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APPENDICES

APPENDIX A: LITERATURE REVIEWS

Document	Description
INVENTORY, SURVEYS, PLANT LISTS, VEGETATION COMMUNITIES AND SPECIES MAPPING	
Anonymous. 1977. *The Rosedale Ravines Study*.	A very thorough study that is now out-of-date and valuable primarily for historical fauna and flora records. Especially interesting for analysis of importance values of vegetation species not just by site, but by slope aspect. It can provide a useful baseline for study of changes in vegetation and species, especially breeding birds (presence of wood thrush, winter wren, ovenbird, Canada warbler and scarlet tanager are especially telling of change in habitat quality as all of these are sensitive species and unlikely to be found currently.)
Brownell, V.R. 1993. *Waterfront Natural Areas—Part I: An Overview of Natural Areas Along the Lake Ontario Waterfront from Burlington to Trenton*. For the Waterfront Regeneration Trust, Toronto, Ontario.	Contains good overview of significant features found at numerous sites along the waterfront and well inland. Briefly reviews physical and biological features, disturbances, designation, and information sources.
Borough of Scarborough. 1981. *At Last Count: An Assessment of Natural Areas in Scarborough, Part 1*. Borough of Scarborough.	Fauna and flora records too out of date for current use. Vegetation communities mapping and descriptions not in enough detail to translate to ELC. In general, the documents are useful as historical records of occurrences and conditions.
Borough of Scarborough. 1983. *At Last Count: An Assessment of Natural Areas in Scarborough, Part 2*. City of Scarborough Works Department.	More detailed information than the 1981 version. Vegetation community mapping that could be interpreted at Eco-Site level.
City of Toronto. 1997. *Grenadier Pond—Shoreline Softening 1996-1997 Year-End Progress and Financial Report*. Submitted to the Great Lakes 2000 Cleanup Fund by the City of Toronto Parks and Recreation Division.	Flora Species lists, wildlife sightings records, August 18,1997, fish and wildlife records, 1995 and 1997 status.
Coady, G and Roy B.H. Smith. 2000. *The Greater Toronto Area Bird Checklist and Reporting Guidelines—2000*. The Toronto Ornithological Club.	List of reported birds in the GTA, notes region sited, status, breeding. Date range. Extensive review of documents. References, reporting guidelines.
Eyles, N and J.I. Boyce. 1991. *Earth Science Survey of the Rouge Valley Park*. Ontario Minister of Natural Resources, Central Region, Aurora, Ontario.	Very good overview of regional geology and deposit information (quaternary geology) related specifically to the Rouge Valley. Good illustration of Iroquois Bluff and sand spits from Humber River eastward (although not detailed enough to digitize).
Kamstra, James. 1991. *Life Science Survey of the Northeastern Portion of the Rouge Valley Park*. Gartner Lee Limited, Ontario Ministry of Natural Resources.	A survey conducted for Phase 2 planning area for Rouge Park. A good overview of vegetation communities and significant species (although communities are not mapped in great detail). Need to assess document for translation to ELC and mapping of communities and species for TRCA database.
Kim, Mark. 1995. Wetland Enhancement Preliminary Monitoring Data. For Todmorden Mills Wildflower Preserve, B.Sc. Honours—Biology EYC Project #30.	Contains an inventory of flora at Todmorden Mills Pond.

Document	Description
Marshall, Macklin, Monaghan. 1997. *East Point Park Environmental Planning Update*. Prepared for Metro Toronto Parks and Culture.	The study provides an excellent overview of park features and use. It makes management recommendations that should be considered for site level planning, taking into consideration the results of the TRCA modelling. Vegetation community mapping is detailed and translatable to ELC, however, TRCA/City NHS study has updated community mapping to greater level of detail in ELC because of the importance of the site. Flora and Fauna species of concern are valuable, and will be entered into TRCA database.
Miller, Gavin C. and Stephen Smith. February, 1997. *An Ecological Survey of the Basilian Father's Property: Humber Valley, North York*.	A baseline Flora species and vegetation community survey of this ecological restoration site.
Miller, Gavin C. and Stephen Smith. In Press. *A Botanical Inventory of the Palisades Tree Power Site*.	Baseline flora species and vegetation community survey of the ecological site located at the Palisades Condominium Property in the East Don Valley.
Miller, Gavin C. and Stephen Smith. In Press. *A Botanical Inventory of the Gwendolen Avenue Tree Power Site*.	Baseline flora species and vegetation community survey of the ecological site located at Gwendolen Avenue.
Miller, Gavin C. and Stephen Smith. In Press. *A Botanical Inventory of the Dee Avenue Tree Power Site*.	Baseline flora species and vegetation community survey of the ecological site located at Dee Avenue.
Miller, Gavin C. and Stephen Smith. In Press. *A Botanical Inventory of the Northline Avenue Tree Power Site*.	Baseline flora species and vegetation community survey of the ecological site located at Northline Avenue.
Miller, Gavin C. and Stephen Smith. 1997. *A Botanical survey of the Fisherville Creek Ravine*. North York, Ontario.	A flora species and community survey for this ravine, which is in the northeastern part of G. Ross Lord Park.
Miller, Gavin C. 1990. *A Natural Heritage Inventory of Smythe Park and Lavender Creek*.	Survey of two sites, including communities, flora and fauna, as well as aquatic inventory at Smythe Park and pollution information at Lavender Creek.
Miller, Gavin C. January, 1988. *A Natural Heritage Inventory of the Black Creek Watershed*.	1. An overview of geological conditions and identification of locally significant sites. 2. In-depth surveys of several of the sites, flora, fauna communities, management recommendations.
Ministry of Natural Resources. 1991. *Life Science Survey of the Northeastern Portion of the Rouge Park*.	The study looks at a section of the park not covered in the 1992 Life Sciences Survey. It contains vegetation community mapping—to be translated and digitized. Also contains fauna and flora information. (Species to be entered in database)
Tomlinson, David. 1996. *Evaluation of the Natural Environment Lambton Woods*. Submitted to the Municipality of Metropolitan Toronto Park and Culture Department.	Current species and community data is inaccurate. Needs proper inventory.
Tomlinson, David. 1993. *Evaluation of the Natural Environment Rowntree Mills Park*. Submitted to the Municipality of Metropolitan Toronto Park and Culture Department.	Has no map to cover vegetation communities, which otherwise could be translated into ELC from extensive text descriptions. Some inaccuracies in species. Very good suggestion of a designated nature preserve linking major wetland areas. Planting suggestions questionable.
Toronto and Region Conservation Authority. February, 1994. *Toronto Islands Shoreline Stabilization Study" Terrestrial Biological Inventory*.	Valuable records of flora and fauna species of concern by island location for TRCA database. Contains records of butterfly species and vegetation community mapping for East Ward's Island and West Algonquin Island (updated for TRCA/City through field work). Vegetation community mapping can supplement mapping that occurred during Toronto NHS Study.

APPENDICES

Document	Description
Varga, S., J. Jalava and J.L. Riley. 1991. *Ecological Survey of the Rouge Valley Park*. Ontario Ministry of Natural Resources, Central Region, Aurora, Ontario.	Contains detailed vegetation type map, species maps. Also provides historical information.
Varga, S. December, 1999. *A Botanical Inventory and Evaluation of the High Park Oak Woodlands Area of Natural and Scientific Interest*. Ontario Ministry of Natural Resources, Parks and Recreational Areas Section, Central Region, Richmond Hill.	Map of Natural Areas and potential restoration areas (native savannah, significant species, vegetation community descriptions.
Wainio, Allan, et al. 1973. *General Biological Survey of Three Ravines Within the City of Toronto; Moore Park Ravine, Vale of Avoca, Glen Stewart Park*.	Interesting for historical records, but out-of-date.
William Draper Consulting. 1998. *Sherwood Park: Ecological Land Classification, Plant Inventory & Monitoring Plan*. City of Toronto Parks & Recreation.	Thorough application of ELC, includes reproductions of field data sheets. Includes good mapping of vegetation communities and excellent species lists by polygon. Has summary of disturbances and management recommendations. Contains monitoring strategy related to management needs. Need to digitize mapping and species records for TRCA/City database.
WATERSHED AND SUBWATERSHED STUDIES	
Aquafor Beech Consultants. 1997. *West Humber River Subwatershed Study. Final Report*. Prepared by Aquafor Beech Consultants for the City of Toronto.	Terrestrial resource study: recommendations: maintain existing conditions, moderate level of enhancement.
City of Scarborough. 1996. *Centennial Creek Subwatershed Study, Phase III Technical Appendices*. The City of Scarborough.	See below.
City of Scarborough. 1995. *Centennial Creek Subwatershed Study Phase II Report*. The City of Scarborough.	See below.
City of Scarborough. 1996. *Centennial Creek Subwatershed Study Phase III Executive Summary*. The City of Scarborough.	Recommendations for protection and enhancement. Conceptual Greenways Design.
City of Scarborough. 1993. *Centennial Creek Subwatershed Study Assessment of Existing and Potential Conditions, Phase I Interim Report*. The City of Scarborough.	Lists Vegetation Communities and species, breeding evidence of Species of Concern but does not include maps of locations. Maps opportunities for greenspace system. Geological information.
R.E. Winter and Associates Ltd. 1993. *Morningside Tributary Subwatershed Study Phase I Repor*t.	Vegetation community mapping, Soil Series, Surficial Geology
R.E. Winter and Associates Ltd. 1997. *Morningside Tributary Subwatershed Study Phase II Report*.	Thorough study of geography, hydrology, fluvial geomorphology, water quality, and groundwater. Its study of aquatic and terrestrial elements is less thorough. Contains maps of surficial soil types, drainage, water temperature, groundwater flow, meander belt, fish assemblage structures and vegetation communities. Some of the Vegetation communities can be translated to ELC, but site visits are required for full definition.
ENVIRONMENTALLY SIGNIFICANT AREAS	
Hanna, R. 1984. *Life Science Areas of Natural and Scientific Interest in Site District 7-4*. Ontario Ministry of Natural Resources, Central Region, Richmond Hill, Ontario.	Provides brief summaries of ANSI sites and features. It does not provide species lists.

Document	Description
Geomatics International. 1992. *Natural Areas and Environmentally Significant Areas in the City of Toronto*. City of Toronto Department of Planning and Development.	Some Species of concerns. Describes each ESA and Natural Area in the former City of Toronto.
Ontario Ministry of Natural Resources Parks and Recreation Section. 1988. *Areas of Natural and Scientific Interest* Map. 1:50 000 scale.	Life Science Sites of Regional Significance.
Ontario Ministry of Natural Resources. 1983. *A Summary Report of the Earth Science Areas of Natural and Scientific Interest in the Metro Toronto and Region Conservation Authority*. Parks and Recreation Section, Central Region. Ministry of Natural Resources, Richmond Hill.	Contains original ANSI check lists (data sheets). Review methodology for choosing sites and the significant features themselves. Each site has general management recommendations. It is valuable as supplementary information to the Natural Heritage Strategy.
Varga, S. 1982. Environmentally Significant Natural Areas in Metro Toronto. *Toronto Field Naturalists*. Number 348, 1982.	Excellent summary of many of the best sites in Toronto, but now out-of-date. It can serve as a valuable source of information on what did, or may still exist on particular sites, many of which have more recent surveys, or which might be highlighted for inventory updates.
STATE OF THE ENVIRONMENT REPORTS	
Paragon Engineering Ltd. and Ecologistics Limited. 1992. *Don River Watershed State of the Ecosystem*. MTRCA.	The most relevant section of this report is Appendix C: Ontario Breeding Bird Atlas Square summary, Reptiles and amphibians recorded within the Don.
TRCA and the City of Toronto. 1999. *State of the Watershed Report: Highland Creek Watershed*.	Contains a map of physiographic regions, surficial geology map. Map of 1954 forest cover is interesting historical information.
Toronto and Region Conservation Authority. December, 1998. *State of the Watershed Report: Etobicoke and Mimico Creek Watersheds*.	Mimico Terrestrial Habitat—Vegetation Community Mapping classified as deciduous, mixed and coniferous forests, successional, meadow, wetlands, which is insufficient for our database.
Municipality of Metropolitan Toronto. 1995. *State of the Environment Report*. Metropolitan Toronto.	Has summary of conditions related to significant natural areas and a good map of these that includes ESAs, ANSI, and ESAs suggested by the Toronto Field Naturalists. Also contains a general summary of status of species, with species lists for the City (but not site-specific). Some general information on fisheries, water quality and runoff.
MANAGEMENT PLANS	
Diral Development Corporation et al. July, 1999. *Morningside Heights Master Environmental Servicing Plan*.	Contains results of an inventory of natural features, but no species lists. Has some vegetation community mapping, which is insufficient for our database. Includes information on surficial geology/soils and hydrology. Also contains plans for a subdivision, indicating some protection for natural features.
Environment Canada, Toronto and Region Conservation Authority. May, 1988. Updated December, 1999. *Evaluating the Fish Communities in the Mimico Creek Watershed*.	Provides mapping of riparian vegetation. Overall, 19% of watershed has woody riparian vegetation. Also reports the percentage of wetlands.
Great Lakes Clean Up Fund, TRCA. Draft. May, 1988. Update, December 1999. Evaluating the Condition of Fish Communities in the Etobicoke Creek Watershed. Great Lakes Clean up Fund, TRCA.	Information relating to terrestrial natural heritage includes the percentage (17%) of woody riparian vegetation existing along Etobicoke Creek.

APPENDICES

Document	Description
The Municipality of Toronto. 1995. *Lower Don River: Regeneration Strategy and Naturalization Plan, Pottery Road to the Forks.* The Municipality of Toronto.	Has "natural communities" mapping, which is not sufficient for our database. Regeneration and naturalization plans are also outlined.
MTRCA, OMNR 1997. *Don Watershed Fish Community and Habitat Management Plan. DRAFT.* Prepared in support of Forty Steps to a New Don.	Has a general recommendation for planting woody riparian vegetation. No specifics.
Ontario Ministry of Natural Resources, TRCA, City of Scarborough. 1998. *Highland Creek Watershed Fisheries Management Plan, Draft.*	A long-term goal of 75% woody riparian vegetation along 75% of the length of the watercourses is recommended.
Ontario Ministry of Natural Resources. 1994. *Rouge Park Management Plan.*	Of relevance to the City of Toronto Natural Heritage Strategy only with respect to guiding the management of ecological and geological features withing the Rouge Park.
Shoreline Management Work Group. March, 1996. *Shore Management Opportunities for the Lake Ontario Greenway*. Waterfront Regeneration Trust.	Contains descriptions of coastal features, management strategy and recommendations. Indicates where erosion of shorelines occurs.
OTHER DOCUMENTS	
Barrett, S. and J. Kidd. 1991. *East Bayfront and Port Industrial Area: Pathways: Towards an Ecosystem Approach*. Royal Commission on the Future of the Toronto Waterfront.	General accounts of terrestrial wildlife habitats in the study area. Community mapping but not to ELC vegetation type. Useful in identifying natural areas.
Department of Planning and Development. 1950. *Don Valley Conservation Report.*	Provides some interesting historical information. Also physiographic maps are good.
Department of Planning and Development. 1956. *Rouge, Duffins, Highland, Petticoat Conservation Report.*	Provides some interesting historical information. Also physiographic maps are good.
Department of Planning and Development. 1948. *The Humber Valley Report.*	Provides some interesting historical information. Also physiographic maps are good.
Department of Planning and Development. 1947. *The Etobicoke Valley Report.*	Provides some interesting historical information. Also physiographic maps are good.
Gartner Lee Limited. *Trail Study of Lower Highland Creek.*	More up-to-date information is now available on this area.
Marshall Macklin Monaghan. 1996. *Impact of Mountain Biking Activities in Metro Parks.*	A useful study of an important management issue.
Metro Parks and Culture. 1998. *Inventory of Cycling Trail Opportunities in Rail and Hydro Corridors.*	No information directly relevant to the Natural Heritage Study.
Metro Parks and Culture. 1997. *Selection of Naturalization Sites for Metro Toronto Road Corridors.*	Maps potential naturalization sites in road corridors. Identifies field, and old field area, tree canopy, and understoreys.
Metro Parks and Culture. 1996. *Metro Parkland Naturalization Compendium*. Metro Parks and Culture.	A useful source of information on restoration sites.
Metro Transportation. 1995. *Heritage Forest Project Vegetative Study.*	Information not detailed enough to be of use for our database.
MTRCA. 1996. *Natural Heritage of the Humber River Watershed: Strategies for the Protection and Enhancement of the Natural Heritage System*. The Report of the Natural Heritage Committee of the Humber Watershed Task Force.	This report contains general descriptions of natural heritage within the Humber River Watershed. No species or vegetation community mapping. Goals, objectives and actions towards improving the watershed condition are laid out in tabular form. No site-specific plans or priorities.

Document	Description
MTRCA. 1994. *Lake Ontario Waterfront Regeneration Project: 1995-1999 In the Municipality of Metropolitan Toronto.*	Maps with trails, management objectives, wetland creation. Most detailed mapping of Tommy Thomson Park. Categories: Palustrine marsh, lacustrine marsh, lake/island, drymeadow, wet meadow, shoreline/pond, beach/dune, shingle beach, cottonwood/aspen/willow.
Ministry of Natural Resources Greater Toronto Area Branch/Maple District. Final Draft, January, 1993. *Discussion Paper No. 3 Woodlands: Their protection, enhancement, and management in the municipal planning process.* Ministry of Natural Resources.	Not formal policy. Purpose to educate those in the Municipal planning process. General discussion about forests in the GTA. Guiding principles for protection, management and enhancement of woodlands.
Ministry of Natural Resources, Greater Toronto Area Branch/Maple District Office. January, 1993. *Value of Woodlands to Society and the Environment: A Supplement to Discussion Paper No. 3 Woodlands: Their protection, enhancement, and management in the municipal planning process.* Ministry of Natural Resources.	Environmental, aesthetic, recreational, economic and other values of woodlands.
Municipality of Metropolitan Toronto. 1994. *Ecological Resources Study: Stage One.*	A study initiated by the Metro Toronto Planning Department. Stage One documented existing information. It contains excellent bibliographies of documents that were and were not evaluated for the study. Also makes recommendations for addressing data gaps.
Wright, Robert M. 2000. *The Evolving Physical Condition of the Greater Toronto Area: Space, Form and Change*. With the financial assistance from the Neptis Foundation, University of Toronto.	Physiographic Regions. Topography, hydrology, regional land cover, regional greenlands system, regional natural areas, density of urbanization.
PLANNING DOCUMENTS	
City of Toronto Planning and Development Department. Approved by Council on July 20, 1993. *City of Toronto Official Plan Part I—City Plan By-law 423-93.*	General Environmental Principles. Definition of Natural Areas and Environmentally Significant Areas. Designation and protection of Ravines. Regeneration, Management and Stewardship, including preservation of significant Landforms.
City of Toronto Environmental Task Force. February, 2000. *Clean, Green and Healthy: A Plan for an Environmentally Sustainable Toronto.*	Broad description of the state of environmental conditions in the City of Toronto. Recommendations for improvements.
Don Watershed Task Force. 1994. *Forty Steps to a New Don: The Report of the Don Watershed Task Force.*	Descriptions of sites with no maps or species lists. Reach plans.
The Don Watershed Regeneration Council. 2000. *A Time For Bold Steps: The Don Watershed report Card 2000*. Toronto and Region Conservation Authority.	Targets for meadows, wetlands, woodlands, riparian habitat pertinent for terrestrial natural heritage strategy in the future.
Gartner Lee Limited. 1990. *Identification of a Regional Greenlands System: A Background Paper for the Greater Toronto Area Greenlands Strategy*. Queen's Printer for Ontario.	A background study for the GTA Greenlands Strategy. It reviews criteria for ESAs and ANSI. Contains a very general discussion of significant areas by municipality. Has some information on historical and current (1982) wetland cover based on Snell (1987). Has no information on species or communities.
Humber Watershed Task Force. 1997. Legacy: *A Strategy for a Healthy Humber*. The Report of the Humber Watershed Task Force.	General description of Terrestrial Natural Heritage. 29 Objectives for improving the health of the Humber.

APPENDICES

Document	Description
Humber Watershed Task Force. 1997. *A Call To Action: Implementing Legacy: A Strategy for a Healthy Humber*. The Metropolitan Toronto and Region Conservation Authority.	Short descriptions of natural heritage, wetlands and meadows. Map of Action Sites. Identifies issues, prescribes actions.
Kanter, Ron. M.P.P. 1990. *Space for All: Options for a Greater Toronto Area Greenlands Strategy*. Queen's Printer for Ontario.	General principles of a greenlands strategy. Also contains a map of existing greenspace.
Municipality of Metropolitan Toronto. 1994. *The Official Plan of the Municipality of Metropolitan Toronto: The Liveable Metropolis*.	Has relevant policies Respecting Habitat Protection and Enhancement. Contains a map of Metropolitan Toronto Green Space System: Map 5, 3.5.3.
Toronto and Region Conservation Authority. 1994. *Valley and Stream Management Program*.	An integrated valley and stream corridor management program to eliminate or reduce risk to life and property from flooding, erosion and slope instability of river banks.
Toronto and Region Conservation Authority. *Watershed Plan*. 1980. The Metropolitan Toronto and Region Conservation Authority.	Summary of a resource inventory, including physiographic features. Land use information is now out-of-date. Policies for watershed planning.

APPENDIX B: GLOSSARY OF TERMS

abiotic	Neither living, nor produced by living organisms.
alien or exotic species	Species out of their native range (Forman, 1995).
age structure	The proportion of individuals in each age class (Forman, 1995).
baseflow	This is the lowest flow that occurs in a river during the year, and usually occurs during the summertime. Baseflow consists mainly of groundwater but can also contain interflow and surface runoff.
biodiversity	The variety and variability of life expressed through genes, species, ecosystems and landscape levels.
biotic	Relating to life or living things: of biological origin.
brood parasite	A species, such as the brown-headed cowbird which lays its eggs in the nests of other birds. The host species then raises the young of the parasitic species.
Carolinian Zone (sometimes known as the Deciduous Forest Region)	One of the nine defined forest regions in Canada. It covers a large portion of the eastern United States and extends into southwestern Ontario as far as Toronto. The highly diverse forests are characterized by such tree species as Kentucky coffee tree, sassafras, flowering dogwood and several varieties of oak.
conservation biology	The science dealing with the conservation of biodiversity. Fundamentally, it relies on the principles of ecology but it is also cross-disciplinary.
contiguous habitat	A large expanse of one or more habitat types.
digitizing	Method of converting information from one format to another using a trace methodology. Traditionally, digitizing has meant the creation of a spatial dataset from a hardcopy source such as a paper map or a plan.
dispersal capacity	The ability of a species or individual to move from one location to another. See 'mobility'.
ecology	The study of the interactions between plants, animals and the abiotic environment.
ecological function and structure	The structure of an ecosystem/community refers to the component species, their relative abundance, age, etc. Function refers to the flows of energy and materials in a food chains and cycles. (Forman, 1995)
ecosite	A classification unit within the spatial hierarchy of the Ecological Land Classification which consists of land having a homogenous combination of soils and vegetation. Usually mapped at a scale of 1:50,000 to 1:10,000.
ecosystem	A complex interacting system that includes all plants, animals, fungi and microorganisms and their environment within a particular area at whatever size segment of the world is chosen for study. (Lee et al, 1998)

APPENDICES

ecosystem health	Ecosystem health is a difficult concept to define in exact terms. Rapport et al. (1998) propose such attributes of "healthy" ecosystems, as: (1) resilient to natural perturbations; (2) free from "Ecosystem Distress Syndrome", (3) self-sustaining, (4) management practices not impairing adjacent ecosystems, (5) economically viable, and (6) sustaining healthy human communities. As part of the above definition, indicators of Ecosystem Distress Syndrome (EDS) include, for example rate of diseases, amplitude of fluctuations in populations, diversity and shift to opportunistic species. (Yazvenko and Rapport 1996)
ecological integrity	Integrity is an intrinsic quality that characterizes natural, self-sustainable ecosystems, composed of native vegetation and wildlife that respond to natural disturbance regimes through adjustments in their composition and structure. There is considerable overlap in definition and meaning of both ecosystem "health" and "integrity". Ecological health may be considered a measure of ecological integrity.
ecological restoration	To repair or re-establish functioning ecosystems; the process of altering a site to establish a defined, indigenous, historic ecosystem; the goal is to emulate the structure, function, diversity and dynamics of a specified ecosystem. (From, Society of Ecological Restoration)
edge effect	External influences that have a negative impact on a habitat patch, such as wind, exotic species, predators, parasites, etc. Edge effects are generally considered to penetrate at least 100m into a forest.
edge habitat	The interface between a habitat patch and its surroundings—particularly forest. Edge habitats tend to be inhabited by generalist species that can use any kind of habitat and species that specialize in edges.
estuarine habitat	Habitat at the mouth of a river, etc., where the river meets a lake or ocean.
fragmentation	Relates to the breaking up of a habitat, ecosystem, or land use type into smaller isolated parcels. (Forman, 1995)
gene flow	Breeding within and between populations of a species resulting in exchange of genetic characteristics.
genetic fitness	The ability of a population to adapt to adverse conditions (e.g., disease) because of genetic variation among its members.
Geographic Information Systems (GIS)	A computerized information system for storing, manipulating and analyzing spatially indexed information.
georeference	To establish the relationship between page coordinates on a planar map and real-world coordinates.
Great Lakes-St. Lawrence Forest Region	One of the nine defined forest regions within Canada. Also referred to as the Mixed Forest Zone. It covers much of central Ontario, from the Carolinian or Deciduous forest zone in the south, to the Boreal, or Coniferous Forest in the north. Dominant tree species include sugar maple, American Beech, white pine and eastern hemlock.
global rank (GRank)	A rank assigned to a species or community based on its numbers and distribution worldwide, according to The Nature Conservancy's Conservation Data Centres.

groundwater	Water in that part of the ground that is wholly saturated.
groundwater discharge	Movement of water from the saturated zone in the ground to the surface, usually to a river, wetland or other water body.
groundwater seepage	Usually used to refer to small, diffuse groundwater discharge.
habitat patch	An individual fragment of forest, wetland, meadow, coastal or other habitat type mapped as individual "polygons" using Geographic Information Systems.
headwater watercourse	The smallest watercourse (1st order) that conveys surface and/or groundwater.
Index of Biotic Integrity	An index based on fish community composition originally developed in the U.S. and adapted to southern Ontario (Steedman, 1988) for assessing the health of a watercourse.
infiltration rates	The speed per unit volume at which water percolates into the ground.
interior habitat	Forest interior contains the damp, dark, cool conditions preferred by some species, and is buffered from negative edge effects such as wind, predation, exotic species. Generally the forest edge where these negative effects can penetrate is defined as a minimum of 100m, thus only forest that is found in compact blocks over 200m across on all sides can contain forest interior.
inventory	The systematic surveying, sampling, classification and mapping of natural resources.
landscape	Refers to the level of ecological assessment that can generally be done using remote sensing data (aerial or satellite imaging). Landscape classes include forest, wetland, meadow, and urban.
landscape ecology	A study of the structure, function, and change in a heterogeneous land area composed of interacting ecosystems (Lee et al, 1998).
Lake Iroquois plain	The lake bottom of the former Lake Iroquois, which has been smoothed by wave action or lacustrine deposits. It extends around the western part of Lake Ontario, from the Niagara River to the Trent River, a distance of 190 miles, its width varying from a few hundred yards to eight miles. In Toronto, the plain, cut in previously deposited clay and till, is covered partially by sand deposits (the Iroquois sand plain). (Chapman and Putnam, 1984)
Lake Iroquois Shoreline/ Shorecliff	While the last glacier was receding, Lake Iroquois occupied the lowlands beyond the present shore of Lake Ontario. The features on the Lake Iroquois Shoreline/Shorecliff include cliffs, bars, beaches and boulder pavements. In Toronto, the hillside occupied by the Davenport Road is known as the Iroquois shorecliff, while the McLennan hill east of Yonge St. is the same bluff. (Chapman and Putnam, 1984) At Scarborough Bluffs, the former shoreline is very close to the present shoreline. Map 12 depicts the northern border of Lake Iroquois.
local rank (LRank)	A rank assigned to a species, vegetation community, or habitat patch which describes its status in the TRCA Region.
matrix	The landscape structure that surrounds and includes habitat patches.

APPENDICES

meander belt	The area of land in which a watercourse channel moves or is likely to move over time.
mesic soils	Soils that contain a moderate amount of moisture on a consistent basis.
metadata	Information pertaining to the source of data.
mobility	The faunal equivalent of dispersal: the ability of a species to move within or between habitats.
mosaic	A pattern of patches, corridors, and matrix, each composed of small, similar aggregated objects.
natural heritage	The basic fabric of the landscape including; Air; Land (landform, soils, geology); Water (surface and ground); and Life (plants and animals). It includes the physical, chemical and biological elements and interactions of our environment that constitute what is often termed "Nature." Natural heritage includes geological features and landforms; associated terrestrial and aquatic ecosystems; their plant species, populations and communities, and all native animal species, their habitats and sustaining environment (A Natural Heritage Areas Strategy, OMNR 1992).
natural heritage system	A description/presentation of the features and functions that make up our natural heritage for a defined area.
natural heritage strategy	A strategic document for achieving and managing a natural heritage system.
Oak Ridges Moraine	A ridge of sand and gravel deposited by receding glaciers which spans 160 km from the Niagara Escarpment in the west to the headwaters of the Trent River in the east.
old field	A general term to describe early successional communities that have regenerated from abandoned agricultural land. (Lee at al, 1998)
orthographic air photographs	Digital imagery in which distortion from the camera angle and topography have been removed, thus equalizing the distances represented on the image.
parasite	An organism that derives benefit from its relation with a host organism, which is either unaffected or suffers detriment. (Riley and Mohr, 1994)
physiographic regions	Regions delineated based on differences in physical geography.
population	A population is composed of the individual plants or animals of a single species present in a location. (Forman, 1995)
population viability	The chance of a population for any one species to survive in a given range.
riparian	The area associated with the bank of a river or lake or tidewater.
riverine habitat	Aquatic habitat associated with a watercourse.
slope aspect	The orientation of a slope face, expressed using a compass direction.

species of concern	According to the TRCA methodology, any species with a local rank of L1 to L3, and some particularly sensitive species with a rank of L4. Generally, species which are disappearing in the landscape, primarily as a result of land use changes.
stepping stone	An ecologically suitable patch where an object or individual such as an animal temporarily stops while moving along a heterogeneous route. (Forman, 1995)
stream order	The number assigned to a particular stretch in a dendritic river system and determined by the numbers for upstream tributaries. For example, an unbranched tributary is first order, two 2nd-order streams combine to form a 3rd-order stream, etc. (Forman, 1995)
sub-basins	Synonymous with sub-watershed. Usually used to refer to a smaller area in which all surface water drains to a single point.
sub-national or provincial rank (SRank)	A rank assigned to a species by The Nature Conservancy's Conservation Data Centres to define the status of a species or community by state or province.
succession	The progression within a community whereby one plant species is replaced by another over time, e.g., meadow eventually reverting to forest.
surficial geology	The study of material overlying bedrock.
tableland	An upland area as opposed to valley land.
terrestrial	Pertaining to land as opposed to water in relation to habitat and species. For the TRCA, this includes wetlands.
terrestrial natural heritage	Includes plants, animals and vegetation communities associated with the land, as opposed to aquatic (water) environments. It includes forests, meadow, wetlands, and coastal communities and the plants and animals associated with them.
valley and stream corridor	Valley and stream corridors are "the natural resources associated with river systems characterized by their landform" (TRCA, 1994).
vegetation type	An abstract vegetation classification unit, based on the species present on a site. The most detailed level in the Southern Ontario Ecological Land Classification. (Lee et al, 1998)
watercourse	Flowing water, though not necessarily continuous, within a defined channel and with a bed or banks and usually discharges itself into some other watercourse or body of water. (TRCA, 1994)
watershed	The area of land in which all the surface water drains to a single point. It is delineated in rural areas based on topography. In urban areas, it can include storm drainage systems.

APPENDIX C: VEGETATION COMMUNITIES AND SPECIES OF CONCERN

CITY OF TORONTO FLORA SPECIES OF CONCERN, MAY 2001*

SPC CODE	SCIENTIFIC NAME	COMMON NAME	TRCA RANK	SRANK	GRANK	MNR STATUS	COSEWIC STATUS	Toronto
ABIBALS	Abies balsamea	balsam fir	L3	S5	G5			R
ACERUBR	Acer rubrum	red maple	L4	S5	G5			X
ACESACI	Acer saccharinum	silver maple	L4	S5	G5			X
ACESACC	Acer saccharum ssp.nigrum	black maple	L4	S4?	G5T5			X
ACESPIC	Acer spicatum	mountain maple	L4	S5	G5			X
ACOAMER	Acorus americanus (A. calamus misapplied)	sweet flag	L3	S4	G5			R
ACTPACH	Actaea pachypoda	white baneberry	L4	S5	G5			X
ADIPEDA	Adiantum pedatum	northern maidenhair fern	L3	S5	G5			R
AGATENU	Agalinis tenuifolia	slender gerardia	L2	S4S5	G5			R
ALLTRIC	Allium tricoccum	wild leek or ramps	L4	S5	G5			X
ALNINCA	Alnus incana ssp.rugosa (A. rugosa)	speckled or tag alder	L3	S5	G5			R
AMELAEV	Amelanchier laevis	smooth serviceberry	L4	S5	G4G5Q			U
AMESANG	Amelanchier sanguinea var. sanguinea	round-leaved serviceberry	L4	S5?	G5T5			U
AMESTOL	Amelanchier stolonifera (A. spicata var. stolonifera)	running serviceberry	L2	S4?	G5			R
AMMBREV	Ammophila breviligulata	marram or beach grass	L2	S3	G5			R
ANAMARG	Anaphalis margaritacea	pearly everlasting	L4	S5	G5			R
ANDGERA	Andropogon gerardii	big bluestem	L4	S4	G5			U
ANEACUT	Anemone acutiloba (Hepatica acutiloba)	sharp-lobed hepatica	L3	S5	G5			U
ANEAMER	Anemone americana (Hepatica americana)	round-lobed hepatica	L2	S5	G5			R
ANECYLI	Anemone cylindrica	long-fruited thimbleweed	L3	S4	G5			R
ANEQUIN	Anemone quinquefolia var. quinquefolia	wood-anemone	L3	S5	G5TQ?			U
ANTNEGL	Antennaria neglecta	field pussytoes	L4	S5	G5			X
ANTPARL	Antennaria parlinii ssp. fallax (A. plantaginifolia)	plantain-leaved pussytoes	L4	SU	G4G5T?			R
APIAMER	Apios americana	ground-nut	L4	S5	G5			U
AQUCANA	Aquilegia canadensis	wild columbine	L3	S5	G5			U
ARARACE	Aralia racemosa ssp. racemosa	spikenard	L4	S5	G4G5			U

SPC CODE	SCIENTIFIC NAME	COMMON NAME	TRCA RANK	SRANK	GRANK	MNR STATUS	COSEWIC STATUS	Toronto
AROMELA	Aronia melanocarpa (A. prunifolia)	black choke-berry	L2	S5	G5			R
ARTCAMP	Artemisia campestris spp. caudata	beach wormwood	L3	S4S5	G5T5)			R
ASACANA	Asarum canadense	wild ginger	L4	S5	G5			X
ASCINCA	Asclepias incarnata ssp. incarnata	swamp milkweed	L4	S5	G5TQ?			U
ASTOOLE	Aster oolentangiensis (A. azureus)	sky-blue or azure aster	L4	S4	G5			U
ASTPIPR	Aster pilosus var. pringlei	Pringle's or spray aster	L2	S4	G5T5			R
ASTUROP	Aster urophyllus (A. sagittifolius)	arrow-leaved aster	L4	S4	G4			R
BETALLE	Betula allegheniensis (B. lutea)	yellow or curly birch	L4	S5	G5			X
BOECYLI	Boehmeria cylindrica	false nettle	L4	S5	G5			R
BRAEREC	Brachyeletrum erectum	bearded shorthusk	L2	S4?	G5T?			R
BROCILI	Bromus ciliatus (B. canadensis)	fringed brome grass	L3	S5	G5			U
BROLATI	Bromus latiglumis	eared or tall brome	L4	S4	G5			U
CAKEDEN	Cakile edentula	sea-rocket	L3	S4	G5			R
CALCANA	Calamagrostis canadensis	Canada blue joint	L4	S5	G5			U
CALPALU	Caltha palustris	marsh marigold	L4	S5	G5			U
CALSPIT	Calystegia spithamaea ssp. spithamaea	low bindwind	L3	S4S5	G4G5TQ?			R
CAMROTU	Campanula rotundifolia	harebell	L2	S5	G5			R
CARCONC	Cardamine concatenata (Dentaria lacinata)	cut-leaved toothwort	L3	S5	G5			X
CARDIPH	Cardamine diphylla (Dentaria diphylla)	broad- or two-leaved toothwort	L4	S5	G5			X
CARDOUG	Cardamine douglasii	purple cress	L3	S4	G5			R
CARALBU	Carex albursina (C. laxiflora var. latifolia)	white bear sedge	L4	S5	G5			R
CARALOP	Carex alopecoidea	foxtail or brown-headed wood sedge	L4	S5	G5			R
CARAURE	Carex aurea	golden-fruited sedge	L4	S5	G5			U
CARCEPI	Carex cephaloidea	thin-leaved sedge	L3	S5	G5			R
CARCOMM	Carex communis	fibrous-rooted sedge	L3	S5	G5			U
CARCRYP	Carex cryptolepis	small yellow sedge	L3	S5	G4			
CARDEWE	Carex deweyana	Dewey's sedge	L4	S5	G5			U
CAREBUR	Carex eburnea	bristle-leaved sedge	L3	S5	G5			R
CARFLAV	Carex flava	yellow sedge	L4	S5	G5			R
CARHIRT	Carex hirtifolia	pubescent or hairy-leaved sedge	L4	S5	G5			R

APPENDICES

SPC CODE	SCIENTIFIC NAME	COMMON NAME	TRCA RANK	SRANK	GRANK	MNR STATUS	COSEWIC STATUS	Toronto
CARHYST	Carex hystericina (C. hystricina)	porcupine sedge	L4	S5	G5			U
CARINTU	Carex intumescens	bladder sedge	L4	S5	G5			R
CARLACU	Carex lacustris	lake-bank sedge	L4	S5	G5			R
CARLAEV	Carex laevivaginata	smooth-sheathed sedge	L3	S4	G5			R
CARLAXF	Carex laxiflora	loose-flowered sedge	L4	S5				R
CARLEPA	Carex leptalea ssp. leptalea	bristle-stalked sedge	L4	S5	G5TQ?			R
CARLUPU	Carex lupulina	hop sedge	L3	S5	G5			R
CARMOLE	Carex molesta	troublesome sedge	L3	S4?	G4			R
CARNORM	Carex normalis	tall straw sedge	L3	S4	G5			R
CARPALL	Carex pallescens	pale sedge	L3	S5	G5			R
CARPELL	Carex pellita (C. lanuginosa; C. filiformis var. lanug	woolly sedge	L4	S5	G5			U
CARPENS	Carex pensylvanica	Pennsylvania sedge	L4	S5	G5			X
CARPLAT	Carex platyphylla	broad-leaved sedge	L3	S5	G5			U
CARSCAB	Carex scabrata	rough sedge	L4	S5	G5			R
CARSICC	Carex siccata (C. foenea)	sand-bank, hillside, or hay sedge	L3	S5	G5T5			R
CARSPRE	Carex sprengelii	long-beaked sedge	L4	S5	G5?			R
CARSTRI	Carex stricta	tussock sedge	L4	S5	G5			R
CARTENE	Carex tenera	straw sedge	L4	S5	G5			R
CARTRIC	Carex trichocarpa	hairy-fruited sedge	L3	S3	G4			R
CARVIRI	Carex viridula ssp. viridula	greenish sedge	L2	S5	G5?TQ?			R
CARCARO	Carpinus caroliniana ssp. virginiana	blue beech or American hornbeam	L4	S5	G5TQ?			X
CARCORD	Carya cordiformis	bitternut hickory	L4	S5	G5			X
CAROVAT	Carya ovata	shagbark hickory	L3	S5	G5			U
CAUTHAL	Caulophyllum thalictroides (incl. C. giganteum?)	blue cohosh	L4	S5	G4G5			X
CEAAMER	Ceanothus americanus	New Jersey tea	L1	S4	G5			R
CELSCAN	Celastrus scandens	climbing or American bittersweet	L4	S5	G5			X
CEPOCCI	Cephalanthus occidentalis	buttonbush	L3	S5	G5			?p
CHAPOLY	Chamaesyce polygonifolia (Euphorbia polygonifolia)	seaside spurge	L2	S4	G5?			R
CHEGLAB	Chelone glabra	turtlehead	L4	S5	G5			U
CINARUN	Cinna arundinacea	tall wood reed	L3	S4	G5			R
CINLATI	Cinna latifolia	nodding wood reed	L4	S5	G5			R
CIRDISC	Cirsium discolor	pasture or field thistle	L2	S4	G5			R

SPC CODE	SCIENTIFIC NAME	COMMON NAME	TRCA RANK	SRANK	GRANK	MNR STATUS	COSEWIC STATUS	Toronto
CLAVIRG	Claytonia virginica	narrow-leaved spring beauty	L3	S5	G5			U
CLIBORE	Clintonia borealis	yellow clintonia or bluebead lily	L3	S5	G5			R
COMUMBE	Comandra umbellata	comandra or bastard toadflax	L4	S5	G5			U
COMPERE	Comptonia peregrina	sweet-fern	L1	S5	G5			R
CORAMOM	Cornus amomum ssp. obliqua	silky dogwood	L4	S5	G5TQ?			R
CORRUGO	Cornus rugosa	round-leaved dogwood	L4	S5	G5			X
CORCORN	Corylus cornuta (C. rostrata)	beaked hazel	L4	S5	G5			X
CRASUBM	Crataegus submollis	Emerson's hawthorn	L4	S4S5	G5			R
CYPLUPU	Cyperus lupulinus (C. filiculmis) (incl. ssp. macilentu)	slender umbrella-sedge or galingale	L3	S4	G5T?			R
CYPODOR	Cyperus odoratus (C. engelmannii; C. ferruginescens)	fragrant umbrella-sedge or galingale	L3	S5	G5			R
CYPSCHW	Cyperus schweinitzii	Schweinitz's umbrella-sedge	L2	S3	G5			R
CYPREGI	Cypripedium reginae	showy lady's slipper	L2	S4	G4			R
CYSBULB	Cystopteris bulbifera	bulblet fern	L4	S5	G5			U
CYSTENU	Cystopteris tenuis (Cystopteris fragilis var. mackayi)	Mackay's fragile fern	L3	S5	G4G5			R
DANSPIC	Danthonia spicata	poverty oat grass	L4	S5	G5			U
DESGLUT	Desmodium glutinosum	pointed-leaved tick-trefoil	L3	S4	G5			U
DICCANA	Dicentra canadensis	squirrel-corn	L3	S5	G5			R
DICCUCU	Dicentra cucullaria	Dutchman's breeches	L2	S5	G5			R
DIRPALU	Dirca palustris	leatherwood	L3	S4?	G4			R
DRYCRIS	Dryopteris cristata	crested wood fern	L3	S5	G5			R
DRYINTE	Dryopteris intermedia (D. spinulosa var. intermedia)	evergreen wood fern	L4	S5	G5			X
DRYMARG	Dryopteris marginalis	marginal wood fern	L4	S5	G5			X
ELYCANA	Elymus canadensis	Canada wild rye	L4	S4S5	G5			R
ELYRIPA	Elymus riparius	riverbank wild rye	L4	S4?	G5			X
EPIVIRG	Epifagus virginiana	beech-drops	L4	S5	G5			X
EPIANGU	Epilobium angustifolium	fire-weed	L3	S5	G5			R
EQUFLUV	Equisetum fluviatile	water horsetail	L3	S5	G5			R

APPENDICES

SPC CODE	SCIENTIFIC NAME	COMMON NAME	TRCA RANK	SRANK	GRANK	MNR STATUS	COSEWIC STATUS	Toronto
EQUSCIR	Equisetum scirpoides	dwarf scouring rush	L3	S5	G5			R
EQUXNEL	Equisetum x nelsonii (E. laevigatum x variegatum)	Nelson's horsetail	L3	S2?	HYB			R
ERYALBI	Erythronium albidum	white trout-lily	L3	S4	G5			R
EUOOBOV	Euonymus obovata (E. obovatus)	running strawberry-bush	L3	S5	G5			R
EUPPURP	Eupatorium purpureum var. purpureum	sweet Joe-Pye weed	L3	S3	G5TQ?			R
FESSUBV	Festuca subverticillata (F. obtusa)	nodding fescue	L4	S4	G5			R
FRANIGR	Fraxinus nigra	black ash	L4	S5	G5			R
GAUHISP	Gaultheria hispidula	creeping snowberry	L1	S5	G5			E
GAUPROC	Gaultheria procumbens	wintergreen	L2	S5	G5			R
GAYBACC	Gaylussacia baccata	black huckleberry	L2	S4	G5			R
GENANDR	Gentiana andrewsii	bottle or closed gentian	L3	S4	G4			R
GENCRIN	Gentianopsis crinita	fringed gentian	L2	S5	G5			R
GERMACU	Geranium maculatum	wild geranium or spotted cranesbill	L4	S5	G5			X
GEURIVA	Geum rivale	water avens	L3	S5	G5			R
GNAOBTU	Gnaphalium obtusifolium	fragrant cudweed	L2	S5	G5			R
GYMDRYO	Gymnocarpium dryopteris	oak fern	L3	S5	G5			U
HAMVIRG	Hamamelis virginiana	witch-hazel	L3	S5	G5			X
HELCANA	Helianthemum canadense	frostweed	L1	S4	G5			R
HELDECA	Helianthus decapetalus	thin-leaved sunflower	L4	S5	G5			R
HELDIVA	Helianthus divaricatus	woodland sunflower	L4	S5	G5			U
HIEKALM	Hieracium kalmii (H. canadense)	Canada hawkweed	L3	SU	G5			R
HYDCANE	Hydrophyllum canadense	Canada waterleaf	L4	S4	G5			R
IMPPALL	Impatiens pallida	yellow touch-me-not (pale jewelweed)	L4	S5	G5			U
IRIVERS	Iris versicolor	blue flag	L2	S5	G5			R
JUGCINE	Juglans cinerea	butternut	L4	S3?	G3G4			X
JUNALPI	Juncus alpinoarticulatus (J. alpinus)	Richardson's rush	L3	S5	G5			R
JUNBALT	Juncus balticus	Baltic rush	L4	S5	G5			R
JUNNODO	Juncus nodosus	knotted rush	L3	S5	G5			R
JUNTORR	Juncus torreyi	Torrey's rush	L4	S5	G5			X
JUNCOMM	Juniperus communis	common juniper	L3	S5	G5			R
LARLARI	Larix laricina	tamarack	L3	S5	G5			R
LATJAPO	Lathyrus japonicus	beach pea	L2	S4	G5			R
LEEVIRG	Leersia virginica	white grass	L4	S4	G5			R

SPC CODE	SCIENTIFIC NAME	COMMON NAME	TRCA RANK	SRANK	GRANK	MNR STATUS	COSEWIC STATUS	Toronto
LESCAPI	Lespedeza capitata	round-headed bush-clover	L2	S4	G5			R
LIACYLI	Liatris cylindracea	cylindric blazing-star	L1	S3	G5			R
LIASPIC	Liatris spicata	spike blazing-star	L1	S3	G5		SC	R
LILMICH	Lilium michiganense	Michigan or Turk's cap lily	L4	S5	G5			U
LILPHIL	Lilium philadelphicum	wood lily	L1	S5	G5			R
LOBKALM	Lobelia kalmii	Kalm's or brook lobelia	L2	S5	G5			E?
LOBSIPH	Lobelia siphilitica	great blue lobelia	L4	S5	G5			U
LONCANA	Lonicera canadensis	fly honeysuckle	L4	S5	G5			R
LONDIOI	Lonicera dioica	wild or glaucous honeysuckle	L4	S5	G5			U
LUPPERE	Lupinus perennis ssp. perennis	wild lupine	L2	S3	G5T?			R
LYSQUAO	Lysimachia quadrifolia	whorled loosestrife	L3	S4	G5			R
LYSTHYR	Lysimachia thyrsiflora	tufted loosestrife	L4	S5	G5			R
MAICANA	Maianthemum canadense	Canada mayflower	L4	S5	G5			X
MENCANA	Menispermum canadense	moonseed	L4	S4	G5			R
MITREPE	Mitchella repens	partridgeberry	L3	S5	G5			R
MITDIPH	Mitella diphylla	mitrewort	L4	S5	G5			U
MITNUDA	Mitella nuda	naked mitrewort	L3	S5	G5			R
MONHYPO	Monotropa hypopithys	pinesap	L2	S4	G5			R
MONUNIF	Monotropa uniflora	Indian-pipe	L3	S5	G5			U
MUHFRON	Muhlenbergia frondosa	wire-stemmed or leafy muhly grass	L4	S4	G5			U
MUHGLOM	Muhlenbergia glomerata	marsh wild timothy	L3	S5	G5			R
NUPVARI	Nuphar variegata	bullhead lily or yellow water lily	L3	S5	G5T5			R
OENOAKE	Oenothera oakesiana	Oake's evening-primrose	L3	S4?	G4G5Q			R
OENPARV	Oenothera parviflora	smaller evening-primrose	L3	S5?	G4?			R
ORYASPE	Oryzopsis asperifolia	white-fruited mountain-rice	L3	S5	G5			U
ORYRACE	Oryzopsis racemosa	black-fruited mountain-rice	L3	S4	G5			R
OSMCLAI	Osmorhiza claytonii	woolly sweet cicely	L3	S5	G5			U
OSMCLAA	Osmunda claytoniana	interrupted fern	L2	S5	G5			R
PANACUM	Panicum acuminatum (P. implicatum; P. lanuginosum)	hairy panic grass	L4	S5	G5T?			U
PANVIRG	Panicum virgatum	switch grass	L3	S4	G5			R

APPENDICES

SPC CODE	SCIENTIFIC NAME	COMMON NAME	TRCA RANK	SRANK	GRANK	MNR STATUS	COSEWIC STATUS	Toronto
PHYHETE	Physalis heterophylla	clammy ground-cherry	L4	S4	G5			U
PHYOPUL	Physocarpus opulifolius	ninebark	L3	S5	G5			R
PHYVIRG	Physostegia virginiana ssp. virginiana	false dragonhead or obedient plant	L3	S4	G5TQ?			R
PINRESI	Pinus resinosa	red pine	L1	S5	G5			R
PINSTRO	Pinus strobus	white pine	L4	S5	G5			X
PLAOCCI	Platanus occidentalis	sycamore	L1	S4	G5			R
POLPUBE	Polygonatum pubescens	downy Solomon's seal	L4	S5	G5			U
POLAMPH	Polygonum amphibium (P. natans; P. coccineum)	water smartweed	L3	S5	G5			R
POLACRO	Polystichum acrostichoides	Christmas fern	L3	S5	G5			U
POPGRAN	Populus grandidentata	large-toothed aspen	L4	S5	G5			X
POTRICH	Potamogeton richardsonii	Richardson's or redhead pondweed	L1	S5	G5			R
POTPARA	Potentilla paradoxa	bushy cinquefoil	L2	S3	G5			R
POTSIMP	Potentilla simplex	common or old-field cinquefoil	L3	S5	G5			U
PRUNIGR	Prunus nigra	Canada plum	L3	S4	G4G5			R
PRUPENS	Prunus pensylvanica	pin cherry	L4	S5	G5			U
PTEAQUI	Pteridium aquilinum var. latiusculum	eastern bracken	L4	S5	G5			X
PYCVIRG	Pycnanthemum virginianum	Virginia mountain-mint	L3	S4	G5			R
PYRELLI	Pyrola elliptica	shinleaf	L3	S5	G5			R
QUEALBA	Quercus alba	white oak	L3	S5	G5			X
QUEVELU	Quercus velutina	black oak	L2	S4	G5			U
RANHICA	Ranunculus hispidus var. caricetorum (R. septentrional)	swamp buttercup	L4	S5	G5T5			U
RHAALNI	Rhamnus alnifolia	alder-leaved buckthorn	L3	S5	G5			R
RHURANE	Rhus radicans (R. radicans ssp.radicans; ssp.negundo)	poison ivy (vine form)	L4	S5	G5			R
ROSBLAN	Rosa blanda	smooth wild rose	L4	S5	G5			U
RUBFLAG	Rubus flagellaris	northern dewberry	L3	S4	G5			R
RUBPUBE	Rubus pubescens	dwarf raspberry	L4	S5	G5			R
RUDLACI	Rudbeckia laciniata	cut-leaved or green-headed coneflower	L4	S5	G5			R
SALBEBB	Salix bebbiana	beaked or Bebb's willow	L4	S5	G5			X
SALDISC	Salix discolor	pussy willow	L4	S5	G5			X
SALHUMI	Salix humilis	upland pussy or prairie willow	L2	S5	G5			R

SPC CODE	SCIENTIFIC NAME	COMMON NAME	TRCA RANK	SRANK	GRANK	MNR STATUS	COSEWIC STATUS	Toronto
SALLUCI	Salix lucida	shining willow	L4	S5	G5			R
SALPETI	Salix petiolaris	slender willow	L3	S5	G5			R
SASALBI	Sassafras albidum	sassafras	L4	S4	G5			R
SCHPURP	Schizachne purpurascens ssp. purpurascens	purple or false melic grass	L3	S5	G5T?			R
SCHSCOP	Schizachyrium scoparium (Andropogon scoparius)	little bluestem	L1	S4	G5			R
SCIACUT	Scirpus acutus	hard-stemmed bulrush	L3	S5	G5			R
SCIFLUV	Scirpus fluviatilis	river bulrush	L3	S4S5	G5			R
SCIPEND	Scirpus pendulus	drooping, nodding, or red bulrush	L2	S5	G5			R
SCIPUNG	Scirpus pungens (S. americanus)	three-square or chairmaker's rush	L4	S5	G5			U
SHECANA	Shepherdia canadensis	buffalo-berry or soap-berry	L3	S5	G5			R
SILPERF	Silphium perfoliatum	cup-plant	L4	S2	G5			R
SISMONT	Sisyrinchium montanum	blue-eyed grass	L3	S5	G5			U
SMIHISP	Smilax hispida (S. tamnoides var. hispida)	bristly greenbrier	L4	S4	G5			U
SOLPATU	Solidago patula	rough-leaved goldenrod	L4	S5	G5			U
SOLSQUA	Solidago squarrosa	stout goldenrod	L2	S5	G4?			R
SORNUTA	Sorghastrum nutans	Indian grass	L2	S4	G5			R
SPAEURY	Sparganium eurycarpum	giant or great bur-reed	L3	S5	G5			R
SPAPECT	Spartina pectinata	prairie cord grass	L3	S4	G5			R
SPICERN	Spiranthes cernua	nodding ladies' tresses	L3	S5	G5			R
SPILUCI	Spiranthes lucida	shining or wide-leaved ladies' tresses	L2	S4	G5			R
SPIROMA	Spiranthes romanzoffiana	hooded ladies' tresses	L2	S5	G5			R
SPOCRYP	Sporobolus cryptandrus	sand dropseed	L4	S4	G5			U
STAPALU	Stachys palustris	marsh hedge-nettle	L3	SE5	G5?			R
STATRIF	Staphylea trifolia	bladdernut	L3	S4	G5			R
SYMALBU	Symphoricarpos albus var. albus	snowberry (low or native)	L3	S5	G5T4			U
SYMFOET	Symplocarpus foetidus	skunk cabbage	L4	S5	G5			R
TAEINTE	Taenidia integerrima	yellow pimpernel	L2	S4	G5			R
TAXCANA	Taxus canadensis	Canada yew or ground hemlock	L3	S5	G5			R
TEUCACA	Teucrium canadense ssp. canadense	wood-sage or germander	L3	S5	G5T5			R
THEPALU	Thelypteris palustris var. pubescens	marsh fern	L4	S5	G5T?			U

APPENDICES

SPC CODE	SCIENTIFIC NAME	COMMON NAME	TRCA RANK	SRANK	GRANK	MNR STATUS	COSEWIC STATUS	Toronto
TIACORD	Tiarella cordifolia	foam-flower	L4	S5	G5			U
TRIBORE	Trientalis borealis ssp. borealis	star-flower	L3	S5	G5TQ?			R
TRIEREC	Trillium erectum	red trillium or stinking Johnny	L3	S5	G5			U
TRIGRAN	Trillium grandiflorum	white trillium	L4	S5	G5			U
TSUCANA	Tsuga canadensis	eastern hemlock	L4	S5	G5			X
UVUGRAN	Uvularia grandiflora	large-flowered bellwort	L3	S5	G5			U
VACANGU	Vaccinium angustifolium	lowbush blueberry	L2	S5	G5			R
VACPALL	Vaccinium pallidum	hillside or early sweet blueberry	L1	S4	G5			R
VIBACER	Viburnum acerifolium	maple-leaved viburnum	L4	S5	G5			X
VIBRAFI	Viburnum rafinesquianum	downy arrow-wood	L3	S5	G5			R
VIOCANA	Viola canadensis	Canada violet	L3	S5	G5			R
VIOSELK	Viola selkirkii	Selkirk's or spurred violet	L4	S5	G5?			R
WALFRAG	Waldsteinia fragarioides	barren strawberry	L4	S5	G5			R
ZIZAURE	Zizia aurea	golden Alexanders	L3	S5	G5			R

* List does not include all species known from the Rouge Park.
S? Unranked, or, if following a ranking, rank uncertain (e.g., S3?).
G? Unranked, or, if following a ranking, rank tentatively assigned (e.g., G3?).
Toronto Status: X = Present U = Uncommon R = Rare E = Extirpated

CITY OF TORONTO KNOWN FAUNA SPECIES OF CONCERN, MAY 2001*

COMMON NAME	SCIENTIFIC NAME	SPC CODE	TRCA RANK	PROV. SRANK	GRANK
hairy-tailed mole	Parascalops breweri	HTMO	L3	S4	G5
meadow jumping mouse	Zapus hudsonius	MJMO	L3	S5	G5
double-crested cormorant	Phalacrocorax auritus	DCCO	L3	S4	G5
black-crowned night heron	Nycticorax nycticorax	BCNH	L3	S3	G5
green heron	Butorides virescens	GNBH	L3	S4	G5
canvasback	Aythya valisineria	CANV	L2	S1	G5
redhead	Aythya americana	REDH	L2	S2	G5
northern harrier	Circus cyaneus	NOHA	L3	S4	G5
Cooper's hawk	Accipiter cooperii	COHA	L2	S4	G5
common moorhen	Gallinula chloropus	COMO	L3	S4	G5
ruffed grouse	Bonasa umbellus	RUGR	L3	S5	G5
sora	Porzana carolina	SORA	L3	S4	G5
common moorhen	Gallinula chloropus	COMO	L3	S4	G5
common tern	Sterna hirundo	COTE	L3	S4	G5
black tern	Chlidonias niger	BLTE	L2	S3	G4
black-billed cuckoo	Coccyzus erythropthal	BBCU	L3	S4	G5
eastern wood-pewee	Contopus virens	EAWP	L3	S5	G5
least flycatcher	Empidonax minimus	LEFL	L3	S5	G5
winter wren	Troglodytes troglodytes	WIWR	L3	S5	G5
brown creeper	Certhia americana	BRCR	L3	S5	G5
wood thrush	Hylocichla mustelina	WOTH	L2	S5	G5
veery	Catharus fuscescens	VEER	L2	S5	G5
brown thrasher	Toxostoma rufum	BRTH	L3	S5	G5
northern parula warbler	Parula americana	NOPA	L2	S4	G5
pine warbler	Dendroica pinus	PIWA	L3	S5	G5
ovenbird	Seiurus aurocapillus	OVEN	L2	S5	G5
northern waterthrush	Seiurus noveboracensi	NOWA	L3	S5	G5
scarlet tanager	Piranga olivacea	SCTA	L3	S5	G5
white-throated sparrow	Zonotrichia albicolli	WTSP	L3	S5	G5
bobolink	Dolichonys oryzivorus	BOBO	L3	S4	G5
eastern meadowlark	Sturnella magna	EAME	L3	S5	G5
striped chorus frog	Pseudacris triseriata	MICF	L2	S5	G5
gray tree frog	Hyla versicolor	TGTF	L3	S5	G5
wood frog	Rana sylvatica	WOFR	L2	S5	G5
Blanding's turtle	Emydoidea blandingii	BLTU	L3	S4	G4
common map turtle	Graptemys geographica	MATU	L1	S4	G5
smooth green snake	Liochiorophis vernalis	SGSN	L3	S4	G5

*Records from the past 15 years. Does not include all species from the 1991 Rouge Park ecological survey.

APPENDICES

CITY OF TORONTO SPECIES OF POSSIBLE LOCAL CONCERN

COMMON NAME	SCIENTIFIC NAME	SPC CODE	TRCA RANK	PROV. SRANK	GRANK
big brown bat	Eptesicus fuscus	BBBA	L4	S5	G5
eastern chipmunk	Tamias striatus	EACH	L4	S5	G5
beaver	Castor canadensis	BEAV	L4	S5	G5
meadow vole	Microtus pennsylvanicus	MEVO	L4	S5	G5
mink	Mustela vison	MINK	L4	S5	G5
wood duck	Aix sponsa	WODU	L4	S5	G5
American black duck	Anas rubripes	ABDU	L4	S4	G5
gadwall	Anas strepera	GADW	L4	S4	G5
perigrine falcon	Falco perigrinus anatum	PEFA	L4	S2	G4
spotted sandpiper	Actitis macularia	SPSA	L4	S5	G5
eastern screech owl	Otus asio	EASO	L4	S5	G5
great horned owl	Bubo virginianus	GHOW	L4	S5	G5
common nighthawk	Chordeiles minor	CONI	L4	S4	G5
ruby-throated hummingbird	Archilochus colubris	RTHU	L4	S5	G5
belted kingfisher	Ceryle alcyon	BEKI	L4	S5	G5
red-headed woodpecker	Melanerpes erythrocephalus	RHWO	L4	S3	G5
pileated woodpecker	Cryocopus pileatus	PIWO	L4	S4/S5	G5
eastern wood pewee	Contopus virens	EAWP	L4	S5	G5
eastern phoebe	Sayornis phoebe	EAPH	L4	S5	G5
great-crested flycatcher	Myiarchus crinitus	GCFL	L4	S5	G5
eastern kingbird	Tyrannus tyrannus	EAKI	L4	S5	G5
purple martin	Progne subis	PUMA	L4	S4/S5	G5
tree swallow	Tachycineta bicolor	TRES	L4	S5	G5
northern rough-winged swallow	Stelgidopteryx serripennis	NRWS	L4	S5	G5
bank swallow	Riparia riparia	BANS	L4	S5	G5
cliff swallow	Hirundo pyrrhonota	CLSW	L4	S5	G5
white-breasted nuthatch	Sitta carolinensis	WBNU	L4	S5	G5
Carolina wren	Thryothorus ludovicianus	CARW	?	S3	G5
blue gray gnatcatcher	Polioptila caerulea	BGGN	L4	S4	G5
eastern bluebird	Sialia sialis	EABL	L4	S4/S5	G5
red-eyed vireo	Vireo olivaceus	REVI	L4	S5	G5
mourning warbler	Oporornis philadelphia	MOWA	L4	S5	G5
common yellowthroat	Geothlypis trichas	COYE	L4	S5	G5
rose-breasted grosbeak	Pheucticus ludovicianus	RBGR	L4	S5	G5
swamp sparrow	Melospiza georgiana	SWSP	L4	S5	G5
eastern meadowlark	Sturnella magna	EAME	L4	S5	G5
orchard oriole	Icterus spurius	OROR	?	?	G5
eastern redback salamander	Plethodon cinereus	RBSA	L4	S5	G5
northern leopard frog	Rana pipiens	LEFR	L4	S5	G5
eastern milk snake	Lampropeltis triangulum	MISN	L4	S4	G5

? indicates status unknown (generally species expanding range)

VEGETATION COMMUNITIES OF CONCERN, JUNE 2001

CODE	COMMUNITY UNITS	Local Distrib.	Geophy. Requir.	TOTAL SCORE	TRCA RANK (2001-03)	SRANK (1997-01)
BBO1	Mineral Open Beach/Bar	4	2	6	L3	
BBO1-1	Sea Rocket Sand Open Beach	4	3	7	L2	S2S3
BBO1-2	Wormwood Gravel Open Beach	5	3	8	L2	S2S3
BBO1-3	Reed Canary Grass Open Beach	5	2	7	L2	
BBS1	Mineral Shrub Beach/Bar	4	3	7	L2	
BBS1-2	Willow Shrub Beach	4	3	7	L2	S4
BBS1-A	Red Osier Dogwood Shrub Beach	5	2	7	L2	
BBT1	Mineral Treed Beach	5	3	8	L2	
SDO1	Open Sand Dune	5	2	7	L2	
SDO1-1	Switchgrass—Beachgrass (Little Bluestem) Open Dune	5	2	7	L2	S2
SDO1-A	Sand Dropseed—Flat-stemmed Bluegrass Open Dune	5	1	6	L3	
SDS1	Sand Shrub Dune	5	2	7	L2	
SDS1-A	Willow Shrub Sand Dune	5	2	7	L2	
SDT1	Treed Sand Dune	5	2	7	L2	S1
SDT1-1	Cottonwood Treed Sand Dune	5	2	7	L2	S1
BLS1	Mineral Shrub Bluff	3	2	5	L3	
BLS1-A	Sumac—Willow Shrub Bluff	3	2	5	L3	
BLS1-B	Serviceberry—Buffaloberry Shrub Bluff	5	3	8	L2	
BLT1-A	White Cedar Treed Bluff	4	3	7	L2	
BLT1-B	Deciduous Treed Bluff	3	2	5	L3	
SBO1-B	Dry-Fresh Flat-stemmed Bluegrass—Forb Sand Barren	5	3	8	L2	
TPO1-1	Dry Tallgrass Prairie Type	5	5	10	L1	S1
TPO2-1	Fresh-Moist Tallgrass Prairie Type	5	4	9	L1	S1
TPS1-1	Dry Black Oak Tallgrass Savannah	5	5	10	L1	S1
TPW2-A	Fresh-Moist Cottonwood Tallgrass Woodland	5	2	7	L2	S1?
FOC1-2	Dry-Fresh White Pine—Red Pine Coniferous Forest	4	5	9	L1	S4
FOC3-A	Fresh-Moist Hemlock—White Pine Coniferous Forest	3	2	5	L3	
FOCA-A	Moderately Wet Hemlock Coniferous Forest (well-drained organic)	5	3	8	L2	
FOM2-1	Dry-Fresh White Pine—Oak Mixed Forest	4	4	8	L2	S5
FOM3-1	Dry-Fresh Hardwood Hemlock Mixed Forest	5	3	8	L2	
FOM5-1	Dry-Fresh Paper Birch Mixed Forest	4	2	6	L3	S5
FOM5-2	Dry-Fresh Poplar Mixed Forest	4	1	5	L3	S5
FOM6-2	Fresh-Moist Hemlock—Hardwood Mixed Forest	3	2	5	L3	S4S5
FOM8-A	Fresh-Moist Poplar—White Birch Coastal Mixed Forest	5	2	7	L2	
FOD1	Dry-Fresh Oak Deciduous Forest	4	3	7	L2	
FOD1-1	Dry-Fresh Red Oak Deciduous Forest	4	4	8	L2	S5
FOD1-3	Dry-Fresh Black Oak Deciduous Forest	5	4	9	L1	S3
FOD1-4	Dry-Fresh Mixed Oak Deciduous Forest	4	3	7	L2	S3S4

APPENDICES

CODE	COMMUNITY UNITS	Local Distrib.	Geophy. Requir.	TOTAL SCORE	TRCA RANK (2001-03)	SRANK (1997-01)
FOD2-1	Dry-Fresh Oak—Red Maple Deciduous Forest	5	2	7	L2	S5
FOD2-2	Dry-Fresh Oak—Hickory Deciduous Forest	5	1	6	L3	S5
FOD2-3	Dry-Fresh Hickory Deciduous Forest	5	1	6	L3	S3S4
FOD4-1	Dry-Fresh Beech Deciduous Forest	5	0	5	L3	S4S5
FOD4-A	Dry-Fresh Ironwood Deciduous Forest	5	1	6	L3	
FOD5-5	Dry-Fresh Sugar Maple—Hickory Deciduous Forest	4	1	5	L3	S4
FOD6-3	Fresh-Moist Sugar Maple—Yellow Birch Deciduous Forest	4	2	6	L3	S5
FOD7-4	Fresh-Moist Black Walnut Lowland Deciduous Forest	5	0	5	L3	S2S3
FOD8-A	Fresh-Moist Cottonwood Coastal Deciduous Forest	5	2	7	L2	
FOD9-1	Fresh-Moist Oak—Sugar Maple Deciduous Forest	3	2	5	L3	
FOD9-2	Fresh-Moist Oak—Maple Deciduous Forest	5	1	6	L3	
FOD9-5	Fresh-Moist Bitternut Hickory Deciduous Forest	5	0	5	L3	
FOD9-A	Fresh-Moist Oak—Beech Deciduous Forest	4	1	5	L3	
FOD9-B	Fresh-Moist Oak—Birch Deciduous Forest	5	2	7	L2	
CUP3-1	Red Pine Coniferous Plantation	2	3	5	L3	
CUP3-4	Jack Pine Coniferous Plantation	4	3	7	L2	
CUP3-A	Restoration Coniferous Plantation	5	0	5	L3	
CUT1-2	Serviceberry Cultural Thicket	4	2	6	L3	
CUT1-D	Round-leaved Dogwood Cultural Thicket	4	2	6	L3	
CUS1-3	Red Oak Cultural Savannah	4	2	6	L3	
CUS1-3A	White Oak Cultural Savannah	5	3	8	L2	
CUS1-3B	Bur Oak Cultural Savannah	4	1	5	L3	
CUW1-2	Dry Red Oak Cultural Woodland	4	3	7	L2	
CUW1-C	Dry White Oak Cultural Woodland	5	3	8	L2	
SWC1-2	White Cedar—Conifer Mineral Coniferous Swamp	4	2	6	L3	S5
SWC2-2	Hemlock Mineral Coniferous Swamp	4	3	7	L2	
SWC3-2	White Cedar—Conifer Organic Coniferous Swamp	3	3	6	L3	S5
SWM3-1	Birch—Conifer Mineral Mixed Swamp	4	2	6	L3	
SWM4-1	White Cedar—Hardwood Organic Mixed Swamp	2	3	5	L3	S5
SWM5-1	Red Maple—Conifer Mixed Organic Swamp	3	3	6	L3	S5
SWM6-2	Poplar—Conifer Organic Mixed Swamp	5	3	8	L2	
SWD2-2	Red (Green) Ash Mineral Deciduous Swamp	3	2	5	L3	S5
SWD3-2	Silver Maple Mineral Deciduous Swamp	3	2	5	L3	S5
SWD3-4	Manitoba Maple Mineral Deciduous Swamp	4	1	5	L3	S5
SWD4-4	Yellow Birch Mineral Deciduous Swamp	4	2	6	L3	S5
SWD4-A	White Birch—Cottonwood Coastal Mineral Deciduous Swamp	5	3	8	L2	
SWD6-2	Silver Maple Organic Deciduous Swamp	5	3	8	L2	
SWD7-1	Paper Birch—Poplar Organic Deciduous Swamp	4	3	7	L2	S5

CODE	COMMUNITY UNITS	Local Distrib.	Geophy. Requir.	TOTAL SCORE	TRCA RANK (2001-03)	SRANK (1997-01)
SWT2-1	Alder Mineral Thicket Swamp	2	3	5	L3	S5
SWT2-3	Mountain Maple Mineral Thicket Swamp	3	2	5	L3	S4
SWT3-1	Alder Organic Thicket Swamp	3	4	7	L2	S5
SWT3-2	Willow Organic Thicket Swamp	3	3	6	L3	S5
MAM5-1	Mineral Fen Meadow Marsh	5	3	8	L2	
MAM4	Great Lakes Coastal Fen Meadow Marsh	5	4	9	L1	S2
MAM4-A	Nelson's Scouring Rush—Baltic Rush Coastal Fen	5	4	9	L1	S2
MAM2-7	Horsetail Mineral Meadow Marsh	3	2	5	L3	S5
MAM3-3	Rice Cut-grass Organic Meadow Marsh	2	3	5	L3	S4
MAM3-4	Fowl Manna Grass Organic Meadow Marsh	2	3	5	L3	S4
MAM3-6	Broad-leaved Sedge Organic Meadow Marsh	4	3	7	L2	S5
MAM3-8	Jewelweed Organic Meadow Marsh	4	3	7	L2	S4
MAM3-9	Forb Organic Meadow Marsh	3	3	6	L3	S4S5
MAS3-1	Cattail Organic Shallow Marsh	3	3	6	L3	S5
MAS3-10	Forb Organic Shallow Marsh	4	3	7	L2	S4S5
SAS1-4	Water Milfoil Submerged Shallow Aquatic	4	1	5	L3	S5
SAM1-4	Pondweed Mixed Shallow Aquatic	5	2	7	L2	S5
SAM1-7	Water Milfoil Mixed Shallow Aquatic	4	1	5	L3	S5

S? Unranked, or, if following a ranking, rank uncertain (e.g., S3?).

APPENDICES

APPENDIX D: LANDSCAPE ANALYSIS METHODOLOGY

SUMMARY OF THE TRCA LANDSCAPE ANALYSIS METHODOLOGY DRAFT, APRIL 2001

This document reviews the methods used to define and score natural habitat patches based on their landscape attributes and context. A wide range of measures are now used in landscape ecology, and a large number of these were carefully scrutinized before a choice was made on those thought to be most relevant for the TRCA's regional landscape context.

The landscape analysis applies several criteria relevant to the inherent qualities of individual patches and their position in relation to each other and to current surrounding land uses. The analysis is undertaken using ArcView GIS software, and requires simplification of habitat attributes such that vegetation communities and human land uses are lumped into broad categories and patches are converted to "polygons."

1. DATA PREPARATION

In a region of rapid land use change, the landscape analysis must be based on the most recent information possible. The TRCA method uses up-to-date digital orthographic aerial photos at a scale of 1:2000. These allow for polygon definition based on major habitat types and land uses as described below.

Habitat and Land Use Definition

An important step in defining and mapping habitat patches for a terrestrial natural heritage strategy is to specify what are the types of habitat to be used in the landscape analysis. The major types considered for the TRCA analysis are forest (including successional areas), wetland, meadow, and coastal habitats such as beach, dune or bluff. These general categories are for use in the landscape analysis only, and should not be confused with the more detailed analysis of vegetation communities used in TRCA natural heritage strategies.

Polygon borders are generally defined by obvious changes in habitat or land use. Main roads and wide trails were considered as boundaries to habitat, and a width of 25 metres was used to define breaks in habitat patches by the former. This area covered by the road is then considered as "urban" land use, as per the definition below. Wide rivers were also considered to separate habitat patches.

Forest—Forest is a term frequently used, but seldom defined. The Ontario Ecological Land Classification System for southern Ontario (ELC) considers forest habitat to be an area that is more than 60% tree cover. The ELC distinguishes between "cultural" plantations, and natural deciduous, coniferous or mixed forest, but it does not set a minimum size of a forest patch, nor does it clearly address the issue of structure.

For the TRCA's system, forest is defined as a "self perpetuating natural habitat dominated by trees". For the landscape analysis minimum forest patch size has been set at 0.5 hectares, although smaller patches may be mapped. Within an urbanizing landscape such small patches can be highly valuable to some wildlife as an oasis, or as stepping stone or stopover habit.

A natural forest typically features several layers, including the canopy, understorey, and herbaceous, as well as standing dead trees and fallen woody debris. By this definition, treed lawns, cemeteries, backyards, etc., do not have a forest structure and are not considered as a functioning forest, despite providing a variety of biological and environmental benefits. In contrast, plantations which usually display basic forest structure (albeit greatly simplified), are not natural forest, although they still provide some forest functions. Depending on how they are managed, their composition and structure can improve over time, especially when native deciduous tree species invade under the coniferous canopy and start to form an understorey. Where they are adjacent to forests, plantations contribute to the increase of the total forest area and the amount of interior habitat. For the landscape analysis of the patch size, shape and matrix influence, forest includes plantations, successional growth, and the three major forest types (coniferous, deciduous and

mixed) have been combined and treated as forest. Successional growth is considered as a separate category when considering total area, as it is important to know the difference between what is already forest, and what will become forest if left alone.

Wetland—Marshes include shallow marsh and meadow marsh. Sites where water is known to be 2 metres or less in depth (according to the MNR wetland definition) are considered to be marsh. Where water depth is unknown, or thought to be deeper than 2 metres, only the perimeter marsh vegetation is mapped as wetland. Meadow marsh is virtually indistinguishable from ordinary meadow on aerial photos and cannot be mapped as wetland unless a wet meadow is known to exist there.

Swamps are dominated either by shrubs or trees. Where they are known to exist, thicket swamps are mapped as wetlands. Tree-dominated swamps are mapped and evaluated as forest in part because they are difficult to discern in aerial photo interpretation, and because they provide many wildlife values associated with forest.

No limit was set on the size of wetlands to be mapped, since they often naturally occur as small pockets in the landscape. Nevertheless, for the landscape analysis the minimum size is set at 0.2 hectares.

Meadow—"Meadow" generally refers to old field habitat, or open areas that are mowed occasionally, such as highway and transmission corridors. Natural prairie and meadow marsh are also considered as "meadow" in the landscape analysis because these are difficult to distinguish from old field in air photo interpretation. In order to ensure that these communities are not overlooked, individual sites should be inventoried in advance of any restoration plans. Such natural meadow types will be covered by more detailed mapping of vegetation communities.

As with forest, the minimum size for meadow to be included and mapped as habitat was set at 0.5 hectares, although, again, smaller patches may be mapped due to the difficulty in gauging the size of such habitat patches when undertaking aerial photo interpretation.

Beach/Bluff—This category includes natural barren coastal habitats that do not correspond to any of the other major habitat type categories. It includes natural beach, coastal dunes, and bluffs.

Agricultural—Agricultural lands include croplands, fruit tree plantations, and pastures. They do not include fallow fields, which are mapped as meadows. Like meadows, agricultural lands are considered to have potential for forest restoration (recognizing that the constraints analysis may indicate that much of this area is not available).

Urban—For the purpose of the landscape evaluation "urban" areas are considered to be any part of the landscape that has been modified primarily for a human use other than agriculture. This includes residential, commercial, and industrial land. Significantly, it also includes manicured areas such as cemeteries, golf courses, and parkland, because the intensity of management and use of these areas is considered to have many potential negative impacts on nearby natural areas—at least as many as would residential and many industrial properties, for example. In some cases manicured parks may be analyzed as having restoration potential.

Study Area Definition

The study area is defined by the exact boundaries of the region, municipality, or watershed. Thus, basic statistics, such as the area of forests, meadows and wetlands, are based on these limits. However, some landscape measures also include areas adjacent to these boundaries. For the size, shape and connectivity metrics, patches occurring entirely within the watershed and those straddling the boundary are included in the calculations. Similarly, the measure of "matrix influence" that requires the consideration of a 2km buffer around polygons, necessarily extends beyond the proper limits of the watershed or region.

APPENDICES

2. THE LANDSCAPE ANALYSIS SCORING METHODOLOGY

Measuring attributes of habitat patches (regarded as individual polygons in GIS) and their interrelationships is the basis of landscape analysis. Because this analysis can be undertaken remotely, and because representation of vegetation communities, flora, and fauna is strongly correlated with these attributes, the landscape analysis is the most fundamental of the TRCA conservation priority measures.

Five criteria are currently used by the TRCA for landscape analysis, three of which are scored. Total area in hectares covered by a particular major habitat type is the sum of the size of each individual patch. Total area cannot be scored because it is not an individual patch measure. However, it is useful for monitoring change in habitat cover. Forest interior is a landscape measure that is relevant both at the patch level, and as a sum of all patches. Whether or not forest interior should be scored for individual habitat patches has yet to be determined.

The three measures that are scored for individual habitat patches are size, shape, and matrix influence. These are discussed in detail below. A possible additional scored criterion, connectivity, is complex and difficult both to define and measure. Connectivity measures are currently being tested and may be incorporated into the analysis at a later date.

Of the three criteria, size is given additional weighting when calculating the final landscape score and rank for each patch. Thus for a small habitat patch each landscape criterion (size, shape, matrix influence) may have relatively equal weighting, while for a larger patch the size score may be weighted more than shape and matrix influence. This is because size is considered more important than shape or matrix. For example, there is a tendency for shapes to become less convoluted the larger the area they cover, and a larger patch clearly will have more resistance against negative external influences than a small one. Connectivity, too, is ultimately covered by size. This is because very large habitat patches are likely to inherently provide all of the values that connectivity provides for wildlife movement between smaller patches.

There is also a close relationship between patch shape and matrix influence. However, matrix influence was given more weight than shape because the negative edge effects themselves from the surrounding landscape are considered to be more fundamentally of consequence to a habitat patch than the shape of the patch exposed to them. With these considerations in mind, the weighting for the scores is as follows: size equals 50% of the total, shape is worth 15%, and matrix influence is given 35% of the total.

Size—This is the most basic polygon measure. For biodiversity and maintenance of ecosystem integrity, large habitat patches are preferable because:

- they can support bigger populations of species, thus promoting their viability;
- they have the capacity to support area-sensitive and forest interior species;
- they are better buffered from negative external influences;
- they likely feature a greater diversity of habitat types which increases biodiversity;
- they are more resilient to external influences;
- they have a greater capacity to maintain and promote a variety of natural ecological processes.

Of the landscape criteria, size is the single most important patch attribute, both because large patches are more likely to maintain their functional integrity, and because negative edge effects (related to shape and matrix influence) tend to have less influence on large patches (that typically support more interior habitat). As a result, when adding size, shape, and matrix influence together for a total landscape score, the size criteria is given an additional weighting on a sliding scale from small to large patches. Because of the tremendous range of patch sizes that can conceivably score 5 points (anything above 250 hectares) it is important to ensure that the values of extremely large patches receive their due. Thus, the weighting continues for a

range of sizes above 250 hectares. For example, a patch of 2000 hectares, while it scores 5 points for size, gets a 75 percent weighting in the total landscape score, instead of receiving 5 points with a weighting of only 50, as is the case for a 250-hectare patch.

In a landscape where forest is the dominant ecosystem type, under natural conditions wetlands typically cover less area than forest (both individually and combined). Small wetlands also are likely to have more value to wildlife than forest patches of equivalent size, hence the decision to not set a minimum size for wetlands while doing so for forests. It therefore makes sense to score wetlands on a scale that gives higher points for smaller patch ranges than forests.

Scores are assigned to the patch size classes, as follows:

Forest, Meadow, Beach/Bar

HA	SCORE
> 0	1
>= 2	2
>= 10	3
>= 50	4
>= 250	5

Wetlands

HA	SCORE
< 1	1
>= 1	2
>= 3	3
>= 10	4
>= 20	5

Shape—Patch shape is a measure of its exposure to external influences, including the negative edge effects resulting from habitat fragmentation. Theoretically, the more convoluted the polygon, the longer its edge and the higher will be its exposure to these influences.

Shape is scored as a patch's perimeter (edge)-to-area ratio. To compensate for the increase in perimeter with increasing size, a corrected shape calculation is used:

$0.282 \times \text{Perimeter}/\text{Area}^{1/2}$.

For the scores, the decimal point is moved over to 28.2 to result in numbers that are easier to understand. A perfect circle (the best possible shape for reduction of edge to area) would be P/A = 100.

Scores for shape are assigned as follows:

P/A	SCORE
>= 500	1
>= 300	2
>= 200	3
>= 125	4
>= 100	5

Matrix Influence—This is a measure of pressure on natural areas from adjacent land uses. In other words, its score reflects the degree of threat and potential disturbance to a natural habitat patch relative to the kind of land use surrounding it. The area considered is a 2 km radius from the outside edge of the habitat. This particular radius was chosen because:

- it is considered to be a reasonable foraging circuit for wildlife species associated with negative edge effects, such as raccoons, foxes, cowbirds; and
- it is a distance that could be considered reasonable by people to visit a natural area for recreational purposes, by walking, cycling or driving.

In scoring, natural areas are considered to have a positive influence and receive a base point of 5. Included in this category are patches of the major habitat types, as well as open water in the form of lakes, rivers, and ponds. Agriculture is considered to be partially compatible with maintaining natural habitats and is assigned a base point of 2. Urban areas are generally harmful to natural habitats and receive 0 points.

APPENDICES

From a biodiversity conservation perspective, the perfect patch surroundings would be 100 percent natural (e.g., wetland within extensive forest patch) and would receive a score of 100 x 5 = 500, while the lowest possible score is zero for a natural habitat patch "immersed" within a vast expanse of urban or industrial land.

The scoring system for matrix influence is as follows:

MATRIX	SCORE
> 0	1
>= 100	2
>= 200	3
>= 300	4
>= 400	5

Total Score—Total score is calculated by adding the scores for size, shape, and matrix influence with the following weightings:

Weighting System for Total Score Calculation (Forest, Meadow, Beach/Bar)

SIZE (HA)	SIZE (HA)	SHAPE	MATRIX
> 0	40%	30%	30%
>= 10	45%	27.5%	27.5%
>= 250	50%	25%	25%
>= 500	55%	22.5%	22.5%
>= 1000	65%	17.5%	17.5%
>= 2000	75%	12.5%	12.5%

Weighting System for Total Score Calculation (Wetlands)

SIZE (HA)	SIZE (HA)	SHAPE	MATRIX
>= 1	33.3%	33.3%	33.3%
>= 3	40%	30%	30%
>= 10	45%	27.5%	27.5%
>= 20	50%	25%	25%

Each of the total weighted scores for landscape are then translated into individual patch ranks based on the range of possible total scores from 3 to 15 points. L-1 is the highest local rank, and L5 the lowest. Thus:

SCORE	RANK
13-15	L1
11-12	L2
9-10	L3
6-8	L4
3-5	L5

APPENDIX E: TERRESTRIAL ENHANCEMENT OPPORTUNITIES

MODELLING FOR RESTORATION OPPORTUNITIES

Modelling is a GIS process used to determine potential habitat restoration opportunities by combining data layers to look at a variety of scenarios. In addition to existing habitat, these data layers can include geological and hydrological features, soils, land use, land ownership, etc. The landscape analysis can then be run to evaluate the new "potential" habitat conditions, to identify restoration targets and increments to achieve these conditions. In essence a scenario that is agreed upon (after considering various options, alternative uses and costs) can be viewed as a target natural heritage system as defined by the model. This modelling process can be undertaken at any scale, from site, to municipality, to watershed, to region.

The modelling can help set priorities for acquisition and restoration. Although it is not possible to measure an improvement in a given patch (because patches are merged in the modelling process), locations where a large improvement is noticeable might be a good place to look for real opportunities.

The terrestrial modelling process presumes that forest is the desired dominant habitat target for a healthy landscape, given that over 90 percent of the Toronto area was forested prior to European settlement, and that most disturbed areas will eventually revert to forest through natural succession unless otherwise managed. Swamp wetlands comprised a substantial portion of the overall forest composition, followed by more unique vegetation communities such as tall-grass prairie, savannah, wet meadows and thickets.

The benefit of the modelled natural heritage system is that it provides a tool to demonstrate how forest values could change as a result of expanding existing habitats or filling in gaps and holes in natural features—in short, improving the size, shape, matrix values or interior values for habitat patches. The model also helps to identify near-term priority restoration areas in a practical context. Depending on the model criteria applied, the results can stretch our imaginations on the possibilities for a greener and more ecologically healthy city.

Since GIS mapping criteria are used to define the model at a broad scale, the limitations of the model are dependent on the quality, accuracy and level of detail of the data used. The basic model identifies available meadows (the majority of which are disturbed old field habitats), and where practical, agricultural lands as potential forest cover. Then the landscape analysis is recalculated using size, shape and matrix influence to show the improvements to the terrestrial system resulting from the potential forested areas.

The criteria used to define the modelled scenario in Toronto included:

- meadows (with the exception of hydro corridors) and known sites that cannot be converted to forest, such as the Downsview Lands and Beare Road Landfill site;
- agricultural lands;
- golf courses;
- public properties within valley and stream corridors.

These criteria were chosen to use in just one sample modelling scenario to demonstrate the technique. Although not all areas identified in the model are available for restoration, modelled scenarios can show a range of potential future restoration options and habitat values. Modelling a future scenario reveals possible values that can be gained should certain properties become available for acquisition. A sample modelled area is provided in Figure 6.

Hydro corridors were treated as a constraint to potential forest cover because they are maintained to meet vegetation height restrictions. However, they provide opportunities

APPENDICES

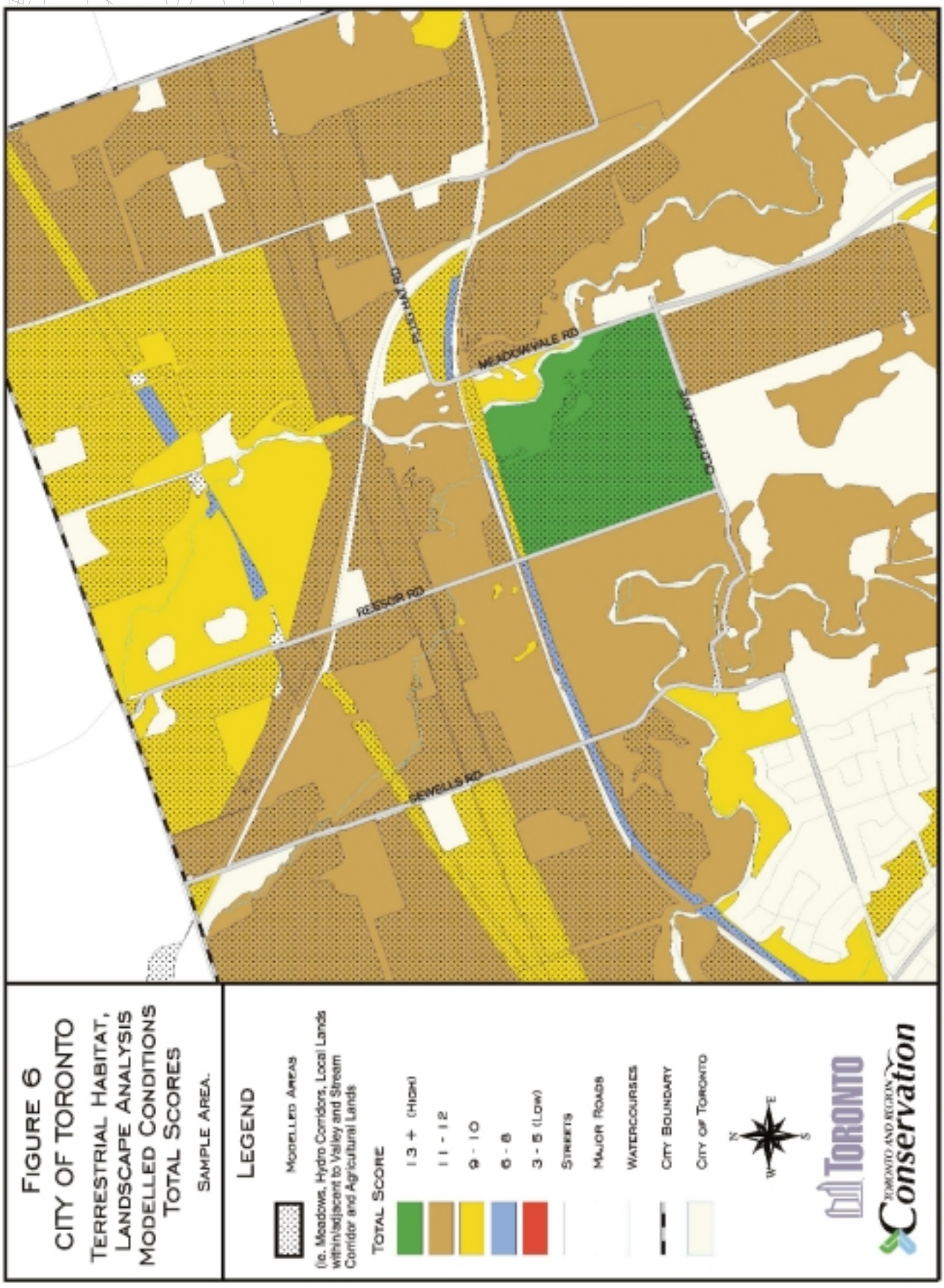
FIGURE 6
CITY OF TORONTO
TERRESTRIAL HABITAT, LANDSCAPE ANALYSIS MODELLED CONDITIONS TOTAL SCORES
SAMPLE AREA.
LEGEND
MODELLED AREAS
(ie. Meadows, Hydro Corridors, Local Lands within/adjacent to Valley and Stream Corridor and Agricultural Lands
TOTAL SCORE
13 + (HIGH)
11 - 12
9 - 10
6 - 8
3 - 5 (LOW)
STREETS
MAJOR ROADS
WATERCOURSES
CITY BOUNDARY
CITY OF TORONTO
N
W
E
S
TORONTO
TORONTO AND REGION
Conservation
MEADOWVALE RD
PLUGHAT RD
OLD KINGSTON RD
KEESSAN RD
GEWELLS RD

to increase meadow, tallgrass prairie or shrub community values (for example, by planting more native meadow or prairie plants) and to increase the diversity of community types across the study area. Thus, hydro corridors remain as meadow communities in the model.

Earth science, hydrological, aquatic or cultural (i.e., roads, land use) data layers compiled through this inventory can be overlaid on this modelled system to identify program priorities. For example, the riparian zone boundary could be overlaid on the modelled system to indicate where riparian and total forest cover values might be increased through the same restoration effort.

Similarly, the Iroquois Sand Plain could be overlaid with existing meadow and known tallgrass habitats to help identify potential prairie or savannah restoration opportunities. There are many possible constraints and opportunities to consider, and the model can be designed to meet different goals and priorities. The inventory database can be used to supplement the basic model.

The landscape modelling does not predict changes in vegetation communities and species that would occur if the identified restoration potential was achieved. Such a model may become available in the future. Certainly, increasing forest area and the amount of interior habitat could be expected to result in increased representation of sensitive forest species, although, in part, this depends on the proximity of source populations and on the degree of disturbance. Birds would likely be the first to benefit from these actions; thus, species such as scarlet tanager and wood thrush might become targets for and indicators of improvement.

The model can be used at a broad or site-specific scale. At the broad scale, potential enhancement opportunities are shown across a larger study area to provide a greater sense of the possibilities for a healthier system. At the site level, the model can identify property-specific locations and can provide direction on where to restore. In both cases, obvious gains in habitat patch values from existing to modelled conditions—provided they are demonstrated to have real opportunity —would be first priority areas for restoration.

It should be noted that the modelled scenario applied through this study must still undergo a constraints analysis at a more detailed level. For example, in general, golf courses are not considered to be real opportunities for reforestation at this time; however, an opportunity may arise to convert such an area to natural conditions in whole or in part. Further modelling should be undertaken to include tableland public properties once a more accurate properties database is available to separate parkland areas from built-up areas.

MODELLED VALUES

Maps 16 to 20 exhibit the results of the modelled scenario by measure.

Total Cover (Map 16)

The total cover of all natural habitat based on the modelled conditions amounts to 11,185 ha. This represents an increase in 2,590 ha, most of which is based on conversion of manicured areas in parks and golf courses and agricultural lands in the Rouge watershed to forest cover. This would increase the total natural cover from the existing 13.5 percent to almost 17.8 percent (see Table 9).

The increase in total forest cover through the modelled conditions is 4622.9 hectares. This figure includes modelling of successional habitat as forest minus 14.7 hectares of the "successional" habitat that is actually the High Park savannah. The total area of the city covered by forest in the modelled conditions is only 14.8 percent which, although it is almost double the existing cover, is still well below the guidelines of the Great Lakes Remedial Action Plan. However, under the modelled conditions, the total percent of forest relative to the total cover of all natural habitat within the city is 84.4 percent, which may be close to historical conditions, given the presence of coastal habitats and the fact that an unknown area of Toronto was once savannah and prairie.

Table 9: Comparison of Existing and Modelled Conditions for Major Habitat Types

HABITAT TYPE	EXISTING COVER (HA)	MODELLED COVER (HA)	EXISTING (% OF CITY)	MODELLED (% OF CITY)
Forest*	4384.2	9424.82	6.89	14.83
Successional	417.71	14.69	0.67	0.02
Meadow	3553.69	1506.11	5.59	2.37
Wetland*	258.18	258.18	0.4	0.4
Beach/Bluff	133.18	133.18	0.21	0.21
Total	8595.06	11185.08	13.52	17.81

*Known swamp cover (151.91 ha) is measured twice under forest and wetland, but included only once in total.

Under the modelled conditions, forest cover is more evenly distributed across the city, although the majority of restoration opportunities are in the east end of the city, particularly in the Rouge watershed. The more even distribution is largely the result of adding golf courses to the model.

Under the modelled conditions, the total area of meadow habitat has decreased from 3553.7 hectares to 1506.1 hectares because the difference of 2047.6 hectares is being considered as new forest cover. What meadow remains is made up of hydro corridors, the Beare Road Landfill site and some of the Downsview lands, which were not considered to have forest restoration potential. The new total for meadow represents 2.4 percent of the total city area, but 13.5 percent of the total natural cover for modelled conditions. As such, this is still a large representation of meadow relative to other natural habitats when compared to probable historical conditions. This may change in the future as some of these areas become available for development.

What is also important to emphasize is that whatever percent cover was historically savannah and prairie, these native tallgrass habitats were very different from the old field which makes up most of the current meadow. As well, they would have had a very different distribution due to their specificity of soil types.

Additional wetland cover is not modelled; therefore, the total area figures do not change from existing conditions. Because it has been estimated that the Greater Toronto Area has lost approximately 80 percent of wetlands (Snell 1989), restoring this function to the landscape is likely to have both hydrological and biodiversity benefits. Modelling to identify potential opportunities for wetland restoration might involve the overlaying of various data layers, such as soils, existing hydrology, slope, and major habitat types. For example, impermeable soil types in flat areas—especially if existing wetlands can be found under similar circumstances—might be identified as areas to consider for wetland restoration. Such areas should be field-checked to confirm suitable conditions and to ensure that other important features would not be disturbed or displaced.

Beach/bluff is not included in the modelling process because these habitats are not suitable for forest cover, and some of them—particularly natural beach and dune habitat—are extremely rare. They should be preserved and enhanced.

Forest Interior (Map 16)

Forest interior was measured at 100-metre increments from the forest edge. Interior cover increased in the modelled conditions from an existing total of 138.6 hectares beyond 100 metres to 1143.5. This is a dramatic increase of 1004.9 hectares. There is also a huge increase in interior beyond 200 metres from the existing 7 hectares to 332.9 hectares.

The most obvious area where an increase in forest interior occurs is again in the Rouge watershed as a result of adding the agricultural areas. The addition of golf courses to the model has also resulted in a better distribution of forest

interior across the city, especially in the Humber and Black Creek watersheds.

Size (Map 17)

With the exception of successional habitats, which are converted to forest for the modelling, the major habitat types that change dramatically in the modelling process are forest and meadow. As is to be expected, the size of potential forests increases substantially. What is particularly of interest is that the number of larger forest patches increases such that nine patches over 100 hectares exist in the modelled conditions. The largest of these is 228.8 hectares. As with existing conditions, the largest patches are in the Rouge watersheds, although in the model there is a greater distribution of large patches across the city, including some very large ones in the Don.

Of the meadows that are not modelled for potential forest cover, patch size does not change from existing to modelled conditions. Large meadow patches remain within the system, including several patches over 30 hectares, and the Beare Road Landfill at 82.3 hectares. Depending on their quality, these largest patches should be capable of supporting area-sensitive birds associated with open areas such as bobolink and eastern meadowlark.

Shape (Map 18)

In general the modelling shows a noticeable increase in shape values across the city. The most obvious improvement is in the newly added or enlarged habitat patches, particularly those in the upper Rouge Park. Many other large tableland patches—including the Portlands, and golf courses throughout the city—also scored very well for shape. In both cases, patches are defined by the grid network of roads, which create a compact square shape. Big shape value improvements can also be seen in the Highland Creek Park and the Glendon College-Sunnybrook Park complex of the Don.

In a few cases, the shape score went down for a given area. This is expected, and is based on a number of smaller forest and meadow polygons fusing into one large forest polygon through the model. As mentioned previously, there is a tendency for large habitat patches to have a more convoluted edge than small ones. Furthermore, since in most cases the only room for a patch to grow within the urban context is in the valley and stream corridor, it is to be expected that a large patch would be defined by the naturally convoluted shapes of these landscape features. The lowered scores for these few sites should be compensated for by the greatly increased value for size.

Matrix Influence (Map 19)

The most obvious increase in matrix influence values for the city are in the Rouge watershed. Adding the agricultural lands found in the northeast corner of the city greatly increases forest cover in the model, improving the matrix influence in this general area. Adding golf courses as potential forest adds large patches of habitat, many of which scored in the low range for matrix influence because they are either all or partially on tableland surrounded by urban development. Because other golf course are in close vicinity to, or within the valley and stream corridors, modelling them as forest has increased the size of many forest patches, resulting in a slightly better matrix influence score for some surrounding patches. Furthermore, because these golf courses originally were valued as a negative urban influence, their change to a positive influence as natural habitat improves the values of nearby patches.

Total Scores (Map 20)

The single highest scoring habitat patch under the modelled conditions is in middle of the Rouge watershed. This patch scored reasonably well for size, but exceptionally well for shape and matrix. This is because it is a compact patch that is largely surrounded by other habitat patches, which encompass much of the 2 km radius that is the basis of the matrix influence measure.

Most of the other patches in the Rouge also scored well relative the remainder of the city for similar reasons. Indeed, the Rouge scores well relative to much of the GTA, suggesting its regional importance. What makes it abundantly clear that the Rouge area holds the greatest potential for improving terrestrial biodiversity

values within the city is that much of the agricultural and meadow land that was modelled may actually be available for restoration. In fact, some of it already has been planted, but still appears to be meadow when interpreting aerial photos.

Other patches that scored reasonably well (coloured brown on the map) include parts of the Portlands and Toronto Islands, in part because of compact shapes, but more because of the proximity of open water, which counts as a positive "natural" influence in the matrix.

South Humber Park and the South Humber Sewage Treatment Plant, as well as the Lower Highland Creek Treatment Plant and adjacent parkland, created single large patches in the modelling because they are adjacent public properties, and all public properties in valley and stream corridors were modelled. Despite the fact that the new patch scored well based on shape and matrix, this is an example of how the modelling scenarios are not always based on real, or at least immediate opportunities. A similar situation exists with the large meadow areas next to the Woodbine Race Track, which also scored well. It may not seem reasonable to assume that these are available to be restored to forest; however, unless private properties such as these are part of the model, one cannot know what might become a priority for acquisition, or what potential has been lost if such large old fields are to be developed.

Although it is not part of scoring, another characteristic that is noticeable from Map 20 is an increase in connectivity across the landscape. This is based both on improved linkages within valley lands because of the modelling of golf courses, but also on the improved proximity of patches by making them larger.

The most obvious priority area for restoration is the Rouge because of the large increases in patch values shown in the model. However, in reality, priorities are likely to be based to a large degree on specific issues or on the interest of community groups. Thus, it is important to look at where gains can be made in any given area, whether it be from red to blue, blue to yellow, or yellow to brown in the colour scheme.

Existing conditions total score colours (Map 6) can be compared with modelled conditions total score colours (Map 20) to determine where research into real opportunities for action might be sought in any given area of interest. In addition, Maps 2 and 16 show changes in forest interior—an important criteria for selecting restoration priorities.

The modelled scenario example applied here demonstrates a total cover increase of just over 4 percent for a total of 17.8 percent natural cover across the city. The results show that the greatest improvement can be gained in the Rouge area due to agricultural lands that are potentially available for reforestation. However, substantial improvements are needed throughout much of the city to address better cover distribution in the west, to enhance tableland features to create large habitat blocks, and to increase habitat proximity. The modelled scenario shows an enhanced ravine system with a more even cover distribution. It also addresses the unnatural meadow to forest ratio (5.6 percent to 6.9 percent respectively) found under existing conditions. The meadow to forest ratio in the modelled system becomes 2.4 percent to 14.8 percent cover respectively, which is closer to more natural conditions.

SUMMARY

In summary, the modelled system scenarios provide a target for healthier ecosystems that is reached through improvements in total cover, forest interior, and in values for size, shape, matrix influence and connectivity. These values can be measured at the city-wide scale, as well as at the site level. Improvements at the landscape scale would eventually be reflected in an increased presence of species of concern.

The modelled system shows how the city might realize a healthier natural heritage system if total cover were more evenly distributed across the city and if available lands were reforested. These measures would equate to an increase in total natural habitat cover from the current 13.5 percent to 17.8 percent. They would also address many of the problems in existing conditions identified through the study results. Although

the model is terrestrial-based, its implementation would enhance many aquatic and hydrological issues indirectly, since vegetation cover relates to each of these factors.

On a broad scale, distinguishing between public and private lands is a useful first step in this direction. Public lands may offer more opportunities where the City considers natural heritage a high priority within the multiple-use context.

Maintaining and restoring natural heritage values on private lands will require private landowner stewardship. A landowner contact program may be initiated to determine the level of interest in conservation or restoration. If the landowner is interested in protecting the features on the property, a stewardship agreement—if not a legal conservation easement—might be considered. Should the owner not be interested, or if an approved development plan is already in place, acquisition of the property might be considered for higher priority features.

Habitat layers can be used in determining sites with numerous important features. Areas with features of concern, especially where these overlap, may be first priorities. Existing layers of protection and ownership can help clarify protection gaps. The modelled conditions should also be taken into consideration in the decision-making process in order not to miss opportunities. Areas in the modelling where habitat patches greatly improve are good first considerations—especially if these provide additional forest interior habitat. Restoring these sites would provide needed habitat for species of concern while greatly improving overall ecosystem quality.

Restoration priorities can also be identified by overlaying other ecosystem resource layers. For example, the City may decide that it values riparian habitat and that aquatic functions would be greatly improved by adding cover in these areas in particular. The riparian resource layer can be overlaid on top of the modelled system to show where a riparian planting will improve size shape and matrix values of patches that extend beyond the valley land. Similarly, potential prairie or savannah restoration sites might be identified by overlaying existing meadow habitats and the Iroquois Sand Plain. Hence, different resource values can be emphasized by using the data in varying ways. The desktop data access tool was designed as part of this study to display and layer resource information to answer a variety of planning or management level questions (see Section 4).

APPENDICES

APPENDIX F: MAPS

MAP DATA SOURCE TABLE

LIST OF MAPS