requirements

Vegetation communities develop under certain site conditions. Certain communities are restricted to particular conditions based on slope, aspect, hydrology, soil character, and dynamic processes. Others occur under less restrictive conditions across a range of sites. Certain communities are associated with particular topographic situations. Conifer and mixed swamp communities require a cool, moist exposure. This means that they are found in bottomlands and north and east facing slopes. The White Cedar-Conifer Organic Coniferous Swamp community occurs only on soils with an organic layer at least 40 cm in depth. These organic soils take centuries to form and cannot be replaced through known ecological restoration techniques. Another important feature of organic wetland soils is that they act as long-term carbon sinks. Some of the regional species of concern that were found in the cedar-conifer swamp require acidic soil offered in “bog-like” microhabitats.

c) Species Representation (Flora and Fauna)

Flora Species
The flora of Cold Creek Conservation Area is noteworthy because of the mix of northern and southern species. The high quality vegetation communities of the site (most notably the cedar-conifer organic swamp and the variety of mature forests) enable it to support a wide range of flora species. A total of 341 flora species were found at Cold Creek by the TRCA 2002 field staff and by Steve Varga from the OMNR in 1997. There are 82 considered regional species of concern and 65 are listed as exotic or non-native species. For a complete list of all vascular plant species and their respective L-ranks found in CCCA, refer to Appendix 4.

Fauna species
The TRCA fauna surveys at CCCA in 2001 documented a total of 73 bird species, seven mammal species and eight amphibian species. Surveys in previous years had also reported black and white warbler on the site, bringing the total of bird species to 74, and the total of resident (breeding) fauna species to 89. Appendix 2 lists all fauna species found at the Cold Creek site together with their conservation ranks.

d) Species - Habitat Dependence

Many species are habitat specialists; that is, they are dependent on very specific conditions or types of habitat. They are sometimes referred to as "obligate" users of those habitats. Many species of fauna require the association of two high-quality habitats for different parts of their life cycle.

Flora
All flora species are dependent, in varying degrees, on certain ecosite characteristics. This varies between species as some are highly adaptable to a wide variety of conditions, while others are dependent on a very narrow range of habitats. Many of the regional species of concern found at CCCA are habitat specialists. A few examples of habitat specialists occurring at CCCA include: oak fern which requires mixed and coniferous swamps and moist forests; Christmas fern, restricted to fresh-moist sugar maple forests or mixed sugar maple-hemlock forests; two-seeded sedge, confined to coniferous, mixed, and thicket swamps, nearly always on organic substrates; and Dutchman's breeches restricted to mature sugar maple forests. Of special interest are the species in the rather large conifer swamp that are dependent on this type of habitat such as creeping snowberry. Included in the large conifer swamp are certain areas of bog-like microhabitat. In these areas, many bog specialists are found including pitcher-plant, round-leaved sundew, small cranberry, black spruce and three-leaved false Solomon's seal.

Polystichum acrostichoides – christmas fern (L3 species)
Photography by Jeremy Ind

Fauna
Certainly, the most interesting of the habitat types that comprise the CCCA is the large and intact coniferous swamp in the south-west corner. The importance of this habitat block is well-illustrated by the occurrence of a fairly dense cluster of species of concern within the swamp, including habitat specialists such as red-shouldered hawk, Blackburnian warbler, black-throated green warbler and black and white warbler. Perhaps more importantly, this coniferous swamp also holds a good population of species that, although not considered habitat specialists, show a marked preference for damp woodland conditions: Nashville warbler (a species which breeds in a variety of habitats but its preferred nesting site is in moss hummocks, as found in such coniferous swamps), winter wren and northern waterthrush (which shows a very definite requirement for surface water).

The variety of vegetation structure (mature forest covering much of the western half, secondary forest in the smaller blocks in the east) and Spatial Landscape (open old-field systems in the north-east quarter, interior forest habitat in the south-west corner) are two aspects of the CCCA site that contribute to the site accommodating such a high number of habitat specialists, and fauna species in general. Both raptor species – red-shouldered hawk and Cooper's hawk – thrive in mature forest, ovenbird and wood thrush both prefer forest-interior habitat, while the Nashville warbler prefers somewhat more open woodland or forest edges. The extensive area of open fields in the north-east corner supports good numbers of field sparrows, alongside bobolinks and eastern meadowlarks.

Deparia acrostichoides- silvery glade fern (L2 species)
Photography by Natalie Iwanycki

4.2 HUMAN HERITAGE

The protection and interpretation of the culture and heritage resources allows us to raise awareness and to reflect on the watershed's diversity, both past and present.

4.2.1 Archaeological Resources

a) Method

Two methods were used to determine the potential of the project area to contain known or unknown cultural heritage resources. First, relevant modern and historic documents held at the Royal Ontario Museum and the Ministry of Culture were examined. Second, the TRCA's Archaeological Site Predictive Model (Burgar 1990)[9] was applied to the project area.

Archival research into historic and modern heritage documents was conducted to determine the presence of any previously reported archaeological sites in the Cold Creek Conservation Area. This research is summarized in the Toronto and Region Conservation Authority's Archaeological Master Plan (Burgar 1990). In addition, the modern data base of recorded archaeological sites, held by the Ministry of Culture, was examined. No archaeological sites had been previously reported within a 1.5 kilometre radius of the property. The nearest registered archaeological site is located 3.5 kilometres to the south.

b) History

The land in the Cold Creek Conservation Area is composed of Lots 10-15 in Concession 10 and Lots 10 and 11 in Concession 11 (Figure 4). The survey of this land was completed in 1799-1800 and was available to settlers shortly thereafter. Evidence suggests that the terrain was hilly in some areas with varying soil conditions, and timbered with hemlock, pine, and hardwood maple. Due to the terrain, the route of the Eleventh Concession Road was altered by the Corporation of the Township of King in 1860-1861. The first Crown patentees were sons and daughters of Loyalists who resided elsewhere in the province and were therefore absentee landlords. Some sold their holdings immediately after their settlement duties were performed and the patent obtained while one, David Bessey, retained his holdings for over 40 years. Often the land passed to speculators, such as the wealthy Niagara merchants Dickson and Street, and the sale of smaller parcels pro rata for tax arrears was seen on some of these township lots in the early to mid-1830's. Only two reserve lots were found within the study area, one of which was acquired by a private individual in the 1840's and the other was sold by the Canada Company. Actual permanent settlement of this area was undertaken by immigrants of English, Irish, Scottish and German background starting in the second quarter of the 19th century. Nearly all these settlers constructed homes of one storey timber construction although the second "Holly Park" house of the 1860's displays some brick construction. Agricultural census returns show that these settlers carried out mixed agriculture with a wide variety of crops and livestock. Fruit growing began to increase in the 1860's and 1870's, and a large proportion of these settlers produced maple sugar. A few grew specialized crops such as hops and flax, some cut timber from their land, and only one family enumerated honey as a farm product. Evidence for trapping was not found with the exception of one fox fur that was taken during the year 1870. The settlers in this area were mainly Presbyterian, although there was also Wesleyan Methodist, Anglican and Catholic families found. Land was donated within the study area for a Presbyterian church, and a Catholic church stood just to the south on Township Lot 9. The main centre of activity focused on the O'Neil "Holly Park" farm on Lot 15. This industrious family erected a sawmill on Lot 15, Concession 11, and ran the local post office between 1878 and 1913. The original Holly Park home, constructed in 1841, was moved and re-assembled in Mulmur Township while the second Holly Park remained in private ownership and was used as a residence as late as 1975. Holly Park was the scene of many social events, and an example of 19th

9. Burger, Robert W.C., 1990. *An Archaeological Master Plan for the Metropolitan Toronto and Region Conservation Authority*. TRCA, Toronto. Ontario.

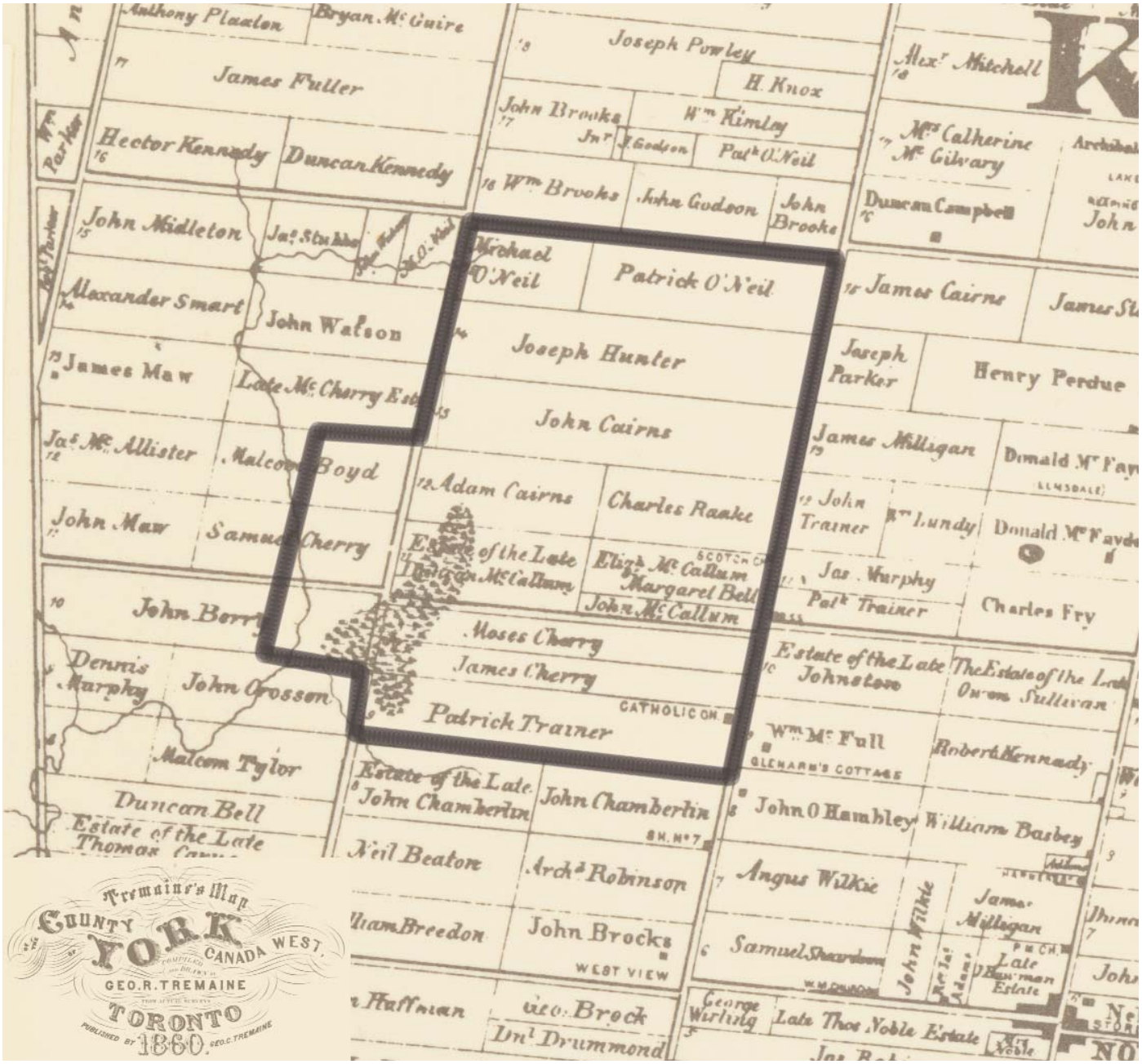


Figure 4: Historical Land Ownership

century poetry commemorating an oyster supper held there has been preserved. The patent plans show a projected railway, the Woodbridge and Sudbury, which was to have cut through the eastern part of Concession 10. This might have increased the importance of the community which, due to its geographic location and the presence of larger towns such as Newmarket and Aurora which were on important transportation routes, Cold Creek and Holly Park were never allowed to develop beyond a small "crossroads" community.

c) Archaeological Potential

Archaeological potential represents the likelihood of finding archaeological sites within a defined area based upon the criteria of the area's distance to a water source, the soil type and drainage capability, and the topography. In planning, determining archaeological site potential provides an immediate indication that sites may be found within a project area. Although all TRCA lands are surveyed for archaeological sites prior to any construction activity or land transfer, site prediction helps to determine the relative amount of land within a project area that is likely to contain heritage resources that may be impacted and, therefore, will require either mitigation or an alteration of the proposed project.

An integral component of the TRCA's Archaeological Master Plan (completed in 1990) was the development of an Archaeological Site Predictive Model (ASPM). This

model was designed for use by the TRCA in land use assessments prior to both passive and active development. The ASPM does not predict precise site locations rather, it presents a generalized view of the current understanding of prehistoric settlement patterns in the watershed and applies this knowledge to lands owned by the TRCA.

The ASPM was based on statistical analyses of a well-defined database and mathematically-derived variables. These variables include:

Distance to Water:	1) -253 metres	(H)
	2) 254 metres^{+}	(L)
Soil Drainage:	1) Good	(H)
	2) Imperfect	(M)
	3) Poor	(L)
Topographic Variability:	1) Level-gently undulating	(H)
	2) Undulating	(H)
	3) Rolling	(M)
	4) Hilly	(L)

H= High Probability
M=Medium Probability
L= Low Probability

An objective classification of sets of combined variables defined the parameters used to establish High, Medium and Low probability categories. These categories demonstrate the probability that an archaeological site is present in a given locality.

d) TRCA's Archaeological Site Predictive Model Application

An application of the TRCA's Archaeological Site Predictive Model indicated that approximately 170 hectares (90%) of the area within the CCCA is classified as High Probability (Categories 1, 2 and 3) for containing archaeological resources. Of the 170 hectares area, approximately 150 hectares are defined as the highest probability (Category 1) areas which indicate that the vast majority of the CCCA is located within 253 metres of a water source, is on well-drained soil, and has relatively flat topography. Within the Greater Toronto Area (GTA), 34.3% of prehistoric archaeological sites have been found in these Category 1 areas. Approximately 20 hectares within the CCCA are considered High Probability Category 3, which only differs from a Category 1 area in that the soil is imperfectly drained. Within the GTA, 30.1% of registered sites have been found in these Category 3 areas. The remaining 20 hectares (10%) in the project area is determined to be Medium Probability Category 5 which indicates that, while the soil is well-drained and the topography is level or nearly level, the area is beyond 253 metres from water. Prehistoric archaeological sites within the GTA have been located on an area with these characteristics in 3.5% of the registered cases.

Although no sites have been identified at the CCCA, the Archaeological Site Predictive Model indicates very strongly that unknown archaeological sites are present. In particular, the presence of well-defined watercourses associated with a coniferous swamp suggests that the project area may have been visited by Ontario's earliest inhabitants; the Palaeo Indians (ca 10,000 BC). Certainly, the local environment would have provided a rich resource base for nomadic peoples for thousands of years (ca 8500 BC – AD 1000).

4.3 PAST RECREATION AND EDUCATION DEVELOPMENTS

4.3.1 Recreation Facilities

The CCCA was developed to provide outdoor recreation and educational opportunities. The facility development at CCCA included a centre fire rifle range (which was also utilized for handguns), and a trap range. In 1979, the construction of a control building adjacent to the trap range provided washrooms, warming area, ammunition storage and limited refreshment facilities. Also included was a range for archery and an artificial pond. The area surrounding the pond was used for dog training. A 300-metre long elevated boardwalk was also constructed in the coniferous swamp, which permitted visitors to view the swamp without severely impacting the area. In the winter months, CCCA was utilized for husky dog sled trials and cross-country skiing.

4.3.2 Conservation Education Programs

The Cold Creek Conservation Field Centre, which was established in September, 1968, was set up to accommodate school classes on a daily basis during the week and to provide a meeting place on weekends for sports clubs such as the Toronto Anglers and Hunters.

Camping at Cold Creek Conservation Area
Photography from TRCA Archives

Rifle Range (circa 1980's)
Photography from TRCA Archives

Model Airplane Training
Photography from TRCA Archives

Previous Recreational Operations

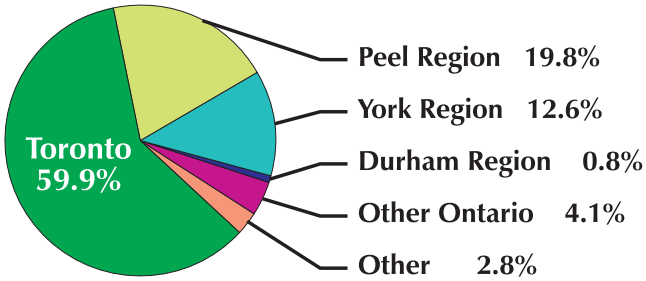
- Rifle Range-100 yards with 26 positions
- Pattern Board for Shot Guns
- Trap Range-2 manual and 2 electric traps
- "Turkey Shoot" Facility
- Archery Range
- Sled Dog Trails
- Facility for Retriever Trials
- Field Centre and Visitor Centre
- Remote Control Airplanes
- Boardwalk through the Coniferous Swamp

4.3.3 Attendance and Users

Use and attendance patterns at Cold Creek Conservation Area showed uniqueness among Authority facilities. Cold Creek drew from a wider geographic area than other Conservation Areas because of the absence of other public shooting facilities in Southern Ontario. The only option that was available to shooters in the region was a membership in a private club, one in Caledon and the other in Whitchurch-Stouffville. In 1987, there was a serious decline in attendance due to reduced operating hours. Over the years, the preferred time for rifle range use was Sundays, though the shooting on this day was curtailed in 1987 due to community concerns over noise.

The facilities were used to provide a variety of public programs including hunter education programs, hunter workshops, dog club events and special programs for schools and youth groups. Past users of the Cold Creek range numbered between 4000 and 4500 persons per year with 21,269 user-days being recorded by 1988.

Figure 5: Visitor Origins by Municipality



Visitor surveys conducted during 1989 indicated that approximately 60% of range users at CCCA did not use any other range facilities such as private gun clubs. Of the users at CCCA, only 27.2% were gun club members.

Cold Creek User Profile

In 1989, the most frequent user of Cold Creek Conservation Area could be characterized in the following manner: An Ontario male, originating in or near Toronto, between the ages of 18 to 54 (92.4 %) and has initiated more than 8 visits, principally for shooting. He learned about the site by word of mouth and he tends not to be a member of a shooting club. He is also interested in a wide range of outdoor activities which are ordered in importance from the most to the least.

Most – hunting, fishing, camping, walking, hiking, swimming, picnicking, canoeing, bicycling
– cross country skiing, horseback riding,
Least – down hill skiing and ice fishing

The visitors to CCCA were outdoors-people whose recreation focused on hunting, fishing, camping and canoeing.

4.4 INFRASTRUCTURE

An infrastructure inspection was carried out in the CCCA in April 2002 to provide a better understanding of the existing conditions of the buildings. The inspection

Cross Country Skiing
Photography from TRCA Archives

Sled Dog Trails
Photography from TRCA Archives

indicated that all buildings in the Conservation Area are in need of attention. Specific observations/recommendations were provided for the following:

a) Water Treatment Building

The existing facility is unstable and has a combination of electrical, water leakage and moisture problems. It is suggested that the water treatment system be either relocated to one of the following locations: a) an above ground building; b) main Visitor Centre; or c) barn, or the existing chamber be repaired. This might require extensive block repair with exterior excavating. Failure to repair the chamber and existing infrastructure could compromise the usage and quality of the water in the Conservation Area.

b) Pump Room

The pump room is located outside the barn and is built into the ground as a chamber. The metal roof with a wooden frame is in poor condition. All four block walls have cracks from ground level to footings and are leaning towards the centre of the building. There is water leakage on the floor which could be from the pipe, tank or ground water.

c) Barn

The barn is approximately 18.5 x 16.6 metres with a 12.4 x 6 metres drive shed attached. The roof is made of asphalt shingles on one side and metal sheeting on the other. The roof is leaking into the hay storage area and inside passage door. The exterior barn boards are in good condition. Some damage has occurred in the ground floor ceiling due to a leak. The doors, sinks and washrooms are in good condition.

d) Visitor Centre

The visitor centre is a 13.6 x 7 metres building with an asphalt shingle roof that is in fair to poor condition. The exterior siding is in good condition but needs general maintenance and repair work. Some window panes are cracked and need repair. Front doors are fine but the south door leading to the basement needs to be replaced. The rest of the interior is in good condition except for some leaks in the sinks and toilets in the men's washroom. Water is leaking into the basement from the exterior around the footings or toilets and sinks. The electrical system is functioning adequately except for some missing switch covers and exposed electrical wires.

e) Education Field Centre

The main building is 18.1 x 7.5 metres with a 6 x 6.6 metres additional area comprised of several rooms. In general, the building is in good condition. The gravel tar roof, concrete block basement walls, eaves-trough and steps are all in good condition. Downspouts are missing, handrails on the deck and the deck itself needs some repairs. Heating is supplied by a 193000 BTU forced air oil furnace and is working fine.

f) Rifle Range Building

The building is approximately 32.7 x 6.3 metres with an additional office area of approximately 4.2 x 2.1 metres. The roof material is asphalt shingles. The west side of the roof is leaking and cracking. The interior structure is in a sound and stable condition but the insulation and sound-reducing material placed throughout the ceiling area, in the main room, shooting area and attic area is falling off rafters and ceiling. The electrical panel in this building has been removed. The building exterior is in good condition but the passage door needs repairs.

g) Shooting Ranges

Rifle and trap shooting operations were carried out in the past at three different locations within the CCCA (see Map 2 for location). Due to concerns regarding the soil quality at these sites, discussions were held with Terraprobe Engineering to seek advice on long-term options for the use and management of affected areas.

Photography by Rosemary Hasner

The primary issue with respect to former shooting ranges is the use of lead in shotgun shells and bullets. At the rifle range, the lead will be concentrated in the soil berm or wooden target mounts immediately in front of the building. Therefore, the volume of affected soil is expected to be relatively small and can be readily accessed and removed. However, in the trap shooting areas the lead shot and broken skeet cover a large area, yet well defined. Lead does not leach or dissolve readily and does not pose an issue to ground water or surface water quality in most cases. The largest concern with lead pellets is their ingestion, either by wildlife (particularly waterfowl) or by small children who may be playing or crawling on the ground.

The following measures are suggested to deal with this issue at the CCCA:

1. A thorough investigation of the site to determine the extent of the affected area and the degree to which the site may be affected by lead.

2. Site clean-up and remediation.

Public use of these sites will not be allowed until the remediation work is completed.

CHAPTER 5
MANAGEMENT ZONES

The inventory and analysis that is outlined in Chapter 4 formed the basis for determining the management zones. The TRCA used this information to refine the definitions of the management zones and to define the level of acceptable use within each zone.

Given the current pressures of urbanization that are affecting the condition of natural cover throughout the TRCA's jurisdiction, it is paramount to approach the management of any natural area in a way that addresses that particular site in the larger regional context. By implementing the following system of management zones, it is hoped that a consistently effective and cautious method will steer natural habitat in the Toronto region towards a condition that possesses a high degree of resilience in what is becoming an environment that is ever more hostile to the persistence of effective natural systems with intact native ecology. Increasing the total natural cover at each site, and thus across the entire region, is an effective route for enhancing the resilience of the system.

The four management zones for the Cold Creek Conservation Area are Nature Reserve, Natural Environment, Restoration, and Public Use. These management zone definitions are originally from the Ontario Provincial Parks – Planning and Management Policies, Provincial Parks Branch, 1976 and respect provincial policy perspectives by identifying ESAs and ANSIs as automatic candidates for inclusion in the Nature Reserve Management Zone, where maximum protection is afforded.

5.1 MANAGEMENT ZONE DEFINITIONS

The four management zones for the Cold Creek Conservation Area are defined as follows:

Nature Reserve:
Existing natural cover supporting Species of Concern or Vegetation Communities of Concern, and interior habitat portions of the "targeted natural system" where the natural system is fully functioning at all levels. (The patch size and shape are providing maximum habitat interior and the surrounding matrix exerts completely natural, positive influences).

Natural Environment:
Existing and targeted natural cover within the "targeted natural system" which does not currently meet the criteria of the Nature Reserve Zone.

Restoration:
Primary Restoration: Lands within the Nature Reserve Zone that have been designated for active restoration to achieve the full potential of the "targeted natural system".

Secondary Restoration: Lands within the Natural Environment Zone that have been designated for passive restoration (ecological succession) to achieve the full potential of the "targeted natural system".

Public Use:
Areas with existing or potential recreational and educational uses, facilities, or services.

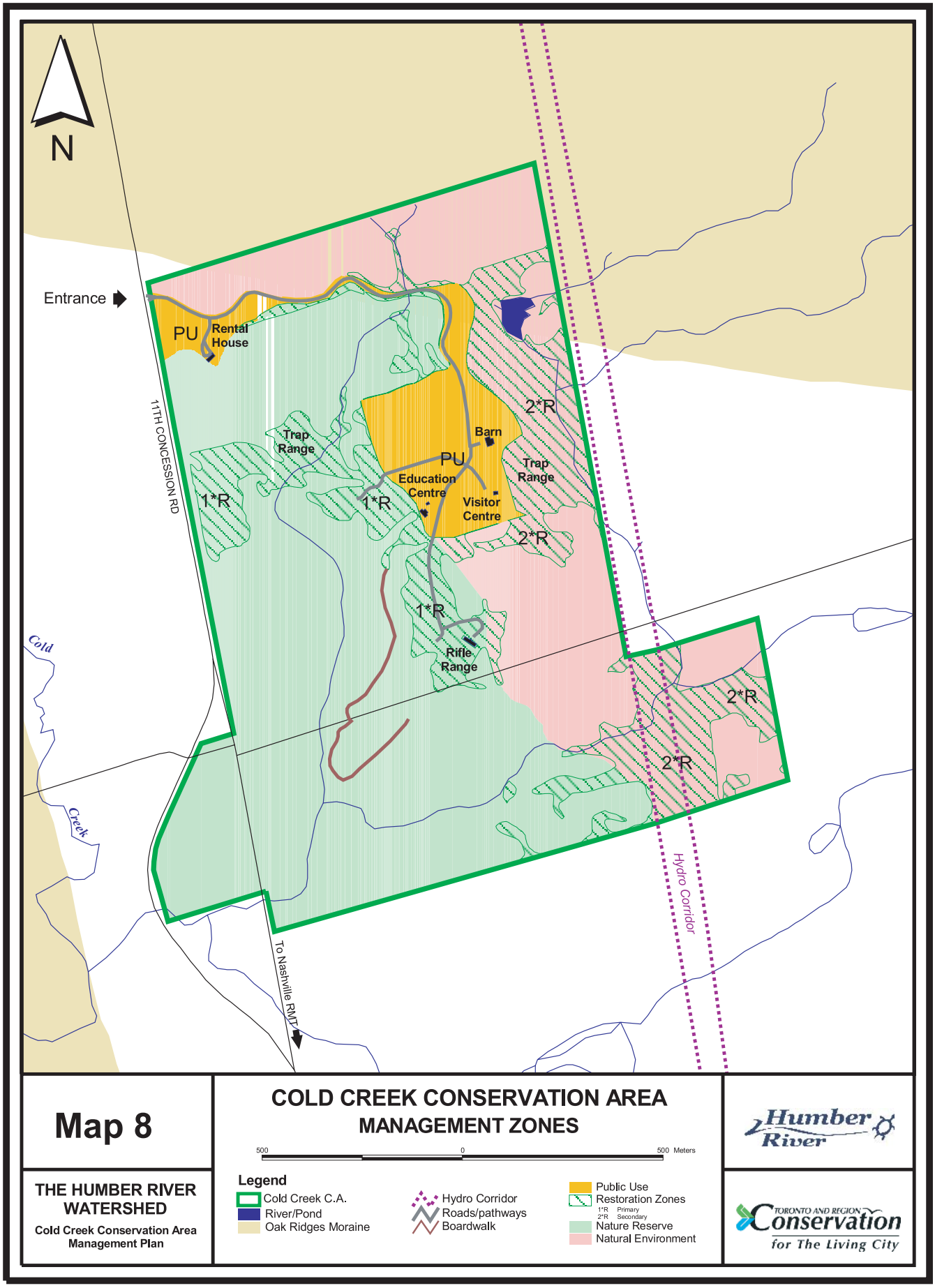
5.2 DETERMINING THE MANAGEMENT ZONES

Cold Creek Conservation Area presents an excellent opportunity for the first-time implementation of the management zone strategy based on TRCA's Terrestrial Natural Heritage Approach discussed in Chapter 4. The topography and distribution of existing natural cover is such that it is a relatively simple task to identify the four zones within the site. The fact that, as of 2002, there exists a highly-detailed inventory of fauna, flora and vegetation communities for CCCA further simplifies the task of identifying the boundaries of the four management zones. Finally, pre-existing provincial designations within the site (ESAs, ANSIs, classified wetlands) help steer decisions in designating the management zones.

To apply the appropriate management zone to a particular area, TRCA staff reviewed, inventoried, analyzed and ranked the features and functions for the entire property. This information was mapped and it reflects the TRCA interpretation of ecological processes on the property.

As a first step, interior habitat, vegetation communities and species of concern, ESAs and ANSIs were identified on the property map. Any existing public use areas and infrastructure that did not coincide with the natural features described above were delineated. Next, an analysis at the landscape level, based on GIS information, was carried out using potential restoration areas to determine potential to increase the size and shape of interior habitat. Essentially, any area or infrastructure that is not included within the previously delineated public use area (either due to discontinued public use or close proximity to the existing interior habitat) was considered a candidate for potential restoration (e.g., the old rifle-range at the centre of the property). Potential restoration areas closest to the continuous forest block were designated as primary restoration areas. The results of this analysis were used to determine the Management Zones as shown on Map 8.

The boundaries of the various Management Zones delineated on Map 8 are approximate only. They relate to features such as the edges of woodlots, fields, hedgerows, as well as to roads and utilities.



Map 8

COLD CREEK CONSERVATION AREA
MANAGEMENT ZONES

500 0 500 Meters

Legend

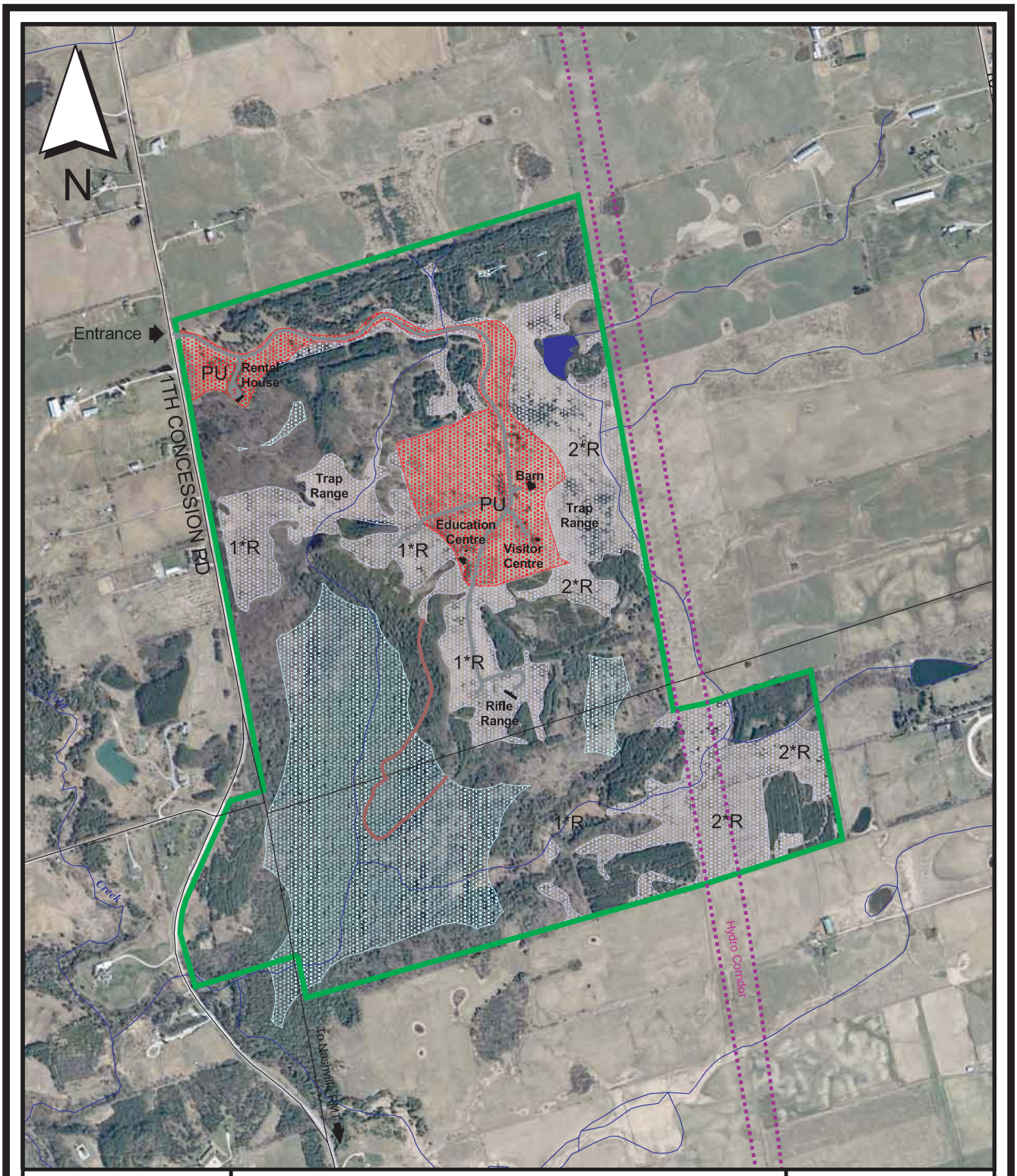
- Cold Creek C.A.
- River/Pond
- Oak Ridges Moraine
- Hydro Corridor
- Roads/pathways
- Boardwalk
- Public Use
- Restoration Zones (1*R Primary, 2*R Secondary)
- Nature Reserve
- Natural Environment

THE HUMBER RIVER WATERSHED

Cold Creek Conservation Area Management Plan

Humber River

Toronto and Region Conservation for The Living City



Map 8A

COLD CREEK CONSERVATION AREA MANAGEMENT ZONES TARGETED SYSTEMS ANALYSIS - STEP 1

200 0 200 400 600 800 Meters

Legend

- Cold Creek C.A.
- River/Pond
- Buildings
- Hydro Corridor
- Roads/Pathways
- Boardwalk
- Existing Interior Habitat (100m)
- Public Use
- Restoration Potential
  - 1*R - Primary
  - 2*R - Secondary

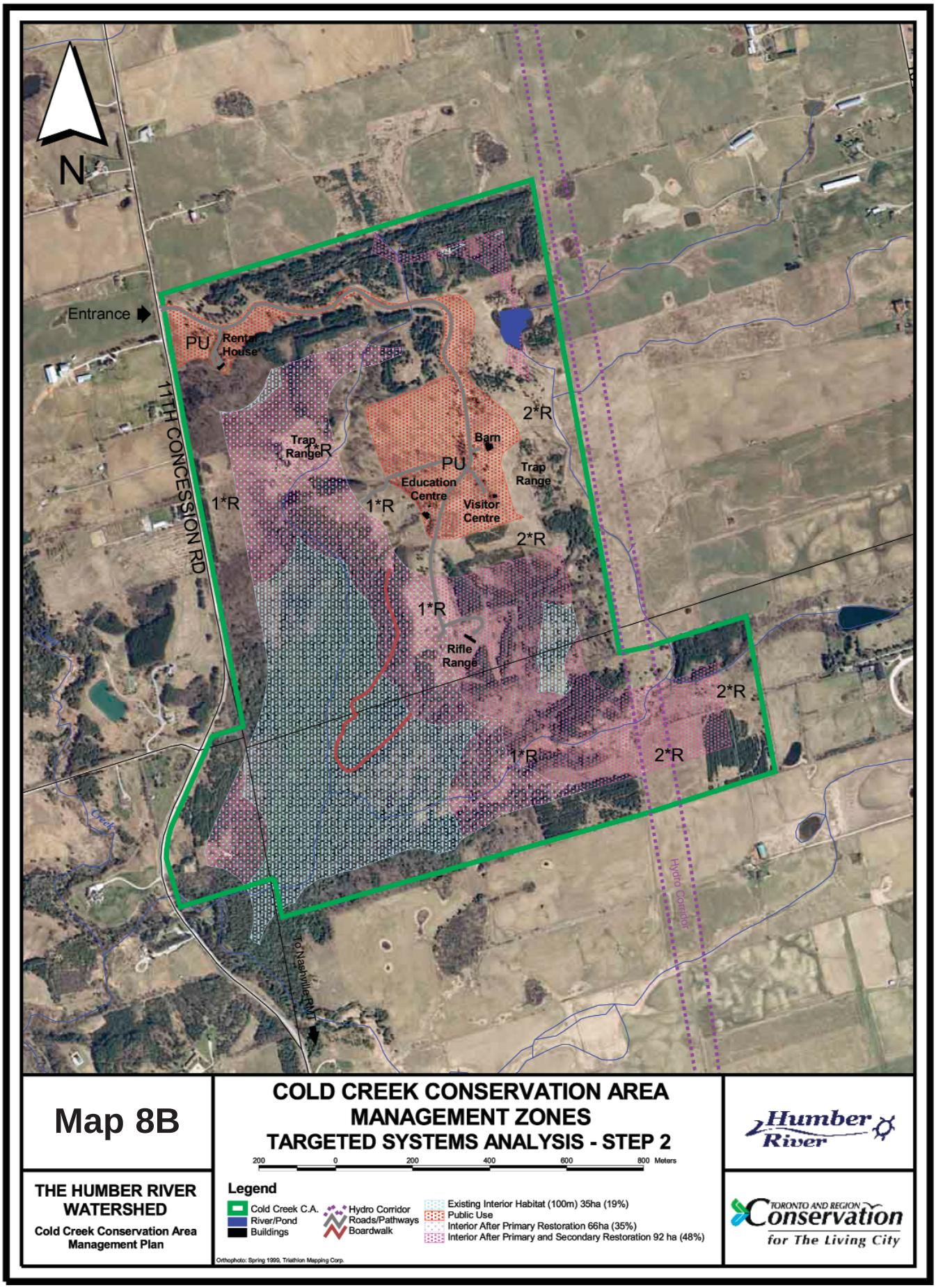
Orthophoto: Spring 1999, Triathlon Mapping Corp.

THE HUMBER RIVER WATERSHED

Cold Creek Conservation Area Management Plan

Humber River

Toronto and Region Conservation for The Living City



Map 8B

COLD CREEK CONSERVATION AREA MANAGEMENT ZONES
TARGETED SYSTEMS ANALYSIS - STEP 2

200 0 200 400 600 800 Meters

THE HUMBER RIVER WATERSHED

Cold Creek Conservation Area Management Plan

Legend

- Cold Creek C.A.
- River/Pond
- Buildings
- Hydro Corridor
- Roads/Pathways
- Boardwalk
- Existing Interior Habitat (100m) 35ha (19%)
- Public Use
- Interior After Primary Restoration 66ha (35%)
- Interior After Primary and Secondary Restoration 92 ha (48%)

Orthophoto: Spring 1999, Triathlon Mapping Corp.

Humber River

Toronto and Region Conservation for The Living City

5.3 MANAGEMENT ZONES-PERMITTED ACTIVITIES

MANAGE-MENT ZONE	AREA	PERMITTED INTENSITY OF USES	PERMITTED POTENTIAL ACTIVITIES	RESOURCE MANAGEMENT
Nature Reserve (NR)	91 ha 48%	None to Low Intensity	Local trails Nature viewing/ interpretation Research and photography Active restoration (None or minimum intrusion into interior habitat)	Environmental management projects that are designed to protect, enhance, or restore natural features, landforms, species or habitats. This includes forest tending, fish habitat improvement, and revegetation activities. Existing uses such as the swamp board walk will be permitted to remain. The extent of intrusion by trails into Nature Reserve Zone should be minimized. No horse riding will be permitted in this zone.
Natural Environment (NE)	39 ha 31%	Low Intensity	Local or inter-regional trails Hiking, skiing, bicycling on approved trails Supervised dog training areas Horseback riding on authorized trails Authorized public access points Low impact comfort stations Passive restoration	Environmental management projects as described for the NR Zone. All trails should be monitored to ensure that invasive species are not being spread throughout the area. Existing uses such as properly sited local trails (approved by TRCA staff), may remain in the Zone. However, as the need and opportunity arise, land may be renaturalized and trails relocated. The inter-regional trail will be subject to detailed trail routing studies being undertaken and field checked to identify the most appropriate route with the least impact.
Restoration (R)	42 ha 22%	None to Low Intensity	Primary Restoration (1*R) Same as NR Zone	This Zone will be allowed to evolve into Nature Reserve or Natural Environment Zones. This Zone will contain two types of restoration areas. Primary restoration areas are designated within the Nature Reserve Zone for active restoration to achieve the full potential of the "targeted natural system". Secondary or passive restoration areas are located within the Natural Environment Zone and these are locations that require restoration or are undergoing ecological succession. Other management activities will be same as the NR and NE Zones.
			Secondary Restoration (2*R) Same as NE Zone	
Public Use (PU)	18 ha 9%	Low to Moderate Intensity	Local or inter-regional trails Sports field Day camping Nature interpretation centre Horticulture Animal sanctuary Supervised dog training areas Horseback riding on authorized trails Associated service buildings and parking areas	Resource management activities that are encouraged in the Public Use Zone include environmental management projects that are designed to protect, enhance, or restore natural features, landforms, species, or habitats. Wherever feasible, every attempt will be made to ensure that there is a net environmental enhancement within the Public Use Zone when activities are developed on the site.
		High Intensity	Restaurant Recreation/conference centre Associated service buildings and associated parking areas	

Table 6: Permitted Activities at Cold Creek Conservation Area

NOTE: The list of activities provides examples of the types of potential uses. This is not an all inclusive list.

The whole system of management zones should be seen as dynamic, with opportunities for the different zones within a site to evolve. The ideal from an ecological perspective would be for all zones to remain or evolve into Nature Reserve Zones. However, as the plan reaches maturity and the Nature Reserve potential has been adequately fulfilled (this should be a priority), Primary Restoration Zones can be managed for more permitted public use thereby, enhancing the immediate user experience. As more natural cover is restored to the quality of Nature Reserve Zones, some of the user restrictions may be relaxed since user influence and activity will be less concentrated, thus causing less impact.

A direct consequence of an increase in total natural cover on any site is the dissipation of human disturbance on the natural cover. Increasing natural cover results in an increased resilience of the natural system whereby a high biodiversity is more likely to persist; thus, improving user experience and presenting opportunities for a greater diversity of user activities. The expectation is that through modeling for a desired level of natural cover at a site, management will be able to envisage a greatly enhanced and improved user experience without deterioration in the natural system. Such a strategy has very positive implications for the quality of the natural system across the entire region.

5.4 ANALYSIS OF LAND USE

Once the new management zones were defined and mapped, they were compared, using a geographic information system application, to past and existing resource uses of the property.

a) Past and Existing Land Uses

As shown in Figure 6, currently about 79% (150 hectares) of CCCA can be considered as Natural Area. As well, 21% (40 hectares) of CCCA is considered as public use area, including a residential property, education centre, recreation areas and associated infrastructure.

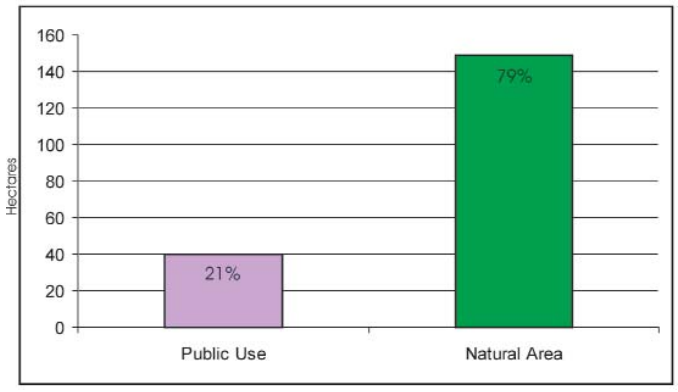


Figure 6: Past and Existing land Uses in CCCA

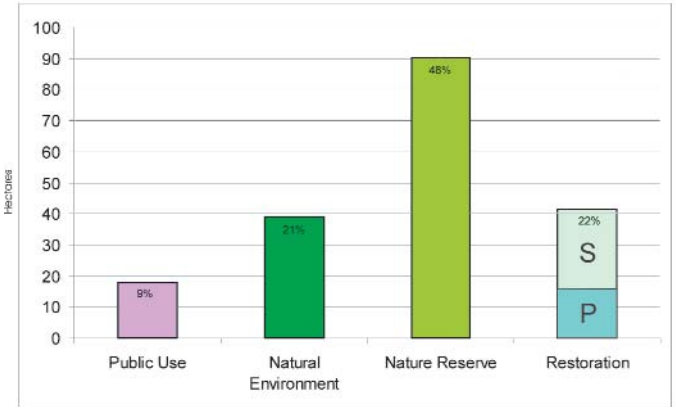


Figure 7: Proposed Land Uses

b) Proposed Land Uses

Once the proposed management zones for Cold Creek Conservation Area were defined, a geographic analysis was performed on the newly-zoned areas. As shown in Figure 7, almost 90 % or 171 hectares of the property has been zoned as Nature Reserve, Natural Environment, or Restoration. Permitted land uses in these areas will range from no formal public use to low intensity recreational and educational uses. This is in keeping with the Cold Creek Conservation Area Management Plan Advisory Committee's vision to ensure there is a balance between protection and enhancement of the natural resources of the property and public use of the lands, with the scales tipping in favour of nature.

In comparison to past and existing land uses, the land uses proposed within the Cold Creek Management Plan will result in the amount of natural lands increasing by approximately 10%. This will be achieved by implementing the recommendations related to the Restoration Zones (Primary 16 hectares and Secondary 26 hectares). The forest interior will almost double in size (existing 35 hectares to proposed 66 hectares). In terms of the entire property, the interior forest component will increase by 16% (existing 19% to proposed 35%). Eighteen hectares or 9% of the property has been dedicated to public use as compared to 40 hectares or 21% in the past. This is in keeping with the vision of protecting and enhancing the significant ecosystem in CCCA.

5.5 REVENUE GENERATING OPPORTUNITIES

Currently the CCCA is not formally open to the public. Visitors are permitted to park at the entrance and access the property for passive recreational uses. A portion of CCCA (270 acres) is presently leased to Humberlea Church of God for limited day time educational and recreational uses. This lease expires on December 31, 2002. The residence on-site is currently being leased on an annual basis.

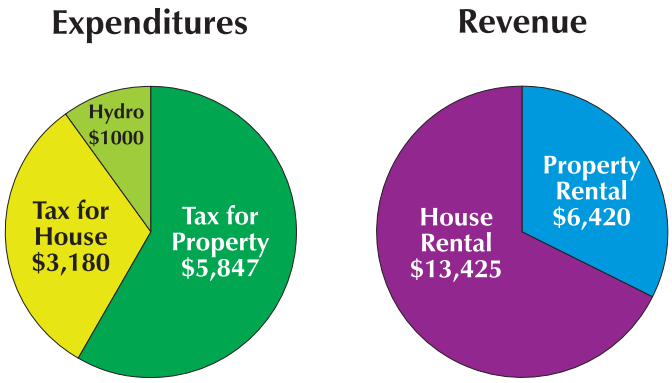


Figure 8: Revenues generated within Cold Creek Conservation Area 2001

The CCCA does incur costs such as taxes but very little revenue is currently generated through leases and agreements. Figure 8 illustrates the revenues and expenditures for the area based on 2001 actual totals. In 2001, property taxes amounted to $5,847. Property taxes for the residences at the entrance and adjoining one acre property was $3,180. Hydro costs for one year amounted to approximately $1,000. Total revenues from leased areas within Cold Creek were $6,420 from property rental and $13,425 from house rental.

The current economic climate is one of continuing fiscal restraint in the public sector. The future public use, operation of facilities, and access to lands at CCCA will need to respond to these conditions. Reduced financial support by traditional funding sources for public use of

Sarracenia purpurea – pitcher plant (L1 species)
Photography by Jeremy Ind

Conservation Authority lands means new revenue generating initiatives and partnerships will need to be created to achieve the vision of a self-sustaining Cold Creek Conservation Area.

To help obtain self-sustaining revenues, consideration will be given to leasing some areas for exlusive use within the Public Use Zone. Some revenues will also be generated from licensing fees and short term rentals of the property by interested groups.

The TRCA must continue to ensure that any future uses are balanced and compatible with the protection and restoration of the natural heritage features of the site and the Humber River Watershed.

Grey Tree Frog *Photography by Rosemary Hasner*

CHAPTER 6

MANAGEMENT RECOMMENDATIONS

While the Cold Creek Conservation Area is in relatively good condition today, it is not a static system. Pressures from future urban growth in the communities of Bolton and Nobleton are anticipated over the next 20 years. To ensure that CCCA will remain a healthy part of the Humber Watershed, future management of the Area must take into account the need for protection and regeneration of the unique natural system that exists on-site. Staff, with the assistance of the Advisory Committee, have developed management recommendations for existing resources in CCCA. Specific recommendations have also been provided for the areas surrounding CCCA. This is important to ensure that the natural heritage system of the Cold Creek subwatershed that sustains the Cold Creek Conservation Area is protected and enhanced as well.

6.1 Resource Management Recommendations for CCCA

These management recommendations have been separated into Natural Heritage; Human Heritage; Public Use; and Infrastructure. These management recommendations are consistent with the provisions outlined in the Authority's *Valley and Stream Corridor Management Program*, as well as the watershed management objectives outlined in *Legacy: A Strategy for a Healthy Humber*.

6.1.1 Natural Heritage Management

a) Valley and Stream Corridors

i. Manage the valley and stream corridor areas within the CCCA according to the criteria set forth in the Authority's *Valley and Stream Corridor Management Program (1994)*.

b) Aquatic Habitat

i. Manage permanent watercourses (see Map 6) for brook and brown trout and Atlantic salmon.

ii. Manage intermittent watercourses (see Map 6) for seasonal use by downstream species.

iii. Enhance riparian cover in Active Riparian Restoration and Passive Riparian Restoration areas shown on Map 6. One of these areas is located adjacent to the western trap range (see Map 6) and the other is downstream of the wetland in the north-eastern section of the property.

iv. Mitigate in-stream barriers (i.e., culvert at the 11th Concession Road) to provide passage for fish.

v. Anglers should reduce their catch and possession limits for trout and use only single, barbless hooks and bait.

vi. Monitor aquatic habitat species regularly as part of TRCA's Regional Watershed Monitoring Program.

vii. No baitfish harvest is allowed on the property.

c) Terrestrial Habitat Management

i. Protect groundwater recharge and discharge areas within the CCCA to support the significant swamp habitat.

ii. Retain natural cover to protect existing vegetation communities and flora and fauna species in the CCCA.

iii. Restore areas to maximize forest interior and increase biodiversity. A brief description of how this restoration will be done is as follows:

Restoration projects should prioritize: areas that surround the large coniferous swamp and mature forests in order to maximize forest interior and enlarge forest blocks; natural areas with square edges in order to round out these areas for the desired shape (large and well rounded habitat patch is better); and areas that will increase connectivity between isolated forest patches (restoration projects should prioritize areas where habitat patches can be connected to the area surrounding the conifer swamp). Restoration areas (Primary and Secondary) determined by staff are shown on Map 9. Detailed restoration plans for priority restoration areas will be developed after site investigation. Restoration should be carried out by TRCA staff with community involvement. Planting sites will either be machine planted or prepared before hand planting. A mixture of tree and shrub species suitable to the site will be planted. Site characteristics will dictate the composition of the mix, determination of the type of planting and spacing. Species mix could include:

coniferous seedlings	deciduous tree seedlings	shrub seedlings
white pine	white ash	american highbush cranberry
tamarack	poplars	nanny berry
white cedar	red oak	red-osier dogwood
white spruce	silver maple	common elderberry
red pine	red maple	gray dogwood
other non-invasive larch spp.	green ash	chokecherry
	black cherry	silky dogwood

iv. Cluster non-natural land uses (e.g. dogs, horses) in certain areas with buffer zones between these land uses and the Nature Reserve Zone (these non-natural land uses should be restricted to the Public Use Zone or to some areas of the Natural Environment Zone and Restoration Zones.

v. Ensure protection of specific features such as the organic coniferous swamp. Black spruce in the coniferous swamp is currently being replaced by white cedar and balsam fir. Over time, the black spruce component of the conifer swamp in the Cold Creek Conservation Area will be replaced by the cedar and balsam trees. In our region it is rare to find black spruce as components of coniferous swamps. A proposal to try to maintain the black spruce component has been developed that will involve minimal human and financial resources and minimal impacts to this very sensitive community. This project would be carried out over the next 10 years at which time its success would be evaluated. It may turn out that maintaining the black spruce component of this swamp is not viable as the swamp is undergoing natural processes of succession. If this happens to be the case, the project would be abandoned and the swamp would be left to evolve naturally. The proposed "black spruce restoration project" involves the following:

1. Detailed site analysis to determine a suitable silvicultural system or feasibility of a restoration program. This site analysis would include soil analysis, seed source inventory and determination of seed availability, and an inventory of appropriate/available planting sites. Should the site analysis prove that the project is viable, the following steps would be taken:

- Seed collection from black spruce trees in the swamp and other black spruce

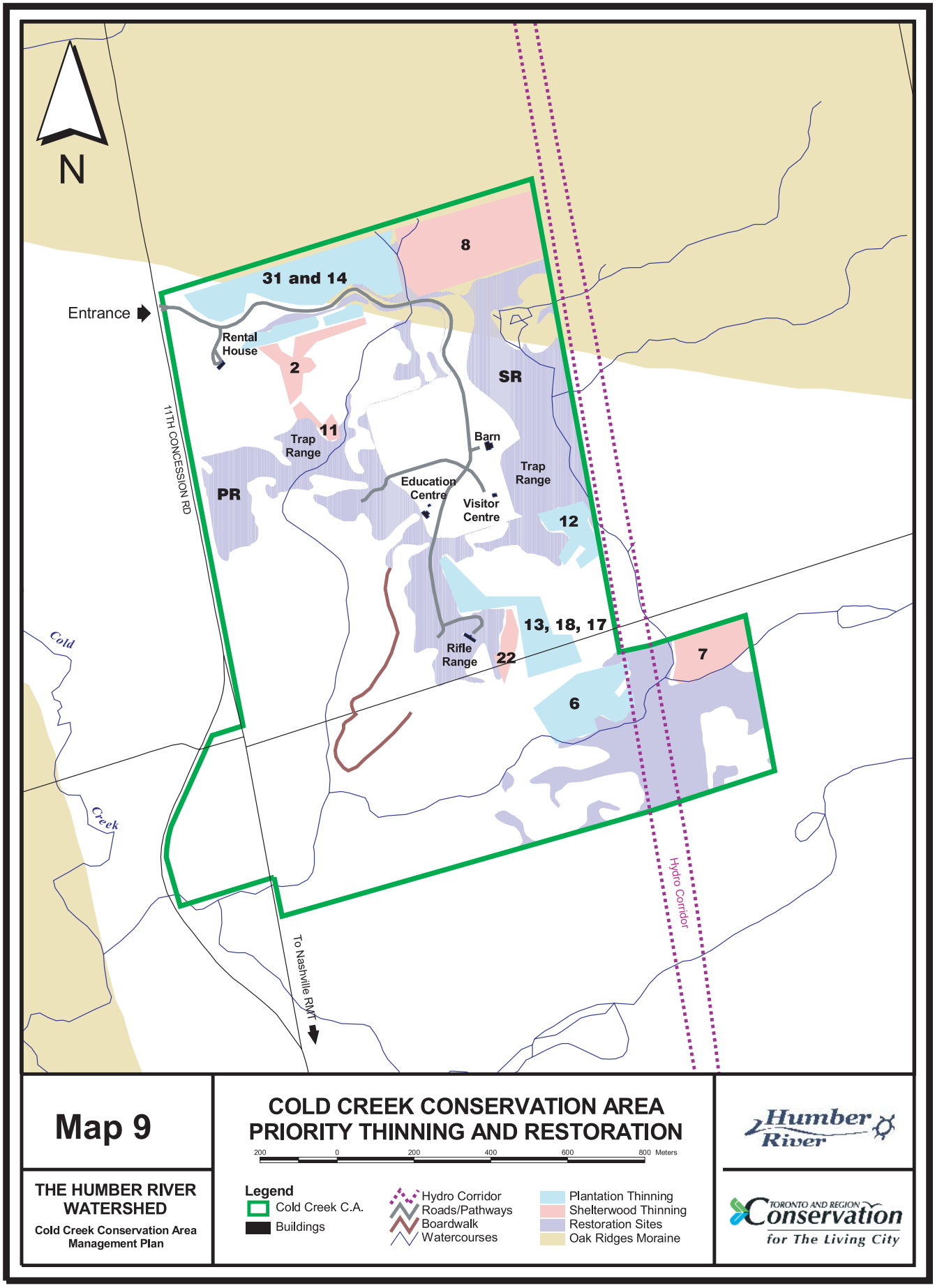
Black Spruce Regeneration – Case Studies

Regarding the black spruce (Picea mariana) component of the conifer swamp at CCCA, little information has been gathered regarding methods of promoting its regeneration and that of the community as a whole. Hence, we advocate a cautious approach. This approach is supported by references to the protection of boreal-type conifer swamps and bogs in the southern limit of such communities' ranges in the northern U.S. For example, in Michigan, it is noted that "researchers and other professionals have experienced limited success in duplicating the natural conditions that created these forests" and "therefore, it is best to leave these forests alone" (Michigan Department of Natural Resources, 1999). Economic need may dictate very limited cutting, with recommended small cuts of 1-4 trees at a time during the winter when the ground is frozen. This mimics small-scale natural disturbances such as fire and windthrow that occur in such communities.

In southern Maine, a remnant bog/conifer swamp that contains Atlantic white cedar (Chamaecyparis thyoides) along with black spruce and tamarack was noted to be very vulnerable to disturbances including hydrological changes and development matrix effects such as incursions of trails and pets. Here again, any soil disturbance was strongly advised against any kind of management directed to regenerating the rare flora, in this case Atlantic white cedar (Maine Natural Areas Project, 2001).

Black spruce regeneration has some degree of fire-dependence in that the cones are semi-serotinous and seedlings require freedom from competing vegetation. On the other hand, this species is shade-tolerant and slow-growing, invading the understory of earlier-successional communities (Fowells, 1965). It is not as tolerant of competition as white cedar or balsam fir, which are co-dominants in the conifer swamp community at CCCA. The best substrates for black spruce regeneration are mineral soils without competing vegetation; sphagnum moss, burned or exposed peat, and rotten wood. Feather mosses tend to dry out too readily for new seedlings to establish successfully. When planted, 8"-12" (20-30 cm) bare-root or plug transplants planted into relatively-well drained organic soils take well. Bare-root transplants are good in early spring; while plugs can be planted in late spring or early summer.

The above information supports our recommendation of minimal intervention in the swamp at CCCA, while engaging in a seed-collection and propagation programme for black spruce. The fact that the cones are semi-serotinous means that seed collection is possible over an extended period rather than in one brief season. The propagated seedlings should be planted out into naturally occurring clearings on an experimental basis, with suitable microsites being tip-up mounds, hummocks, and rotten logs. Such collection and planting-out would involve no machinery or significant disturbance of the swamp community, and even very little trampling; while having a reasonable hope of success in retaining the local population of this species of concern.


N
Entrance
Rental House
31 and 14
8
2
SR
11
Trap Range
Barn
Trap Range
PR
Education Centre
Visitor Centre
12
13, 18, 17
Rifle Range
22
7
6
11TH CONCESSION RD
Cold
Creek
Hydro Corridor
To Nashville RMT
Map 9
COLD CREEK CONSERVATION AREA
PRIORITY THINNING AND RESTORATION
200 0 200 400 600 800 Meters
Legend
Cold Creek C.A.
Buildings
Hydro Corridor
Roads/Pathways
Boardwalk
Watercourses
Plantation Thinning
Shelterwood Thinning
Restoration Sites
Oak Ridges Moraine
THE HUMBER RIVER WATERSHED
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Humber River
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Table 7 : Priority Thinning Areas

Stand	Area	Age	Site class	Plots tallied	Avg Hgt (m)	Total	BA/ha	Spp	% Composition
2	2.1	39	1	8.0	14.5	22.5		Pw	38.89
								Aw	27.78
								Cb	15.56
								Sw	6.67
								Mh	6.67
								Elm	4.44
6	1.9	42	1	6.0	21.8		39.7	Pr	45.38
								Sw	39.50
								Pw	8.40
								Cb	3.36
								Elm	2.52
								Le	0.84
7	2.2	43	1	5.0	18.6		37.6	Pw	60.64
								Pr	19.15
								Pj	18.09
								Elm	5.32
								Sw	2.13
8	6.9	40	4	13.0	17		43.4	Pw	35.45
								Sw	34.76
								Pr	12.41
								Le	8.87
								Or	5.32
								Ms	2.13
								Elm	0.71
								Bd	0.36
11	0.4	43	4	2.0	19		36.0	Pw	67.00
								Sw	22.00
								Pj	8.30
								Aw	2.70
12	0.7	38	4	3.0	18.3		28.0	Pw	59.52
								Sw	30.95
								Apple	9.52
13	0.9	42	1	2.0	16.5		30.0	Sw	56.67
								Pw	43.33
14	0.4	37	4	2.0	19.5		42.0	Pw	64.29
								Sw	30.95
								Elm	4.76
15	1.1	43	4	4.0	19.8		42.5	Pw	50.58
								Sw	47.06
								Elm	2.35
16	0.6	33	4	3.0	15.3		42.0	Pw	92.06
								elm	4.76
								Sw	1.59
								Cb	1.59
17	1.7	41	4	4.0	15.8		24.0	Sw	39.58
								Pw	29.17
								Po	27.08
								Apple	4.17
22	1.9	41	4	4.0	12.5		26.0	Pw	73.08
								Sw	17.31
								Cw	7.69
								Po	1.92
31	5.9	40	4	14.0	15.5		32.9	Pw	57.80
								Sw	28.26
								Po	3.92
								Mnorway	2.61
								Mmanitoba	2.17
								Le	1.74
								Elm	1.74
								Willow	1.31
								Cb	0.44

Total 26.7 hectares (66.0 acres)

stock found in similar sites in the area (e.g. Ballycroy, in The Township of Mono and Adjala).
- Seed propagation in a nursery to create plugs for planting in the swamp.
- Hand planting of black spruce plugs by TRCA staff in areas that have been naturally disturbed so that there are occurrences of canopy openings. These areas should also contain bog-like conditions and sphagnum mosses for the best results (the areas for planting would be determined in the site analysis above).
- Monitor the success of the project (survival of plantings) to decide whether the project should continue.
- Planting would begin in approximately five years once the seeds have been collected and propagated. The evaluation of the project would occur in an additional five years (10 years from now).

vi. Avoid sensitive communities and species when planning trails.

vii. Protect wildlife populations from human disturbance including disturbance by dogs off-leash

viii. Non-native animal or plant species should not be introduced. Removal should be prioritized in this order: European buckthorn, Tartarian honeysuckle, black locust, other exotics including Siberian pea tree and exotic willows. Invasive species removal is especially important in communities that are in a stage of advanced regeneration from old field. Invasive species are heaviest in these areas as they have taken advantage of prior disturbance situations.

ix. Manage plantations to encourage their conversion to natural forest cover, promote the growth of native tree and shrub species and increase biodiversity. This will be done by TRCA staff and will involve plantation thinning and shelterwood thinning. These activities are described in further detail below: (Please refer to Map 9 and Table 7 for stand location and analysis)

d) Plantation Thinning

Within the first five year period, selected first priority plantations will be scheduled for thinning operations and wood products tendered to forestry contractors. First priority stands are those which have been identified by TRCA staff as being overdue for thinning due to their age and health. For pure stands, the first thinning will remove complete rows to facilitate access to the plantation. Usually every fourth row is removed unless otherwise stated. Mixed plantations present problems in terms of a standard management technique. Stocking within these compartments, their potential products and appropriate row removal must be evaluated per compartment so as to use the best methods. In many cases, first and second thinning will amount to compartment tending and sanitation operations.

e) Shelterwood Thinning

This strategy will take place in the white pine component of the CCCA plantations over the next five years. This thinning methodology involves the partial removal of the stand overstory to a prescribed number or density of residual trees. This allows for the retention of the healthiest trees growing on the site while providing them light, space and resources, and also for natural hardwood regeneration to become established. Selection of trees to retain on the site is based on a tree being: in a dominant or co-dominant crown position; healthy; covered with healthy foliage and having a well-developed crown. This strategy allows for a quick conversion of a typical white pine or mixed plantation to a forest stand that will affect a more "natural" appearance with consecutive thinnings to produce a mixed conifer-hardwood forest. (Priority forest-thinning areas are shown on Map 9 and illustrated in Table 7.)

To ensure benefits to biodiversity, some standing dead trees (snags) will be left. Some trees that are diseased (with white pine blister rust), and those in a closed canopy situation, which are expected to die and become snags will also be left. Woody debris and logs will be left on the ground.

6.1.2 Human Heritage

a) Archaeological Resource Management

i. All archaeological sites (known and unknown) within the CCCA are important cultural resources and must be protected and conserved.
ii. All land use modifications within CCCA (trails, parking lots, building, etc.) shall be preceded by an archaeological assessment. This assessment will be conducted by TRCA staff.

6.1.3 Public Use

i. Ensure that all development is compatible with the ecological function of the CCCA and the vision and objective of this Plan.

ii. Public use proposals will be reviewed in accordance with municipal Official Plans and By-Laws.

iii. Planning for any future public use will involve public consultation and environmental evaluation.

iv. Public use proposals must address risks to flooding and erosion, as outlined in the Authority's Valley and Stream Corridor Management Program (1994).

v. Stormwater management, erosion and sediment controls, and fencing must be included in the design of all public use proposals to minimize impact on the natural environment.

vi. Focus public uses on outdoor education and recreation.

vii. Focus non-natural land uses (e.g., dog training, horsesback riding) in certain areas with buffer zones between these land uses and the nature reserve zone.

viii. Development of a trail system must take into account the sensitivity of the sites' natural system. Follow the procedures set forth in the Authority's Trail Planning Guidelines (1992), the guidelines of the Valley and Stream Corridor Management Program (1994) and Guidelines provided in the Terrestrial Natural Inventory for Cold Creek Conservation Area while planning and developing trails.

ix. Maximize public use and recreation opportunities by linking CCCA to the ORM Trail and other public trail systems when the opportunity exists.

x. Lighting that interferes with wildlife behaviour must not be permitted.

xi. Dogs must be kept on leash.

xii. No horseback riding should be permitted in the Nature Reserve Zone.

xiii. No hunting is allowed in the Cold Creek Conservation Area.

6.1.4 Infrastructure

i. In the short term, existing infrastructure will be managed by the TRCA, subject to available funding. Where lands are leased for approved public uses, upgrades or replacement of the infrastructure will be the responsibility of the proponent/tenant unless other agreed upon terms and conditions are established with TRCA.

ii. Proposals for Public Use Zone should include new technologies relating to construction, grounds maintenance and water conservation, where possible, to maintain the ecological integrity of the CCCA and demonstrate sustainable practices.

iii. An environmental audit should be carried out to determine what needs to be done, if anything, to rehabilitate the areas where the trap and rifle ranges once existed. Public use of these sites will not be allowed until the recommended work is completed.

6.2 LAND USE RECOMMENDATIONS FOR "SUPPORTING AREAS" SURROUNDING COLD CREEK

At the time of developing this Management Plan, there are no specific development issues pertaining to this site. However, in light of the present rate of urbanization in the region, it is important to present this document in the context of potential pressures that may occur.

The management recommendations discussed above provide a framework for achieving environmental sustainability within the Cold Creek Conservation Area. In order to support a fully functioning habitat within Cold Creek, it is important to look at issues and opportunities in the areas surrounding the site on a subwatershed and larger Humber watershed level. Hence, the recommendations below provide direction based on the Natural Heritage Approach for the entire watershed.

6.2.1 Surrounding Land Use

The surrounding land use has an influence on the ecological function of the natural heritage system in CCCA. Generally, adjoining natural cover is beneficial, agriculture uses (as well as golf courses) exert a moderately negative influence, while urban uses exert a strongly negative influence. In the case of CCCA, there are large areas of natural cover in the vicinity, including the Bolton and Nashville Resource Management Tracts. The high quality natural cover of the property will depend upon the condition of the broader landscape. Therefore, the following recommendations should be followed:

i. Protect the natural heritage system surrounding CCCA through the land use planning process.

ii. Retain natural cover to maintain the range of flora, fauna, and community types (to protect high-quality habitats such as Cold Creek Conservation Area, it is important from a regional perspective).

iii. Protect and rehabilitate lands in the Cold Creek Subwatershed identified for natural area regeneration through the application of Terrestrial Natural Heritage Approach. This will require support from private landowners, agencies, municipal government and community leaders.

iv. Maintain or enhance the current connectivity between the site and its immediate surroundings. Any physical obstacle might negatively impact the mobility of fauna species in and around the site thereby adversely affecting the biodiversity of the area in the long term.

v. Identify and protect groundwater recharge, groundwater pathways, and discharge points to maintain water levels in the swamp.

vi. Implement recommendations of the ORM Conservation Plan. Specifically, Section 12 (Natural Linkage Policy Area) and Section 41 (5) (transportation, infrastructure or utility use) as it applies to the areas within and surrounding the CCCA (refer to section 3.3 of this Management Plan for details).

vii. Protect and secure lands identified for natural area regeneration.

viii. Encourage adjacent landowners to reforest agriculture land and old field natural cover to preserve and support the coniferous swamp. Priority areas include the lot adjacent to the south-west corner of the property and the area north of the CA on the west side of Concession 11.

ix. Introduce adjacent land owners to The Managed Forest Tax Incentive Program (MFTIP) offered by the Government of Ontario. The Managed Forest Tax Incentive Program is a voluntary provincial program that provides lower property taxes to participating landowners who agree to conserve and actively manage their forests.

x. Educate residents and agriculture land owners regarding the benefits of lot level stormwater control measures.

6.2.2 Groundwater and Source Protection

Changes in hydrogeology, as a result of irrigation or drainage projects or simply through the construction of paved trails or road systems, could alter the surface water and drainage features of the habitat within and around the CCCA. Even though development may occur at some distance from hydrogeologically-sensitive features, the effects of such changes are all too readily transferred through the terrain. For example, upland recharge zones are crucial to the maintenance of water levels in the swamp. Run-off from adjacent agricultural lands, existing and proposed golf courses, lawns, roads and/or bridges is often highly concentrated with pesticides, nutrients, oil and road salt. This run-off enters the nearby wetlands and other natural habitat patches and can potentially alter the physical and chemical composition in an unfavourable manner. The following recommendations should be followed:

i. Confirm the locations of the groundwater discharge zones and quantify the rate of groundwater influx into the creekbed. The preferred mechanism for this would be the installation of mini piezometers and seepage meters. In addition, the assumed groundwater recharge rates in the tablelands should be confirmed through percolation tests. Once the key hydrogeological features have been identified and quantified, a Cold Creek subwatershed groundwater protection plan should be developed to protect the recharge and discharge areas from urban encroachment and potential sources of impact.

ii. An education program should be initiated to ensure that local residents and agricultural land owners are utilizing best management practices, since it is much more effective to prevent impacts than to remediate after the fact.

iii. A regular groundwater monitoring program should be established to verify that the quality and quantity of groundwater recharge and discharge have not been adversely affected. If impacts are identified through the monitoring program, corrective action should be taken to restore the resource.

iv. Prevent alterations to soil and protect ground and surface water quality to support natural water input in small wetlands adjacent to the CCCA. Alterations in soil chemistry could be harmful to plants requiring low-nutrient or acidic conditions such as pyrolas and Labrador tea or wintergreen found in and around the CCCA area on organic soils. Wetlands with altered chemistry, especially high levels of nutrients and silt, tend to be taken over by aggressive species that take advantage of the high fertility, such as reed canary grass.

v. Implement Walkerton Inquiry's Part 2 report recommendations regarding source protection, particularly for private wells and farm water protection plans.

vi. Protect all watercourses and wetlands from contamination through point and non-point source discharges.

vii. Target priority areas identified by AGNPS model for treed level investigation and impletation of TRCA'S Rural Clean Water Program within the Cold Creek Subwatershed

viii. Manage adjacent agriculture lands using Best Management Practices to support the existing natural heritage system.

ix. Reduce local use of pesticides which may seriously harm amphibian species that are currently breeding in a variety of permanent and vernal water bodies surrounding the site.

CHAPTER 7

FUTURE MANAGEMENT OF COLD CREEK CONSERVATION AREA

It is anticipated that Cold Creek Conservation Area will become a model of sustainability that will be achieved by protecting and enhancing the area's natural environment while providing environmental, recreational and outdoor education benefits to the community through self-sustaining revenues and community stewardship. Hence, it is imperative that the management of the property will be based on sound environmental management principles, collaboration with partner municipalities, interest groups and the local community.

7.1 IMPLEMENTATION OF THE MANAGEMENT PLAN

7.1.1 Agency and Municipal Stewardship

The natural, cultural, and recreational resources that exist within CCCA provide benefits beyond the TRCA property boundaries. These resources extend into the surrounding landscape therefore, integration with the community was considered throughout the planning process. Existing Official Plans identify the land surrounding CCCA as agriculture or rural/residential. Some new development will take place in the adjacent communities of Bolton and Nobleton. It is also anticipated that some infrastructure (i.e., roads and highways) will also be developed to support growth in areas surrounding CCCA. Municipalities and government agencies should be encouraged to support Authority policies when planning new developments, by having regard for the following recommendations when considering community design:

a) Protect, restore and enhance as many natural open spaces as possible to maintain terrestrial natural habitat connectivity and interior habitats.

b) Create publicly-accessible trail systems that will connect communities to CCCA and eventually to the Oak Ridges Moraine and larger Humber River valley.

c) Promote private land stewardship that increases awareness about Best Management Practices and creates opportunities to engage landowners in the protection and enhancement of CCCA and its valuable resources.

7.1.2 Community Stewardship

Cold Creek Conservation Area will continue to provide opportunities for outdoor recreation, conservation education, and nature appreciation to the surrounding communities. The area will also provide many health and economic benefits to the community. There are many things people can do to fulfil the goals and objectives of this Management Plan.

a) Cold Creek Conservation Area Stewardship Committee

A Community Stewardship Committee should be established to assist with the implementation of this Management Plan. This committee could assist in the review of all proposed public uses and related activities for the property. The committee could also assist with specific aspects such as trails, education, and communications. An important role of the Community Stewardship Committee will also be to assist the Authority in raising funds to implement site maintenence, environmental protection and restoration activities.

A list of general tasks that the Community Stewardship Committee may implement, is identified as follows. All priorities should be reviewed and re-evaluated in terms of their feasibility, as needed.

- Employ the Community Action Site model as identified in *Legacy: A Strategy for a Healthy Humber* to encourage the community's participation in managing the Cold Creek Conservation Area.
- Prepare a communications plan to raise awareness and inform surrounding communities about the CCCA.
- Prepare a detailed restoration plan and implementation schedule.
- Establish a network of groups and individuals interested in participating in a volunteer program.
- Prepare access and trail development plans.
- Prepare and install natural and cultural heritage interpretative signs.
- Assist TRCA in implementing various stewardship programs including the Rural Clean Water Program.
- Develop educational resources and tools for private land owners and visitors.
- Build trail heads with signage and appropriate parking.
- Monitor the trail for invasive plant material and prevent their spread by using barriers and other eradication techniques.

- Monitor the presence of noxious weeds on site and remove as necessary.
- Organize celebration events to increase people's awareness of the site.
- Assist TRCA in implementing the Terrestrial Natural Heritage Monitoring Program.
- Secure financial and in-kind resources to undertake the implementation of the Management Plan.

b) Private Land Stewardship

Adjacent landowners and users of the CCCA can contribute to ensure that the surrounding landscape does not negatively impact the environmental quality of this unique natural area:

- Plant native species on lands adjacent to Cold Creek Conservation Area instead of planting exotic vegetation species, some of which are invasive species such as Purple Loosestrife and Norway Maple.
- Leash pets on-site to minimize disturbance to wildlife and promote "poop and scoop" to prevent pet faeces from entering the watercourses after rainfall events.
- Protect and restore private lands identified for natural area regeneration through the application of TRCA's Terrestrial Natural Heritage Approach.
- Participate in a private land stewardship program, which assists landowners with agriculture Best Management Practices, preservation of woodlots and other wildlife habitat on their property.
- Participate in TRCA's Rural Clean Water Program.
- Assist with the implementation of the recommendations of the Walkerton Inquiry's Part 2 Report regarding source protection, particularly for private wells.

7.2 SAFETY AND SECURITY

Discussions will be undertaken with police and other emergency service providers to identify their concerns and questions regarding accessing the lands for patrol and emergency response purposes. As a result of the land's natural character, many areas are inaccessible by conventional response vehicles (Fire, Ambulance and Police). Special considerations are therefore required including:

- A trail locator system such as a series of distance markers along the trails to locate/orient trail users.
- Geographically integrate the trail location system into the emergency response system of the fire, police, and ambulance departments. A fully integrated map depicting all named trails and locations of markers along each trail should be installed at all major and minor trail heads.
- An emergency response plan should be developed for the area with involvement from local and neighbouring emergency service providers.
- Gates should be installed at the entrances of all area parking lots. Parking lots should be closed to the public after dusk. Parking lots should be monitored for undesirable behaviour, garbage dumping and unauthorized access.
- Parking lots will be closed to the public if maintenance problems persist.

7.3 PLAN REVIEW AND AMENDMENT

The Cold Creek Conservation Area Management Plan will undergo a review every five years. If major revisions are necessary to reflect changing environmental, social, or economic conditions, they will only be made after consultation with affected groups and individuals. Revisions to the Plan will be in keeping with the original stated vision and objective of the Plan to protect the natural, recreational and educational values of the property.

The Management Plan identifies potential public use zones. Any specific uses proposed within these areas will be screened and assessed according to TRCA's *Strategy for Public Use of Conservation Authority Lands (1995)*. A community consultation process will also be employed at this later stage of planning to ensure local and regional interests have input into the concept and detailed design review. The Cold Creek Conservation Area Stewardship Committee will provide input on all such proposals. The screening process for specific public uses will ensure that all proposed uses, facilities, and landscape changes will be thoroughly examined and designed to minimize disruption, and to protect, enhance, or restore the natural values of the area.

7.4 FUTURE INTEGRATION WITH THE COLD CREEK SUBWATERSHED PLAN

To ensure that planning of future development within the watershed proceeds in an environmentally sound manner, the TRCA in partnership with the regional and local municipalities, has recently initiated subwatershed planning projects for various subwatersheds within the Humber River. The Cold Creek Subwatershed is a priority planning area and it is anticipated that an integrated subwatershed management plan development process will be initiated in 2004. This subwatershed plan is intended to guide existing resource use and new development within the context of environmental protection, conservation and restoration to ensure the long term sustainability of the natural features and functions of the subwatershed. Cold Creek Conservation Area is a very significant natural feature within the Cold Creek Subwatershed and the Cold Creek Management Plan recommendations will be integrated into the subwatershed planning process in the future.

Appendix 1

1999 Benthic Invertebrate Collection for Station COLT

Acarina			
		Unionicola sp	5
		Sperchon sp*	22
Coleoptera			
	Elmidae		
		Optioservus sp	1
		Optioservus fastiditus	1
Diptera			
	Ceratopogonidae		2
	Chironomidae		
		Brundiniella sp*	3
		Cricotopus sp	2
		Diamesa sp	1
		Eukieferellia (devonica group)*	1
		Heterotrissocladius sp	12
		Limnophyes sp	1
		Macropelopia sp	27
		Pagastia sp	6
		Paralauterbornierlla sp	1
		Parametriocnemus sp	16
		Procladius sp	2
		Prodiamesa sp	3
		Rheocricotopus sp*	4
		Stempellina sp	2
		Tanytarsus sp	11
		Trissopelopia sp*	9
		Zavrelia sp	1
	Muscidae*		5
	Simuliidae		1
	Tabanidae		
		Chrysops sp	5
	Tipulidae		
		Dicranota sp*	13
		Hexatoma sp	3
Ephemeroptera			
	Baetidae		
		Baetis sp	13
Megaloptera			
	Corydalidae		
		Nigronia sp*	2
	Sialidae		
		Sialis sp	16
Mollusca			
	Pelecypoda		
		Pisidium casertanum	1
	Gastropoda		
		Physa gyrina	1
Trichoptera			
	Hydropsychidae		
		Hydropsyche slossonae	1
		Parapsyche sp*	17
	Limnephilidae		9
	Philopotamidae		
		Dolophilodes sp	14
	Rhyacophilidae		
		Rhyacophila sp	8

2001 Benthic Invertebrate Collection for Station HU0027WM

Acarina			
	Hygrobates sp		16
	Lebertia sp		24
Amphipoda			
	Gammarus sp (immature)		6
Coleoptera			
	Elmidae		
		Dubiraphia sp	12
		Dubiraphia vittata	2
		Optioservus sp	20
		Optioservus fastiditus	2
		Stenelmis sp	10
	Dytiscidae		
		Agabus sp	8
Diptera			
	Chironomidae		
		Brundiniella sp	16
		Chironomus spp	8
		Conchapelopia sp	34
		Cryptochironomus sp	34
		Eukieferellia (devonica group)	10
		Heterotrissocladius sp	674
		Pagastia sp	24
		Paralauterborniella sp	2
		Parametriocnemus sp	6
		Paratendipes sp	8
		Procladius sp	2
		Prodiamesa sp	6
		Stempellinella sp	10
		Stictochironomus sp	22
		Tanytarsus sp	176
		Trissopelopia sp	4
	Empididae		
		Hemerodromia sp	4
	Muscidae		14
	Simuliidae		
		Simulium sp	10
	Tabanidae		
		Chrysops sp	16
	Tipulidae		
		Antocha sp	2
		Dicranota sp	20
		Hexatoma sp	2
Ephemeroptera			
	Baetidae		
		Baetis sp	24
Megaloptera			
	Sialidae		
		Sialis sp	12
Plecoptera			
		Paraleuctra sp	18
Oligochaeta			
	Tubificidae (immature)		2
Trichoptera			
	Hydropsychidae		
		Cheumatopsyche sp	4
		Hydropsyche sp	2
		Hydropsyche bronta	4
	Limnephilidae		
		Psychoglypha sp	6
	Rhyacophylidae		
		Rhyacophila sp	22

Appendix 2

List of Fauna Species

RANK		SPECIES	CA*	PT(N)	PT(T)	HD	AS	MR	StD	AP	TS
L1	Buteo lineatus	red-shouldered hawk	3	2	3	4	5	1	5	2	25
L2	Podilymbus podiceps	pied-billed grebe	4	4	3	2	2	1	3		19
L2	Accipiter cooperii	Cooper's hawk	4	2	2u	3	3	2	4		20
L2	Hylocichla mustelina	wood thrush	2u	4	3	3	2	3	5	1	23
L2	Dendroica virens	black-throated green warbler	3	2u	2u	3	4	3	3		20
L2	Mniotilta varia	black and white warbler	2	2	2	3	5	3	4	1	22
L2	Pseudacris triseriata	striped chorus frog	3	2u	3	3	2	5	4	1	23
L2	Hyla crucufer	northern spring peeper	2	2u	3	4	3	3	4		21
L2	Rana sylvatica	wood frog	2	2u	3	2	3	3	5	1	21
L3	Buterides virescens	green heron	2	1	2u	2	3	2	4		16
L3	Boanasa umbellus	ruffed grouse	2	3	2u	2	3	2	4		18
L3	Scolopax minor	American woodcock	0	2u	3	4	3	2	1		15
L3	Coccyzus erythropthalmus	black-billed cuckoo	2u	2	2u	2	4	2	1		15
L3	Coccyzus americanus	pileated woodpecker	0	2	2	3	4	2	2		15
L3	Contopus virens	eastern wood-pewee	0	4	2	2	2	3	2		15
L3	Empidonax minimus	least flycatcher	0	2u	3	1	5	2	2	1	16
L3	Regulus satrapa	golden-crowned kinglet	3	2u	2	2	3	2	3		17
L3	Troglodytes troglodytes	winter wren	1	2u	3	2	4	3	3		18
L3	Toxostoma rufum	brown thrasher	0	5	3	0	2	2	2	1	15
L3	Vermivora ruficapilla	Nashville Warbler	2	2	2u	1	3	2	3		15
L3	Dendroica coronata	yellow-rumped warbler	4	2u	2u	2	3	2	1u		16
L3	Dendroica fusca	Blackburnian warbler	4	2	2u	4	4	2	1u		19
L3	Dendroica pinus	pine warbler	2	2	2	2	4	2	3		17
L3	Seiurus airocapillus	ovenbird	0	2u	3	3	4	3	4		19
L3	Seiurus noveboracensis	northern waterthrush	0	2u	2u	2	3	3	4		16
L3	Oporornis philadelphia	mourning warbler	1	2	2	1	2	3	4		15
L3	Piranga olivacea	scarlet tanager	0	2	3	2	4	2	3		16
L3	Spizella pallida	clay-coloured sparrow	4	3	2u	1	2u	2	1		15
L3	Spizella pusilla	field sparrow	1	3	3	2	2	2	3		16
L3	Zonotrichia albicollis	white-throated sparrow	1	3	2	1	3	2	3		15
L3	Sturnella magna	eastern meadowlark	0	5	2	1	3	2	4	1	18
L3	Dolichonyx oryzivorus	bobolink	0	4	2u	2	4	3	1		16
L3	Carpodacus purpureus	purple finch	3	4	3	1	1	1	3		16
L3	Hyla versicolor	tetraploid grey treefrog	2	2u	3	2	3	3	4		19
L4	Tamias striatus	eastern chipmunk	2	2u	2u	1	2	2	2		13
L4	Tamiasciurus hudsonicus	red squirrel	1	2u	2u	1	1	2	2		11
L4	Odocoileus virginianus	white-tailed deer	1	2u	2u	1	2	2	2		12
L4	Aix sponsa	wood duck	0	1	1	3	3	1	3		12
L4	Otus asio	eastern screech owl	1	2	2	2	1	2	2		12
L4	Chordeiles minor	common nighthawk	2	3	3	1	1	1	3		14
L4	Archilochus colubris	ruby-throated hummingbird	2	2	2	1	1	1	4		13
L4	Picoides villosus	hairy woodpecker	0	2	1	2	3	2	2		12
L4	Colaptes auratus	northern flicker	0	3	2	1	1	2	2		11
L4	Empidonax alnorum	alder flycatcher	0	1	2	2	2	2	3		12

* See page 65 for legend

RANK		SPECIES	CA	PT(N)	PT(T)	HD	AS	MR	StD	AP	TS
L4	Myiarchus crinitus	great-crested flycatcher	0	2	3	1	2	2	2		12
L4	Sayornis phoebe	eastern phoebe	0	2	2	2	1	2	1		10
L4	Vireo olivaceus	red-eyed vireo	0	2	2	1	2	2	3		12
L4	Sitta canadensis	red-breasted nuthatch	1	1	1	2	2	2	2		11
L4	Sialia sialis	eastern bluebird	2	2	1	2	2	1	2		12
L4	Dumetella carolinensis	grey catbird	0	3	1	1	1	2	3		11
L4	Geothlypis trichas	common yellowthroat	0	2	2	2	1	2	4		13
L4	Passerculus sandwichensis	savannah sparrow	0	3	1	1	1	2	3		11
L4	Pheucticus ludovicianus	rose-breasted grosbeak	0	2	2	1	2	2	3		12
L4	Passerina cyanea	indigo bunting	0	2	2	1	1	2	3		11
L4	Rana pipiens	northern leopard frog	0	3	2u	1	1	3	4		14
L4	Rana clamitans	green frog	0	2	2	1	1	3	2		11
L4	Chrysemys picta	midland painted turtle									
L5	Sylvilagus floridanus	eastern cottontail									
L5	Sciurus carolinensis	grey squirrel									
L5	Canis latrans	coyote									
L5	Procyon lotor	raccoon	0	2u	1	1	1	1	1		7
L5	Branta canadensis	Canada goose	0	1	0	1	1	1	3		7
L5	Anas platyrhynchos	mallard	0	1	2	0	1	1	3		8
L5	Buteo jamaicensis	red-tailed hawk	0	2	2	1	1	1	2		9
L5	Falco sparverius	American kestrel	0	2	2	2	1	1	1		9
L5	Charadrius vociferus	killdeer	0	2	2	0	1	1	3		9
L5	Zenaida macroura	mourning dove	0	2	1	0	1	1	1		6
L5	Picoides pubescens	downy woodpecker	0	2	1	1	1	2	2		9
L5	Cyanocitta cristata	blue jay	0	4	2	0	1	1	1		9
L5	Corvus brachyrhynchos	American crow	0	2	1	0	1	1	1		6
L5	Vireo gilvus	warbling vireo	0	1	2	0	1	2	3		9
L5	Tachycineta bicolor	tree swallow	0	2	2	1	1	1	2		9
L5	Hirundo rustica	barn swallow	0	2	2	2	1	1	1		9
L5	Parus atrocapillus	black-capped chickadee	0	1	1	1	1	1	2		7
L5	Troglodytes aedon	house wren	0	2	1	1	1	2	2		9
L5	Bombycilla cedrorum	cedar waxwing	0	1	2	0	1	1	2		7
L5	Tirdus migratorius	American robin	0	1	2	0	1	1	1		6
L5	Dendroica petechia	yellow warbler	0	1	1	1	1	2	3		9
L5	Spizella passerina	chipping sparrow	0	2	2	0	1	1	2		8
L5	Melospiza melodia	song sparrow	0	2	2	0	1	2	2		9
L5	Cardinalis cardinalis	northern cardinal	0	2	1	0	1	2	2		8
L5	Agelaius phoeniceus	red-winged blackbird	0	3	2	0	1	1	2		9
L5	Quiscalus quiscula	common grackle	0	3	2	0	1	1	2		9
L5	Molothrus ater	brown-headed cowbird	0	3	2	0	1	1	1		8
L5	Icterus galbula	Baltimore oriole	0	2	2	0	1	2	2		9
L5	Carpodacus mexicanus	house finch	0	2	0	1	1	1	0		5
L5	Carduelis tristis	American goldfinch	0	2	2	0	1	1	2		8
L5	Bufo americanus	American toad	0	2u	2u	0	1	2	2		9
L+	Sturnus vulgaris	European starling									

Legend for Table:

CA	Current Abundance	PT(N)	Population Trend (National)	PT(T)	Population Trend (TRCA region)
HD	Habitat Dependence	AS	Area Sensitivity	MR	Mobility Restriction
StD	Sensitivity to Development	AP	Additional Points	TS	Total Score

Appendix 3

Vegetation Community Scores

Code	Community Units	Local Distrib.	Geophy. Requir.	TOTAL SCORE
CBO1	Open Clay Barren Ecosite	3	4	7
FOC2-2	Dry-Fresh White Cedar Coniferous Forest	2	2	4
FOC4-2	Fresh-Moist White Cedar - Hemlock Coniferous Forest	2	2	4
FOM3-2	Dry-Fresh Hemlock - Sugar Maple Mixed Forest	2	2	4
FOM4-1	Dry-Fresh White Cedar - Paper Birch Mixed Forest	3	1	4
FOM6-1	Fresh-Moist Sugar Maple - Hemlock Mixed Forest	2	2	4
FOM7-1	Fresh-Moist White Cedar - Sugar Maple Mixed Forest	2	2	4
FOM7-2	Fresh-Moist White Cedar - Hardwood Mixed Forest	2	2	4
FOM8-1	Fresh-Moist Poplar Mixed Forest	5	2	7
FOD3-1	Dry-Fresh Poplar Deciduous Forest	2	0	2
FOD4-2	Dry-Fresh White Ash Deciduous Forest	2	0	2
FOD5-2	Dry-Fresh Sugar Maple - Beech Deciduous Forest	1	0	1
FOD5-4	Dry-Fresh Sugar Maple - Ironwood Deciduous Forest	2	0	2
FOD5-6	Dry-Fresh Sugar Maple - Basswood Deciduous Forest	4	0	4
FOD5-8	Dry-Fresh Sugar Maple - White Ash Deciduous Forest	2	0	2
FOD6-5	Fresh-Moist Sugar Maple - Hardwood Deciduous Forest	2	0	2
CUP2-E	Silver Maple - Conifer Mixed Plantation	3	0	3
CUP2-f	Hybrid Poplar - Conifer Mixed Plantation	3	0	3
CUP3-1	Red Pine Coniferous Plantation	2	0	2
CUP3-2	White Pine Coniferous Plantation	2	0	2
CUP3-A	Restoration Coniferous Plantation	5	0	5
CUP3-C	White Spruce Coniferous Plantation	2	0	2
CUP3-e	Norway Spruce Coniferous Plantation	2	0	2
CUP3-F	Tamarack Coniferous Plantation	4	0	4
CUP3-G	White Cedar Coniferous Plantation	3	0	3
CUP3-H	Mixed Conifer Coniferous Plantation	2	0	2
CUM1-A	Native Forb Old Field Meadow	1	0	1
CUM1-b	Exotic Cool-season Grass Old Field Meadow	1	0	1
CUT1-A1	Native Deciduous Sapling Cultural Thicket	1	0	1
CUT1-c	Exotic Cultural Thicket	4	0	4
CUW1-D	Hawthorn Cultural Woodland	2	0	2
SWC3-2	White Cedar - Conifer Organic Coniferous Swamp	3	3	6
SWD4-1	Willow Mineral Deciduous Swamp	1	0	1
SWT2-2	Willow Mineral Thicket Swamp	1	0	1
SWT2-5	Red-osier Mineral Thicket Swamp	2	0	2
SWT3-5	Red-osier Organic Thicket Swamp	2	3	5
MAM2-2	Reed Canary Grass Mineral Meadow Marsh	2	0	2
MAM2-3	Red-top Mineral Meadow Marsh	2	1	3
MAM2-6	Broad-leaved Sedge Mineral Meadow Marsh	3	1	4
MAM2-10	Forb Mineral Meadow Marsh	2	1	3
MAM3-6	Broad-leaved Sedge Organic Meadow Marsh	4	3	7
MAS2-1A	Broad-leaved Cattail Mineral Shallow Marsh	2	1	3
MAS2-1b	Narrow-Leaved Cattail Mineral Shallow Marsh	1	0	1
MAS2-4	Broad-leaved Sedge Mineral Shallow Marsh	3	1	4
MAS3-4	Broad-leaved Sedge Organic Shallow Marsh	4	3	7
SAS1	Submerged Shallow Aquatic Ecosite	2	1	3

Appendix 4

List of Flora Species

Rank TRCA	Scientific name	Common Name	TRCA J. Skelton 2002	OMNR S.Varga 1997	L.O. 1-5	P.T. 1-5	H.D. 0-5	S.D. 0-5	T.S. 2-20
L1	Botrychium virginianum	rattlesnake fern		X	4	5	5	5	19
L1	Corallrhiza trifida	early coral-root		X	5	5	5	5	20
L1	Cornus canadensis	bunchberry	X	X	4	5	5	5	19
L1	Drosera rotundifolia	round-leaved sundew		X	5	5	4	5	19
L1	Gaultheria hispidula	creeping snowberry	X	X	4	5	5	5	19
L1	Osmunda regalis var. spectabilis	royal fern	X		4	5	5	5	9
L1	Sarracenia purpurea	pitcher-plant	X	X	4	5	5	5	19
L1	Vaccinium oxycoccos	small cranberry	X	X	5	5	5	4	19
L2	Chamaedaphne calyculata	leatherleaf		X	4	5	5	4	18
L2	Cypripedium calceolus var. pubescens (C. pubescens)	larger yellow lady's slipper		X	5	4	5	4	18
L2	Cypripedium reginae	showy lady's slipper	X	X	4	3	5	5	17
L2	Dicentra cucullaria	Dutchman's breeches	X		4	4	5	5	18
L2	Epilobium leptophyllum	narrow-leaved willow-herb	X		4	5	4	4	17
L2	Gaultheria procumbens	wintergreen	X	X	3	5	5	5	18
L2	Huperzia lucidula (Lycopodium lucidulum)	shining club-moss		X	3	5	5	5	18
L2	Ilex verticillata	winterberry		X	4	4	4	5	17
L2	Iris versicolor	blue flag		X	3	5	4	5	17
L2	Ledum groenlandicum	Labrador-tea	X	X	4	5	5	4	18
L2	Linnaea borealis ssp. longiflora	twinflower	X	X	4	5	3	5	17
L2	Maianthemum trifolium (Smilacina trifolia)	three-leaved false Solomon's seal	X	X	4	4	5	4	17
L2	Moneses uniflora	one-flowered pyrola	X	X	4	5	4	5	18
L2	Monotropa hypopithys	pinesap	X		4	4	4	5	17
L2	Nemopanthus mucronatus	mountain holly		X	4	3	5	5	17
L2	Osmunda cinnamomea	cinnamon fern	X	X	3	5	4	5	17
L2	Picea mariana	black spruce	X	X	4	4	5	5	18
L2	Platanthera hyperborea (Habenaria hyperborea)	northern or tall green orchis	X	X	3	4	5	5	17
L2	Pyrola asarifolia	pink pyrola	X	X	3	4	5	5	17
L2	Vaccinium myrtilloides	velvet-leaf blueberry	X	X	4	4	4	5	17
L3	Abies balsamea	balsam fir	X	X	3	3	3	5	14
L3	Adiantum pedatum	northern maidenhair fern	X		3	3	5	4	15
L3	Alnus incana ssp. rugosa (A. rugosa)	speckled or tag alder	X	X	2	4	4	5	15
L3	Cardamine concatenata (Dentaria lacinata)	cut-leaved toothwort	X		4	3	4	4	15
L3	Carex communis	fibrous-rooted sedge		X	2	4	4	4	14
L3	Carex disperma	two-seeded or soft-leaved sedge	X	X	4	3	4	4	15
L3	Carex eburnea	bristle-leaved sedge	X	X	4	4	3	4	15
L3	Carex hirtifolia	pubescent or hairy-leaved sedge		X	3	3	5	3	14

Rank TRCA	Scientific name	Common Name	TRCA J. Skelton 2002	OMNR S.Varga 1997	L.O. 1-5	P.T. 1-5	H.D. 0-5	S.D. 0-5	T.S. 2-20
L3	Carex hitchcockiana	Hitchcock's sedge		X	4	3	5	2	14
L3	Carex interior	inland or prairie star sedge	X	X	4	2	4	5	15
L3	Carex laevivaginata	smooth-sheathed sedge		X	4	4	2	4	14
L3	Carex lupulina	hop sedge		X	4	4	4	3	15
L3	Carex trisperma var. trisperma	three-seeded sedge	X	X	4	3	4	4	15
L3	Carex utriculata (C. rostrata var. utriculata)	beaked or bottle-shaped sedge		X	4	3	4	3	14
L3	Carex woodii (C. tetanica var. woodii)	purple-tinged or Wood's sedge		X	4	3	5	2	14
L3	Caulophyllum giganteum (C. thalictroides var. giganteum)	long-styled blue cohosh	X	X	5	2	4	3	14
L3	Chrysosplenium americanum	golden saxifrage	X	X	4	3	3	4	14
L3	Cicuta bulbifera	bulblet-bearing water-hemlock		X	3	3	4	4	14
L3	Cinna latifolia	nodding wood reed	X		4	3	4	3	14
L3	Claytonia caroliniana	broad-leaved spring beauty	X	X	4	4	3	5	16
L3	Clintonia borealis	yellow clintonia or bluebead lily	X	X	2	5	4	5	16
L3	Coptis trifolia (C. groenlandica)	goldthread	X	X	3	5	3	5	16
L3	Cystopteris tenuis (Cystopteris fragilis var.mackayi)	Mackay's fragile fern	X	X	3	4	4	5	16
L3	Deparia acrostichoides (Athyrium thelypterioides)	silvery glade fern or spleenwort	X	X	4	4	5	3	16
L3	Dicentra canadensis	squirrel-corn	X	X	3	4	5	4	16
L3	Dryopteris cristata	crested wood fern	X	X	3	4	4	4	15
L3	Equisetum fluviatile	water horsetail	X	X	2	4	5	4	15
L3	Equisetum scirpoides	dwarf scouring rush	X	X	3	4	4	5	16
L3	Equisetum sylvaticum	woodland horsetail	X		4	3	3	4	14
L3	Euonymus obovata (E. obovatus)	running strawberry-bush	X	X	3	4	4	4	15
L3	Gymnocarpium dryopteris	oak fern	X	X	2	3	4	5	14
L3	Hamamelis virginiana	witch-hazel	X		2	3	4	4	5
L3	Hydrocotyle americana	marsh pennywort	X	X	3	4	4	4	15
L3	Larix laricina	tamarack	X	X	2	4	4	4	14
L3	Lonicera canadensis	fly honeysuckle		X	3	4	4	3	14
L3	Lysimachia terrestris	swamp candles		X	5	4	3	4	16
L3	Mitchella repens	partridgeberry	X	X	4	4	3	5	16
L3	Mitella nuda	naked mitrewort	X	X	3	4	4	5	16
L3	Monotropa uniflora	Indian-pipe	X	X	3	4	4	5	16
L3	Oryzopsis asperifolia	white-fruited or rough-leaved mountain-rice	X	X	2	4	4	5	15
L3	Oxalis acetosella ssp. montana (O. montana)	common wood sorrel		X	5	3	3	4	15
L3	Panicum latifolium	broad-leaved panic grass		X	4	5	3	4	16
L3	Picea glauca	white spruce	X	X	3	5	4	3	15
L3	Polygala paucifolia	fringed polygala or gaywings	X	X	4	5	2	5	16

Rank TRCA	Scientific name	Common Name	TRCA J. Skelton	OMNR S.Varga	L.O.	P.T.	H.D.	S.D.	T.S.
L1-L5			2002	1997	1-5	1-5	0-5	0-5	2-20
L3	Polystichum acrostichoides	Christmas fern	X	X	2	3	5	5	15
L3	Pyrola elliptica	shinleaf	X		2	4	4	4	14
L3	Rhamnus alnifolia	alder-leaved buckthorn	X	X	3	3	4	4	14
L3	Ribes triste	swamp red currant	X	X	4	4	2	4	14
L3	Sparganium emersum ssp. emersum (S. chlorocarpum)	green-fruited bur-reed		X	4	3	5	4	16
L3	Sparganium eurycarpum	giant or great bur-reed	X	X	3	4	5	4	16
L3	Streptopus roseus	rose twisted-stalk		X	2	4	4	5	15
L3	Taxus canadensis	Canada yew or ground hemlock	X	X	2	4	4	5	15
L3	Trientalis borealis ssp. borealis	star-flower	X	X	2	4	4	5	15
L3	Viola renifolia	kidney-leaved violet		X	4	4	4	2	14
L4	Acer rubrum	red maple		X	2	4	1	5	12
L4	Acer saccharum ssp. nigrum	black maple	X		2	3	4	2	11
L4	Acer spicatum	mountain maple	X	X	2	3	2	4	11
L4	Actaea pachypoda	white baneberry	X	X	2	3	4	3	12
L4	Allium tricoccum	wild leek or ramps	X	X	2	3	4	4	13
L4	Anaphalis margaritacea	pearly everlasting	X	X	3	4	3	3	13
L4	Antennaria neglecta	field pussytoes	X		2	3	3	3	11
L4	Aralia racemosa ssp. racemosa	spikenard	X	X	2	4	3	3	12
L4	Asarum canadense	wild ginger	X	X	2	3	4	3	12
L4	Asclepias incarnata ssp. incarnata	swamp milkweed	X	X	2	3	3	3	11
L4	Betula allegheniensis (B. lutea)	yellow or curly birch	X	X	1	4	3	5	13
L4	Betula papyrifera	paper or white birch	X	X	1	4	2	4	11
L4	Caltha palustris	marsh marigold		X	2	4	2	3	11
L4	Cardamine diphylla (Dentaria diphylla)	broad- or two-leaved toothwort	X	X	2	3	4	4	13
L4	Carex albursina (C. laxiflora var. latifolia)	white bear sedge	X	X	2	3	5	3	13
L4	Carex alopecoidea	foxtail or brown-headed wood sedge	X		4	3	1	3	11
L4	Carex arctata	nodding wood sedge	X	X	2	4	4	3	13
L4	Carex deweyana	Dewey's sedge		X	2	4	2	3	11
L4	Carex hystericina (C. hystricina)	porcupine sedge	X	X	2	3	2	5	12
L4	Carex intumescens	bladder sedge	X		3	4	2	2	11
L4	Carex lacustris	lake-bank sedge		X	3	3	2	4	12
L4	Carex leptalea ssp. leptalea	bristle-stalked sedge	X	X	3	3	3	4	13
L4	Carex leptonervia (C. laxiflora var. leptonervia)	few- or fine-nerved wood sedge		X	4	3	2	2	11
L4	Carex retrorsa	retrorse sedge	X	X	2	3	3	3	11
L4	Carex scabrata	rough sedge	X	X	2	2	4	3	11
L4	Carex stricta	tussock sedge	X		2	3	4	3	12
L4	Carpinus caroliniana ssp. virginiana	blue beech or American hornbeam	X	X	2	3	4	2	11
L4	Chelone glabra	turtlehead		X	3	3	1	4	11

Rank TRCA L1-L5	Scientific name	Common Name	TRCA J. Skelton 2002	OMNR S.Varga 1997	L.O. 1-5	P.T. 1-5	H.D. 0-5	S.D. 0-5	T.S. 2-20
L4	Circaea alpina	smaller enchanter's nightshade	X	X	2	4	4	2	12
L4	Cornus rugosa	round-leaved dogwood	X		2	4	2	3	11
L4	Cystopteris bulbifera	bulblet fern	X	X	1	4	3	5	13
L4	Dryopteris intermedia (D. spinulosa var. intermedia)	evergreen wood fern	X	X	2	4	4	3	13
L4	Dryopteris marginalis	marginal wood fern	X	X	1	3	3	4	11
L4	Fagus grandifolia	American beech	X	X	1	4	3	4	12
L4	Fraxinus nigra	black ash	X	X	2	4	2	3	11
L4	Glyceria grandis	tall manna grass		X	2	3	5	2	12
L4	Hydrophyllum canadense	Canada waterleaf	X	X	3	3	4	3	13
L4	Impatiens pallida	yellow touch-me-not (pale jewelweed)		X	3	2	4	2	11
L4	Lycopus americanus	American or cut-leaved water-horehound	X	X	2	4	2	3	11
L4	Lysimachia thyrsiflora	tufted loosestrife	X		3	3	3	4	13
L4	Maianthemum canadense	Canada mayflower	X	X	2	4	0	5	11
L4	Mimulus ringens	square-stemmed monkey-flower	X		2	2	4	4	12
L4	Mitella diphylla	mitrewort		X	2	3	1	5	11
L4	Pinus strobus	white pine	X	X	1	4	3	4	12
L4	Polygonatum pubescens	downy Solomon's seal	X	X	2	4	2	5	13
L4	Populus grandidentata	large-toothed aspen		X	2	3	4	3	12
L4	Pteridium aquilinum var. latiusculum	eastern bracken	X	X	2	4	2	4	12
L4	Ranunculus hispidus var. caricetorum (R. septentrionalis)	swamp buttercup		X	2	4	3	2	11
L4	Rubus pubescens	dwarf raspberry	X	X	2	3	1	5	11
L4	Rudbeckia hirta (R. serotina)	black-eyed Susan	X	X	2	4	3	3	12
L4	Sagittaria latifolia	common arrowhead	X	X	2	2	5	4	13
L4	Salix amygdaloides	peach-leaved willow		X	2	2	5	3	12
L4	Salix bebbiana	beaked or Bebb's willow	X	X	2	4	2	4	12
L4	Salix discolor	pussy willow		X	2	3	4	3	12
L4	Salix petiolaris	slender willow		X	3	3	5	2	13
L4	Schizachne purpurascens ssp. purpurascens	purple or false melic grass		X	3	3	3	4	13
L4	Scirpus cyperinus	woolly bulrush or wool-grass		X	2	3	3	5	13
L4	Scirpus microcarpus (S. rubrotinctus)	barber-pole sedge or bulrush	X		2	2	5	3	12
L4	Scirpus validus	soft-stemmed bulrush	X	X	2	2	4	3	11
L4	Solidago patula	rough-leaved goldenrod	X	X	3	3	2	3	11
L4	Stellaria longifolia	long-leaved chickweed		X	4	3	2	3	12
L4	Symplocarpus foetidus	skunk cabbage	X	X	3	2	4	3	12
L4	Thelypteris palustris var. pubescens	marsh fern	X	X	2	4	3	4	13
L4	Thuja occidentalis	white cedar	X	X	1	4	2	4	11
L4	Tiarella cordifolia	foam-flower	X	X	2	3	1	5	11
L4	Trillium erectum	red trillium or stinking Johnny	X	X	2	4	2	5	13

Rank TRCA L1-L5	Scientific name	Common Name	TRCA J. Skelton 2002	OMNR S.Varga 1997	L.O. 1-5	P.T. 1-5	H.D. 0-5	S.D. 0-5	T.S. 2-20
L4	Trillium grandiflorum	white trillium	X	X	1	4	3	5	13
L4	Tsuga canadensis	eastern hemlock	X	X	1	4	3	5	13
L4	Typha latifolia	broad-leaved cattail	X	X	1	4	4	3	12
L4	Veronica americana	American speedwell or brooklime		X	3	3	1	4	11
L4	Viola affinis	Le Conte's violet		X	3	4	3	2	12
L4	Viola blanda (V. incognita)	sweet white violet		X	3	4	1	3	11
L5	Acer saccharum ssp. saccharum	sugar maple	X	X	1	3	3	2	9
L5	Achillea millefolium ssp. lanulosum	woolly yarrow		X	1	2	4	1	8
L5	Actaea rubra	red baneberry	X	X	2	3	2	3	10
L5	Agrimonia gryposepala	agrimony	X	X	2	2	0	2	6
L5	Alisma plantago-aquatica (A. triviale)	water-plantain	X	X	2	2	4	2	10
L5	Anemone virginiana (inc. vs. alba, cylindroidea, riparia)	common thimbleweed		X	2	3	1	3	9
L5	Apocynum andr osaemifolium	spreading dogbane	X		2	3	2	3	10
L5	Apocynum cannibinum (inc. var. hypericifolium)	Indian-hemp dogbane	X		2	2	2	2	8
L5	Aralia nudicaulis	wild sarsaparilla	X	X	2	3	1	3	9
L5	Arisaema triphyllum	Jack-in-the-pulpit	X	X	1	3	3	2	9
L5	Asclepias syriaca	common milkweed	X	X	1	2	3	1	7
L5	Aster cordifolius	heart-leaved aster		X	1	1	0	1	3
L5	Aster lanceolatus ssp. lanceolatus	panicled or tall white aster	X		1	2	0	1	4
L5	Aster lateriflorus	calico or one-sided aster	X	X	1	2	1	1	5
L5	Aster macrophyllus	big-leaved aster	X	X	1	3	1	2	7
L5	Aster novae-angliae (Virgulus novae-angliae)	New England aster	X	X	1	2	2	2	7
L5	Aster puniceus var. puniceus	swamp or purple-stemmed aster	X	X	2	2	1	2	7
L5	Athyrium filix-femina var. angustum	northeastern lady fern	X	X	1	3	2	3	9
L5	Bidens cernuus	nodding bur-marigold		X	2	2	0	2	6
L5	Bidens frondosus	common or devil's beggarticks	X	X	1	1	0	1	3
L5	Bidens tripartitus (inc. B. connatus, B. comosus)	three-parted beggar's ticks		X	3	2	0	2	7
L5	Cardamine pensylvanica	bitter cress		X	2	2	1	2	7
L5	Carex bebbii	Bebb's sedge		X	2	2	0	3	7
L5	Carex cristatella	crested sedge	X	X	2	2	1	2	7
L5	Carex gracillima	graceful sedge		X	2	3	2	2	9
L5	Carex granularis	meadow sedge		X	1	2	1	3	7
L5	Carex pedunculata	early-flowering sedge	X	X	2	3	2	3	10
L5	Carex projecta	necklace or loose-headed oval sedge		X	4	2	1	2	9

Rank TRCA	Scientific name	Common Name	TRCA J. Skelton	OMNR S.Varga	L.O.	P.T.	H.D.	S.D.	T.S.
L1-L5			2002	1997	1-5	1-5	0-5	0-5	2-20
L5	Carex pseudo-cyperus	pseudocyperus sedge	X		1	3	2	4	10
L5	Carex radiata (formerly C. rosea)	stellate or straight-styled sedge	X		2	2	2	2	8
L5	Carex rosea (formerly convoluta)	curly-styled sedge	X	X	2	2	3	2	9
L5	Carex sparganioides	bur-reed sedge	X		2	2	4	2	10
L5	Carex stipata	awl-fruited sedge		X	2	3	0	2	7
L5	Carex vulpinoidea	fox sedge	X	X	1	2	5	1	9
L5	Cicuta maculata	spotted water-hemlock	X		2	2	2	2	8
L5	Circaea lutetiana ssp. canadensis (C. quadrisulcata)	enchanter's nightshade	X	X	1	1	2	1	5
L5	Clematis virginiana	virgin's bower		X	2	2	4	2	10
L5	Clinopodium vulgare (Satureja vulgaris)	dogmint or wild basil	X	X	2	3	2	2	9
L5	Cornus alternifolia	alternate-leaved dogwood	X	X	2	2	3	2	9
L5	Cornus foemina ssp. racemosa (C. racemosa)	gray dogwood	X	X	4	2	1	3	10
L5	Cornus stolonifera	red osier dogwood	X	X	1	2	0	4	7
L5	Crataegus punctata	dotted hawthorn		X	2	2	4	2	10
L5	Diervilla lonicera	bush honeysuckle		X	2	3	1	4	10
L5	Dryopteris carthusiana (D. spinulosa)	spinulose wood fern	X	X	1	3	1	2	7
L5	Epilobium ciliatum ssp. ciliatum	sticky willow-herb		X	2	2	2	1	7
L5	Equisetum arvense	field or common horsetail	X	X	1	2	0	1	4
L5	Equisetum hyemale ssp. affine	scouring rush	X	X	2	2	1	2	7
L5	Erigeron annuus	annual or daisy fleabane		X	2	2	1	1	6
L5	Erigeron philadelphicus ssp. philadelphicus	Philadelphia fleabane		X	2	2	1	2	7
L5	Erythronium americanum ssp. americanum	yellow trout-lily	X	X	1	3	2	2	8
L5	Eupatorium maculatum ssp. maculatum	spotted Joe-Pye weed	X	X	1	2	1	2	6
L5	Eupatorium perfoliatum	boneset	X	X	1	3	0	3	7
L5	Eupatorium rugosum	white snakeroot		X	2	2	2	1	7
L5	Euthamia graminifolia (Solidago graminifolia)	grass- or narrow-leaved goldenrod	X		1	1	2	1	5
L5	Fragaria vesca ssp. americana	woodland strawberry		X	2	2	1	2	7
L5	Fragaria virginiana (incl. ssps. glauca & virginiana)	wild or common strawberry	X	X	1	2	0	2	5
L5	Fraxinus americana	white ash	X	X	1	2	0	2	5
L5	Fraxinus pennsylvanica var. pennsylvanica	red ash	X	X	2	2	2	2	8
L5	Galium asprellum	rough bedstraw		X	2	2	1	2	7
L5	Galium triflorum	sweet-scented bedstraw		X	2	2	0	2	6
L5	Glyceria striata (incl. vars. striata & stricta)	fowl manna grass		X	2	2	1	2	7

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L1-L5			2002	1997	1-5	1-5	0-5	0-5	2-20
L5	Hydrophyllum virginianum	Virginia waterleaf	X	X	1	2	2	1	6
L5	Impatiens capensis (I. biflora)	orange touch-me-not (spotted jewelweed)	X	X	1	2	0	2	5
L5	Juncus effusus ssp. solutus	soft rush		X	2	4	1	3	10
L5	Juncus tenuis	path rush	X		2	2	2	1	7
L5	Laportea canadensis	wood nettle	X	X	2	3	3	2	10
L5	Leersia oryzoides	rice cut grass	X	X	2	2	4	2	10
L5	Lemna minor	common or lesser duckweed	X	X	2	2	4	2	10
L5	Lycopus uniflorus	northern water-horehound or bugleweed		X	2	3	1	3	9
L5	Lysimachia ciliata	fringed loosestrife	X		1	2	0	2	5
L5	Maianthemum stellatum (Smilacina stellata)	starry false Solomon's seal	X	X	2	2	2	3	9
L5	Matteuccia struthiopteris var. pensylvanica	ostrich fern	X	X	1	2	3	3	9
L5	Oenothera biennis	common or hairy evening-primrose	X		2	1	3	1	7
L5	Onoclea sensibilis	sensitive fern	X	X	2	3	1	3	9
L5	Ostrya virginiana	ironwood	X	X	1	3	3	2	9
L5	Parthenocissus inserta (P. vitacea)	thicket creeper	X	X	2	2	4	2	10
L5	Phryma leptostachya	lopseed		X	2	2	3	2	9
L5	Pilea pumila	dwarf clearweed	X		2	2	1	2	7
L5	Plantago rugelii	red-stemmed or Rugel's plantain		X	2	2	3	1	8
L5	Podophyllum peltatum	May-apple	X	X	2	3	3	2	10
L5	Populus balsamifera ssp. balsamifera	balsam poplar	X	X	1	2	2	2	7
L5	Populus tremuloides	trembling aspen	X	X	1	3	1	3	8
L5	Prunus serotina	black cherry	X	X	1	2	2	2	7
L5	Prunus virginiana ssp. virginiana	choke cherry	X	X	1	2	0	2	5
L5	Ranunculus abortivus	small-flowered or kidneyleaf buttercup	X	X	1	3	3	2	9
L5	Ranunculus recurvatus var. recurvatus	hooked buttercup		X	2	3	2	2	9
L5	Ranunculus sceleratus	cursed crowfoot		X	2	2	4	2	10
L5	Rhus rydbergii (R. radicans ssp. rydbergii)	poison ivy (shrub form)	X		1	2	0	2	5
L5	Rhus typhina	staghorn sumach	X	X	1	1	2	2	6
L5	Ribes americanum	wild black currant	X	X	2	3	0	2	7
L5	Ribes cynosbati	prickly gooseberry	X	X	2	3	2	2	9
L5	Rubus allegheniensis	common blackberry	X	X	2	3	0	2	7
L5	Rubus idaeus ssp. melanolasius (R. strigosus)	wild red raspberry	X	X	1	1	0	1	3
L5	Rubus odoratus	purple-flowering raspberry	X	X	2	2	4	2	10
L5	Salix eriocephala (S. rigida; S. cordata misapplied)	narrow heart-leaved or Missouri willow	X	X	1	1	3	1	6

Rank TRCA L1-L5	Scientific name	Common Name	TRCA J. Skelton 2002	OMNR S.Varga 1997	L.O. 1-5	P.T. 1-5	H.D. 0-5	S.D. 0-5	T.S. 2-20
L5	Sambucus racemosa ssp. pubens (S. pubens)	red-berried elder		X	1	3	4	2	10
L5	Sanguinaria canadensis	bloodroot	X	X	1	3	2	4	10
L5	Scirpus atrovirens	black-fruited or dark green bulrush	X	X	2	2	4	2	10
L5	Scutellaria galericulata (S. epilobiifolia)	common skullcap	X		2	2	2	3	9
L5	Scutellaria lateriflora	mad-dog skullcap	X		2	2	1	3	8
L5	Sium suave	water-parsnip		X	2	2	3	3	10
L5	Solidago altissima	tall goldenrod	X	X	1	2	0	1	4
L5	Solidago caesia	blue-stemmed goldenrod		X	1	2	3	2	8
L5	Solidago canadensis var. canadensis	Canada goldenrod	X	X	1	2	0	1	4
L5	Solidago flexicaulis	zig-zag goldenrod	X	X	1	1	2	1	5
L5	Solidago nemoralis ssp. nemoralis	gray goldenrod	X	X	2	2	2	2	8
L5	Thalictrum dioicum	early meadow rue	X	X	1	3	4	2	10
L5	Tilia americana	basswood	X	X	1	4	2	3	10
L5	Ulmus americana	white elm	X	X	1	4	0	2	7
L5	Verbena hastata	blue vervain	X	X	2	2	4	2	10
L5	Verbena urticifolia	white vervain	X		2	2	1	2	7
L5	Viburnum lentago	nannyberry	X		2	3	0	2	7
L5	Viola conspersa	dog violet	X	X	2	2	2	2	8
L5	Viola pubescens (inc. vars. pubescens & scabriuscula)	stemmed yellow violet	X	X	2	3	1	2	8
L5	Viola sororia	common blue violet	X	X	1	2	1	1	5
L5	Vitis riparia	riverbank grape		X	1	1	0	1	3
LH	Acer x freemanii (A. rubrum x saccharinum)	Freeman's or hybrid swamp maple	X		h				
LH	Cardamine x maxima (C. concatenata x diphylla)	hybrid toothwort		X	h				
LH	Dryopteris x triploidea (D. carthusiana x intermedia)	confusing hybrid wood fern		X	h				
L+	Agrostis gigantea (A. stolonifera var. major; A. alba)	redtop		X	+				
L+	Arctium lappa	great burdock	X	X	+				
L+	Arctium minus ssp. minus	common burdock	X	X	+				
L+	Barbarea vulgaris	winter cress or yellow rocket		X	+				
L+	Betula pendula (B. verrucosa)	European white or silver birch	X		+				
L+	Bromus inermis ssp. inermis	smooth brome grass	X	X	+				
L+	Caragana arborescens	Siberian pea-shrub	X		+				
L+	Centaurea sp.	knapweed	X						
L+	Chrysanthemum leucanthemum	ox-eye daisy		X	+				
L+	Cichorium intybus	chicory	X	X	+				
L+	Cirsium arvense	creeping (Canada) thistle		X	+				
L+	Convolvulus arvensis	field bindweed	X		+				
L+	Cynoglossum officinale	hound's tongue		X	+				

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L1-L5			2002	1997	1-5	1-5	0-5	0-5	2-20
L+	Dactylis glomerata	orchard grass		X	+				
L+	Daucus carota	Queen Anne's lace or wild carrot	X	X	+				
L+	Dipsacus fullonum ssp. sylvestris	teasel		X	+				
L+	Elaeagnus umbellata	autumn olive	X		+				
L+	Epilobium parviflorum	small-flowered willow-herb	X	X	+				
L+	Epipactis helleborine	helleborine	X	X	+				
L+	Hieracium caespitosum ssp. caespitosum (H. pratense)	yellow or field hawkweed		X	+				
L+	Hypericum perforatum	common St. Johnswort	X	X	+				
L+	Inula helenium	elecampane	X	X	+				
L+	Linaria vulgaris	toadflax, butter-and-eggs		X	+				
L+	Lithospermum officinale	Eurasian gromwell	X	X	+				
L+	Lonicera x bella (L. morrowi x tatarica)	hybrid shrub or Bell's honeysuckle	X		+				
L+	Lonicera xylosteum	European fly honeysuckle	X		+				
L+	Lotus corniculatus	bird's foot trefoil	X	X	+				
L+	Lythrum salicaria	purple loosestrife		X	+				
L+	Malus pumila (M. domestica; Pyrus malus)	apple	X	X	+				
L+	Melilotus alba	white sweet clover		X	+				
L+	Phleum pratense	timothy grass	X	X	+				
L+	Picea abies	Norway spruce	X		+				
L+	Pinus banksiana	Jack pine	X		+				
L+	Pinus sylvestris	Scots pine	X	X	+				
L+	Poa pratensis ssp. pratensis	Kentucky blue grass		X	+				
L+	Populus x canadensis (P. deltoides x nigra)	Carolina poplar	X		+				
L+	Potentilla recta	rough-fruited or sulphur cinquefoil	X	X	+				
L+	Ranunculus acris	tall buttercup	X	X	+				
L+	Rhamnus cathartica	common or European buckthorn	X	X	+				
L+	Robinia pseudoacacia	black locust	X	X	+				
L+	Rosa multiflora	multiflora or Japanese rose	X		+				
L+	Rumex crispus	curly dock		X	+				
L+	Rumex obtusifolius ssp. obtusifolius	bitter dock		X	+				
L+	Salix x rubens (S. alba x fragilis)	European tree willow	X	X	+				
L+	Salix x sepulcralis (S. alba var. vitellina x babylonica)	weeping willow	X		+				
L+	Solanum dulcamara	bittersweet nightshade	X	X	+				
L+	Sorbus aucuparia	European mountain-ash or rowan	X	X	+				
L+	Syringa vulgaris	common lilac	X		+				
L+	Tanacetum vulgare	tansy	X		+				

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L1-L5			2002	1997	1-5	1-5	0-5	0-5	2-20
L+	Taraxacum officinale	dandelion		X	+				
L+	Tragopogon pratensis ssp. pratensis	meadow goat's beard		X	+				
L+	Trifolium pratense	red clover		X	+				
L+	Tussilago farfara	coltsfoot	X	X	+				
L+	Urtica dioica ssp. dioica	European stinging nettle	X		+				
L+	Verbascum thapsus	common mullein	X	X	+				
L+	Veronica officinalis	common speedwell		X	+				
L+	Viburnum opulus	guelder-rose/Eu highbush cranberry	X	X	+				
L+	Vicia cracca	cow, tufted, or bird vetch	X	X	+				
L+?	Agrostis stolonifera (A. alba var. palustris)	creeping bent grass		X	+?				
L+?	Geranium robertianum	herb Robert	X	X	+?				
L+?	Phalaris arundinacea	reed canary grass	X	X	+?				
L+?	Poa compressa	Canada or flat-stemmed blue grass		X	+?				
L+?	Prunella vulgaris (incl. ssp. lanceolata and vulgaris)	heal-all	X	X	+?				
L+?	Typha angustifolia	narrow-leaved cattail		X	+?				
P L1	Pinus resinosa	red pine	X	X	5	5	4	5	19

Legend for Table:

L.O. Local
P.T. Population Trend
H.D. Habitat Dependence
S.D. Sensitivity to Development
T.S. Total Score
L+ Exotic Species
L+? Probable Exotic but not Confirmed
P Planted

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