

Cold Creek Conservation Area Management Plan



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

December, 2002



www.trca.on.ca

TABLE OF CONTENTS

Vision Statement and Values.....	iii
The Cold Creek Conservation Area Management Plan Advisory Committee	iv
Executive Summary.....	v
Chapter 1: Introduction	
1.1 Towards a Living City Region.....	1
1.2 The TRCA and Conservation Lands.....	2
1.3 Cold Creek Conservation Area.....	2
Chapter 2: Developing the Management Plan	
2.1 TRCA Direction	4
2.2 Purpose	4
2.3 Location, Site Description and Land Use.....	6
2.4 Process for Developing the Management Plan.....	7
2.5 The Advisory Committee.....	7
2.6 Public Consultation	8
2.7 Approval of the Management Plan	8
Chapter 3: Background Studies	
3.1 TRCA Planning Studies, Policies and Legislation.....	9
3.2 Municipal Land Use Planning.....	13
3.3 Provincial Plans and Other Studies	16
Chapter 4: Resource Inventory and Analysis	
4.1 Natural Heritage	18
4.1.1 Landform	18
4.1.2 Ground and Surface Water.....	19
4.1.3 Aquatic Habitats.....	23
4.1.4 Terrestrial Habitats.....	26
4.2 Human Heritage.....	41
4.2.1 Archaeological Resources	41
4.3 Past Recreation and Education Developments	43
4.3.1 Recreational Facilities.....	43
4.3.2 Conservation Education Programs.....	43
4.3.3 Attendance and Users	44
4.4 Infrastructure.....	44
Chapter 5: Management Zones	
5.1 Management Zone Definitions.....	47
5.2 Determining the Management Zones	47
5.3 Management Zone – Permitted Activities	51
5.4 Analysis of Land Use	52
5.5 Revenue Generation Opportunities	52
Chapter 6: Management Recommendations	
6.1 Resource Management Recommendations for Cold Creek Conservation Area.....	54
6.1.1 Natural Heritage	54
6.1.2 Human Heritage	58
6.1.3 Public Use	58
6.1.4 Infrastructure	59
6.2 Recommendations for “Supporting Areas” Surrounding Cold Creek Conservation Area.....	59
6.2.1 Surrounding Land Use.....	59
6.2.2 Groundwater and Source Protection	60

Chapter 7: Future Management of Cold Creek Conservation Area

7.1	Implementation of the Management Plan.....	61
7.1.1	Agency and Municipal Stewardship.....	61
7.1.2	Community Stewardship	61
7.2	Safety and Security	62
7.3	Plan Review and Amendment.....	62
7.4	Future Integration with the Cold Creek Subwatershed Plan	62

List of Appendices

Appendix 1	Benthic Invertebrate Survey Results.....	63
Appendix 2	List of Fauna Species	64
Appendix 3	Vegetation Community Scores.....	66
Appendix 4	List of Flora Species	67

MAPS

Map 1	Cold Creek Conservation Area – Context Map	1
Map 2	Cold Creek Conservation Area – Site Map	5
Map 3A	Cold Creek Conservation Area – Valley and Stream Corridors	10
Map 3B	Cold Creek Conservation Area – Areas of Special Designation.....	15
Map 4	Cold Creek Subwatershed – Baseflow Data Collection and Surface Water Quality Monitoring Stations	21
Map 5	Cold Creek Subwatershed – Priority Source Contribution Areas	23
Map 6	Cold Creek Conservation Area – Aquatic Features	25
Map 7	Cold Creek Conservation Area – Terrestrial Habitats	29
Map 7A ₁	Known Flora Species of Concern	31
Map 7A ₂	Known Fauna Species of Concern	32
Map 7B	Terrestrial Habitat – Size, Shape and Matrix	35
Map 7C	Vegetation Communities and Forest Types	37
Map 8	Cold Creek Conservation Area Management Zones	48
Map 8A	Management Zone Targeted System Analysis Step 1.....	49
Map 8B	Management Zone Targeted System Analysis Step 2.....	50
Map 9	Cold Creek Conservation Area – Priority Thinning and Restoration	56

FIGURES

Figure 1	Management Plan Development Process	6-7
Figure 2	Land Use Designations, Township of King Official Plan	14
Figure 3	Hydrogeology: Cold Creek North-South Cross Section.....	20
Figure 4	Historical Land Ownership	42
Figure 5	Visitors Origin by Municipality	44
Figure 6	Past and Existing Land Uses in Cold Creek Conservation Area	52
Figure 7	Proposed Land Uses.....	52
Figure 8	Past Revenue Generation (2001)	53

TABLES

Table 1	Water Quality Data from Cold Creek.....	21
Table 2	Relative Pollutant Contributions – Cold Creek Subwatershed	22
Table 3	Results of Temperature Sampling.....	24
Table 4	Fish Species Captured Near Cold Creek Conservation Area.....	26
Table 5	Terrestrial Natural Heritage Approach	28
Table 6	Permitted Activities at Cold Creek Conservation Area.....	51
Table 7	Priority Thinning Areas	57



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 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
Jacque 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
Dennis James	Friends of Cold Creek
Judith James	Resident
Anne Kong	Resident
Luciano Martin	Action to Restore a Clean Humber
Dick O'Brien	Chair, The Toronto and Region Conservation Authority
Linda Pabst	Councillor, Township of King
Rod Powell	Boy Scouts
Vince Principato	Resident
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

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

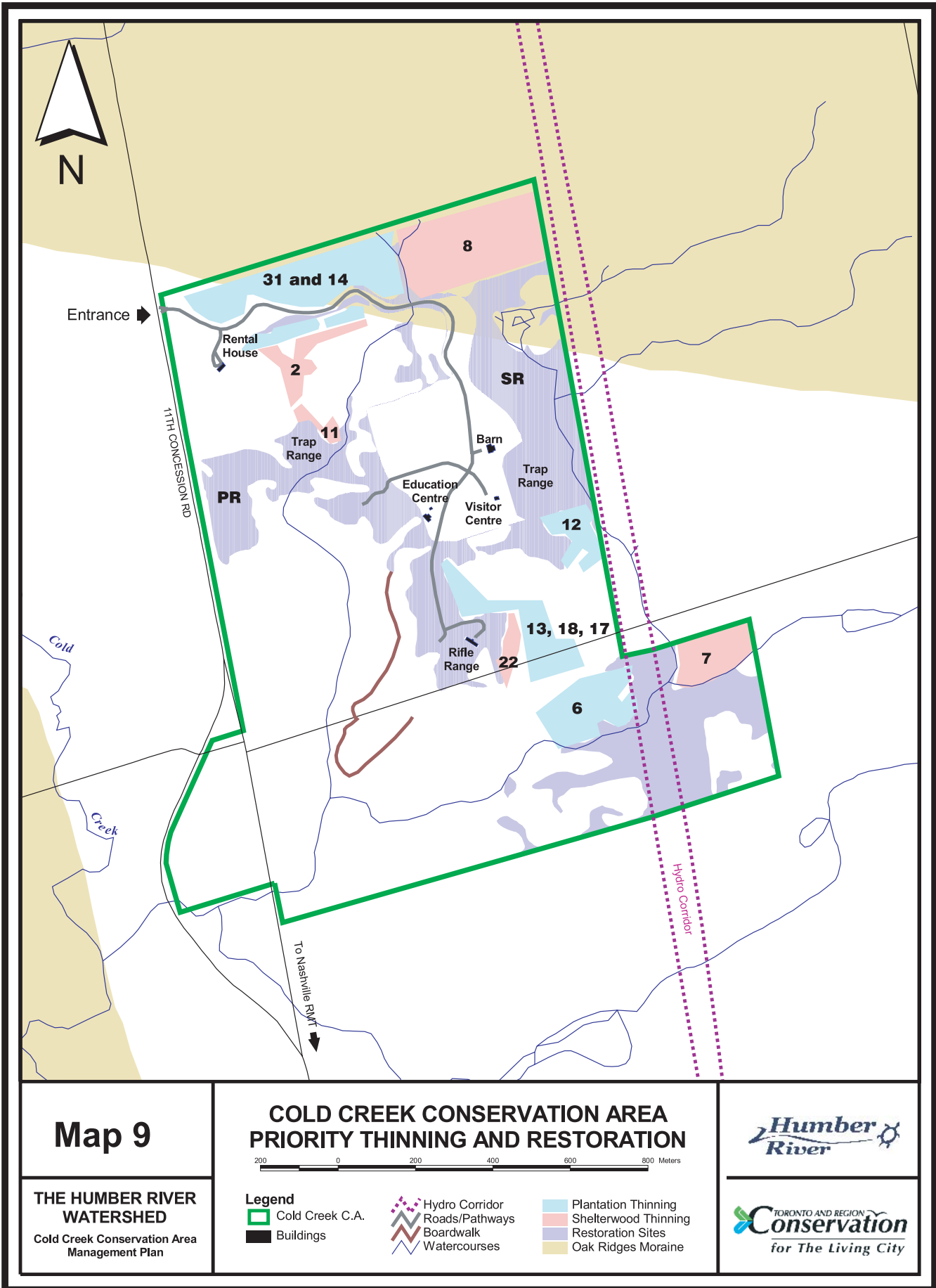
Black Spruce Regeneration – Case Studies

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.



Map 9

COLD CREEK CONSERVATION AREA PRIORITY THINNING AND RESTORATION

200 0 200 400 600 800 Meters



**THE HUMBER RIVER
WATERSHED**
Cold Creek Conservation Area
Management Plan

Legend

- Cold Creek C.A.
- Buildings
- Hydro Corridor
- Roads/Pathways
- Boardwalk
- Watercourses
- Plantation Thinning
- Shelterwood Thinning
- Restoration Sites
- Oak Ridges Moraine



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
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
7	2.2	43	1	5.0	18.6		37.6	Le	0.84
								Pw	60.64
								Pr	19.15
								Pj	18.09
								Elm	5.32
8	6.9	40	4	13.0	17		43.4	Sw	2.13
								Pw	35.45
								Sw	34.76
								Pr	12.41
								Le	8.87
11	0.4	43	4	2.0	19		36.0	Or	5.32
								Ms	2.13
								Elm	0.71
								Bd	0.36
								Pw	67.00
12	0.7	38	4	3.0	18.3		28.0	Sw	22.00
								Pj	8.30
								Aw	2.70
13	0.9	42	1	2.0	16.5		30.0	Pw	2.70
								Sw	59.52
14	0.4	37	4	2.0	19.5		42.0	Sw	30.95
								Apple	9.52
15	1.1	43	4	4.0	19.8		42.5	Sw	56.67
								Pw	43.33
16	0.6	33	4	3.0	15.3		42.0	Pw	64.29
								Sw	30.95
								Elm	4.76
17	1.7	41	4	4.0	15.8		24.0	Pw	50.58
								Sw	47.06
								Elm	2.35
								Pw	92.06
22	1.9	41	4	4.0	12.5		26.0	elm	4.76
								Sw	1.59
								Cb	1.59
								Sw	39.58
31	5.9	40	4	14.0	15.5		32.9	Pw	29.17
								Po	27.08
								Apple	4.17
								Pw	73.08
31	5.9	40	4	14.0	15.5		32.9	Sw	17.31
								Cw	7.69
								Po	1.92
								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 implementation 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.