



TRCA Terrestrial Volunteer Monitoring Program Volunteer Manual

2014

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1. INTRODUCTION

1.1 This Manual

This manual is designed to support the training objectives of the Toronto and Region Conservation Authority's (TRCA) Terrestrial Volunteer Monitoring Program (TVMP). It provides background information on the TRCA, particularly with reference to its terrestrial ecology related activities, as well as the TVMP program survey protocols, safety information and additional instructions for volunteers. This document is to be used in conjunction with the TVMP Field Guide which provides photographs, illustrations and identification characteristics for the program's indicator species. The TVMP kit that is provided on loan to volunteers is comprised of this manual, the field guide, a fauna calls CD, a site specific laminated aerial photograph and an ecological land classification (ELC) coded map. It is the responsibility of the participating volunteer to ensure that all of these materials are returned to the coordinator when the volunteer eventually leaves the monitoring program.

The manual should be reviewed by new volunteers prior to attending the first volunteer training session.

1.2 Toronto & Region Conservation Authority

Under the Ontario Conservation Authorities Act (R.S.O. 1990, c. C.27, s. 20), TRCA, as a conservation authority, has a responsibility to conserve, restore, develop and manage natural resources other than gas, oil, coal and minerals within its jurisdictional boundaries. Monitoring the condition of these resources is a necessary part of this work that provides the information needed for effective management and restoration. Over the long-term, information from TRCA monitoring programs provides the basis for reporting on progress, and informs the adaptive management process. The TVMP is one component of the overall monitoring activity undertaken by the Watershed Monitoring and Reporting section of the Authority.

As well, there is a growing demand for opportunities for public involvement in volunteer activities and in their community. Interest in naturalist and environmental activities is particularly high. This TRCA volunteer program aims to respond to some of these needs.

Your contribution to this initiative provides a very valuable service to the Toronto region's plant and animal species, its forests, wetlands, meadows and human citizens.

1.3 Toward a Living City Region

The Toronto and Region Conservation Authority is committed to community partnerships with all sectors of society to encourage environmental stewardship, and to build knowledge and innovative thinking about environmental health, social responsibility and sustainable economies.

TRCA's Living City Region objectives of relevance to this program are:

1. **Regional biodiversity:** Biodiversity is an excellent measure of the health of the natural ecosystem. A high level of biodiversity means that the system is able to support a wide variety of native animals and plants and that they are able to maintain healthy regional populations. Systems with a high level of diversity are better able to "weather" stress and change, such as climate change. The variety of species and individuals within the system extends the overall range of tolerance to disturbance and environmental change. In a urban and urbanizing region such as ours, the challenge is to maintain biodiversity for the long term. Directing conservation activities towards protecting and enhancing regional biodiversity is a systematic approach meant to preserve ecosystem health, thereby also protecting human habitat and health.
2. **Terrestrial Natural Heritage System Strategy Implementation:** Regional biodiversity and regional ecosystem health is dependent upon the existence of a connected terrestrial ecosystem that is at or above a minimum size and quality. The Terrestrial Natural Heritage System Strategy lays out both the authority's commitment to enhancing the size and connectivity of the natural system, and the methods by which the objective is to be achieved. Refer to section 1.6 for more detail on this key strategy.
3. **Healthy Rivers and Shorelines:** Safe, clean, vibrant rivers and shorelines within the nine watersheds of the region. Healthy habitats are a prerequisite for regional biodiversity. Natural shorelines also reduce the potential for flooding during heavy rainfall events thereby, once again, protecting human habitats and infrastructure.
4. **Sustainable Living through Education:** People learning about and engaging in environmentally friendly practices.

1.4 The Regional Terrestrial Natural Heritage System

The terrestrial ecosystem in our region is made up of patches of natural cover in the form of forests, wetlands, meadows, and beach/bluff habitats. Patches vary in size, shape, and degree of connectivity with other patches. Connections include rivers/ravines, hedgerows and other remnants of original cover, although some patches are completely isolated from the rest of the system by surrounding human land use. TRCA staff carry out landscape level geospatial analyses to map and quantify the size/extent, distribution

and degree of connectivity of the terrestrial ecosystem (see Map 1 in section 2.3).

A healthy system provides a wide variety of habitats for a large number of different species having differing needs. It is sufficiently large and connected to allow for the safe movement of individuals and for population and seed dispersal across the landscape. Disturbance and pollution is sufficiently minimized to allow for these species to sustain populations, i.e. to raise healthy young. Since humans are as dependent upon a healthy ecosystem as are all other species, a healthy system is considered an important aspect of our natural heritage. The term "Terrestrial Natural Heritage System" recognizes both this heritage and the importance of maintaining a connected system, rather than just patches of flora and fauna habitat, for health.

1.5 Regional Species of Conservation Concern

Biological surveys carried out over many years have shown that many of the region's native species are present only in the higher quality, or larger natural cover patches, or in the rural parts of the jurisdiction. Others thrive in proximity to humans, some to the extent that their populations increase well beyond natural levels within urban areas. While approximately 1000 native species of vascular plant flora and vertebrate animal fauna can be found within the rural zone of the jurisdiction, this declines to approximately 500 of these species being represented in natural cover located within the urban zone. Moreover, faunal species diversity in the urban zone is reduced to a greater degree than floral diversity.

These observations highlight a need to understand what ecological needs are or are not being met for individual species in different areas and what can be done to achieve a higher level of species biodiversity in the region.

To accomplish this, a method was developed that scores individual species on several ecological criteria. Some examples of the criteria used are:

- 1) Sensitivity to patch isolation: how well the species can use habitat that is fragmented across the landscape (e.g. pileated woodpecker will travel over residential areas and use multiple patches of habitat while a porcupine has a large home range, is vulnerable to road kill and needs habitat that is safely connected);
- 2) Area-sensitivity: some species require a large area of habitat in order to be present at all (e.g. eastern meadowlarks will breed in smaller meadows than bobolinks will but require larger meadows than savannah sparrows);
- 3) Habitat Dependence: the kind of habitat they need and how specific their habitat needs are, combined with the availability of such habitat in the region (e.g. wood frogs breed in wetlands and spend summer and winter in upland forest, ruffed grouse require fallen logs as drumming platforms,

Virginia rails require only wetlands, and green frogs require wetlands which will not freeze to the bottom over winter; narrow-leaved spring beauty requires rich deciduous forest, while zig-zag goldenrod can grow in a variety of forest types).

- 4) **Sensitivity to Development:** the species' sensitivity to human activity related disturbance or pollution (e.g. ruffed grouse, which are large ground-nesters, breed successfully only away from cities while eastern meadowlarks, smaller ground-nesters, are often able to nest in hydro corridors).

Using the total score for each species, a **local level of conservation concern rank (L rank)** is determined, which represents that species degree of vulnerability to being lost from the regional ecosystem, relative to other species. The L ranks run from L1 to L5, with L1 assigned to species with the highest vulnerability. They are the highest priority for conservation focus. Species ranked in the top three levels, L1 to L3, are the **Regional Species of Conservation Concern**. L4 species are considered species of concern in the urban envelope while L5 species are judged to be not of concern regionally. The scoring is revisited over time as the overall ecosystem and its habitats change, and as new information becomes available with respect to the status and/or life history needs of individual species. A rank of L+ denotes a species that is non-native in origin, having been introduced to our region through human activity, while LX is applied to a historically native species that is no longer found here, i.e. one that has been extirpated from our region.

While the scoring method is not based on rarity alone, the more sensitive species, particularly those in the L1 to L2 range of conservation concern are in fact quite rare, and/or limited in their distribution, within the region. If identified conservation actions are not implemented in time, these species are very likely to be lost.

1.6 The TRCA Terrestrial Natural Heritage System Strategy

The TRCA has developed and approved a strategy that has as its goal the achievement of a connected terrestrial natural heritage system encompassing at least 30% of the overall land base in the region, a target arrived at through an extensive ecological analysis. This size is believed to be the minimum which can support a sustainable level of biodiversity over the long term (TRCA, 2007). Considerable work has been done to evaluate how to protect the highest quality and quantity of remaining ecosystem natural cover, and to identify where there is potential for restoration to achieve the goal. Analysis shows that it is still feasible to achieve this average target for the region as a whole, although the most urbanized areas have limited opportunities for natural system growth. The implementation phase of the Terrestrial Natural Heritage System Strategy has begun as TRCA works in partnership with regional municipalities to refine where and how the system can be achieved. More detail on the strategy development and

implementation can be found in the strategy document, which is available for download at: <https://trca.ca/conservation/greenspace-management/terrestrial-natural-heritage/>

1.7 Terrestrial Ecosystem Monitoring

Terrestrial ecosystem monitoring is comprised of several components, all of which are elements of the TRCA's overall Regional Watershed Monitoring Program. Analysis of the complementary data sets provides an understanding of the system as a whole, the species and communities represented within it, the general state/condition, and how it is changing over time. Key terrestrial components include:

1. Landscape level analysis of the regional system:

- determines the extent and location of forests, wetlands, meadows, beaches and bluffs
- method employs interpretation of aerial photography and analysis using a geographic information system (GIS).

2. Staff biological inventories:

- of selected areas of natural cover each year
- goal is to cover the entire system over a 10 to 15 year period
- data is recorded on Ecological Land Classification of vegetation communities, floral Species of Conservation Concern, breeding frog, toad, and bird Species of Conservation Concern, as well as incidental observations of other fauna.

3. Volunteer data collection at 10-hectare fixed sites:

- for presence of a set of native indicator species as well as severity of invasion by eight high-priority invasive plants
- collection of data during ten visits per year, every year to the same 10 hectare sites
- measure of ecosystem condition - allows for general comparisons to be made between different spatial components of the system, such as land-use zones or watersheds, and supports the investigation of change in condition over time

4. Forest, wetland and meadow fixed plot monitoring by staff (new 2008):

- collect detailed data for multiple species groups (e.g. forest tree health, species abundance for selected species)
- recurring data collection at regular intervals to record change over time
- expected to provide information related to climate change impact at the regional scale

1.8 Watershed Reporting

The TRCA's jurisdiction is made up of nine watersheds (the Etobicoke, Mimico, Humber,

Don, Highland, Rouge, Petticoat, Duffins and Carruthers watersheds), extending from the crest of the Oak Ridges Moraine south to the Lake Ontario waterfront.

The TRCA conducts much of its watershed planning with municipal partners, community groups and residents of the watersheds through individual watershed management plans. The themes are varied and include water quality and quantity management, aquatic ecosystems, terrestrial ecosystems, and public recreation. The watershed groups report regularly on the health of individual watersheds, on trends in land use, and on the progress of community action, through the development of individual watershed reports. These groups include the Don Watershed Regeneration Council, Humber Watershed Alliance, Etobicoke/Mimico Watersheds Coalition Task Force and the Duffins/Carruthers Watersheds Task Force.

Your observations and the reports produced from them are used by these watershed groups as they prepare watershed plans.

1.9 Development Review

TRCA also works in cooperation with municipalities with respect to environmental review for planned development. Data and reports from all of our monitoring work inform this process.

2. TERRESTRIAL VOLUNTEER MONITORING PROGRAM (TVMP) SCOPE

2.1 Site Selection and Land Ownership

There are 56 ten hectare (approximately 25 acres) "fixed sites" distributed throughout the TRCA jurisdiction (See Map 1). As samples of the regional natural cover, each site includes multiple general habitat types as well as the transition zones or "edge" habitat between them. Where possible, site boundaries were established to include forest, wetland and meadow habitat. Where that was not possible, a priority was placed on forest, followed by wetland.

In order to support reporting on the ecosystem across the region as a whole, no preference was placed on either public or private lands; therefore some of the sites are located partly or entirely on private property. A long-term relationship between the TRCA, volunteers and landowners supports continued monitoring on private lands. As a TRCA volunteer you are required to respect landowner wishes in accordance with the agreement that TRCA has entered into with each landowner. This may include contacting landowners prior to each visit, parking in specified areas etc. If your site is located on one or more properties owned by private individuals, or public bodies other than TRCA, this kit will include landowner instructions and contact information specific to the site, as appropriate. Any special instructions will be discussed during your site

assignment and orientation meeting with the TVMP Coordinator.

2.2 Volunteer Expectations

This program provides an opportunity to learn how to recognize species and learn about where they live, a fun incentive to spend some time outdoors throughout the year, a network for meeting interesting people with similar interests to yours, and an insight into how species respond to different environments. Contributing valuable scientific data and seeing its value reflected in the reports produced from the program is a satisfying experience.

We recognize that for some of our volunteers, participation is part of their career building path, complementing their education, and/or adding Canadian experience. Subject to reliable and long term participation in the program, the coordinator is able to provide an employment reference as appropriate. Since the program includes a strong field data collection component, a high degree of individual responsibility for the volunteer, and long term participation, it is valuable in building and demonstrating both field competency and performance reliability.

One volunteer kit, including a manual with field guide, maps, fauna call files on a CD/DVD and a dashboard sign, is assigned per fixed site. One person is designated as the primary volunteer responsible for this kit, for attending training, leading the survey, recording & entering data for the site online, and communicating with the Coordinator.

As the primary volunteer, you are required to work with one adult companion, for safety reasons, but should not take any additional people. No pets should ever be taken along during surveys. Doing so would impact the observation results, since most fauna species would hide from a perceived threat/predator, making it impossible for the human observer to establish their presence on the site. In addition, the focus during each visit needs to be searching for and identifying the indicator species. Unnecessary distractions should be avoided.

The primary volunteer is asked to be a long-term observer of the site. We request that you commit to a minimum of three years. Although it is important for you to recruit one reliable field assistant who will be able to go with you on a regular basis, when needed according to the protocol schedule, it is acceptable to use a different partner if needed. **Seasonal training is required for primary volunteers and optional for field partners.** Participants are encouraged to attend the training every year in order to refresh identification skills, receive program updates and network with others.

As participants of this monitoring program, you are recording the presence and absence of species throughout the natural system. By relating your findings to the kinds of land uses and habitats found there, we can assist decision-makers in understanding how their land use planning affects regional ecosystem health.

The level of effort required in a given year is estimated at:

- 4 evenings of training (one per season);
- 17 hours of on-site surveying (spread over the four seasons);
- 1 to 2 hours of online data entry (i.e. 5-10 minutes following each visit); and
- variable travel time

The 17 survey hours are spent hiking and looking for the indicator species, and checking off species characteristics on field data sheets, as well as recording the presence and severity of invasion by invasive plant indicators and some mapping of trails.

Fauna surveys tend to be at early or late hours, including five surveys at or just after sundown each year. This includes one for owls in March (after 7 pm), two in April for frogs and American woodcock (after 9 pm), and two in June for frogs (after 9:30 pm). These are great times to be out in the woods, wetlands and meadows, simply because it takes us out of our well-known human patterns of behaviour and draws us into the world of fascinating creatures. For evening surveys we provide extra safety tips to ensure that you get the most enjoyment out of your experience.

2.3 Fixed Site Versus Region

Understanding the scale at which we are working is very important to the success of the monitoring program. Fixed sites are 10 hectares in size, with each considered a sample of a much bigger area around it, so that the full set of sites represents the region as a whole. For your work on the fixed sites to be used to its full potential you must restrict your activities to “making observations”, and neither impacting nor improving the health of the fixed site, so as not to bias the results.

It is also valuable to record comments on your data sheet regarding changes you observe on or near the site over time. Some examples might include tree removal or planting, a new trail, road or road paving, road kills, construction or other development, increases or decreases in visitors or pets observed on the site, and changes in type of use, dumping etc. This information may help in interpreting changes in the species found on the site.

2.4 Species Selection

Twenty-five animals, 19 plants and 6 lichens have been selected as indicators of the condition of the natural systems in our region, to assist us in testing the findings of the biological inventory and landscape modelling work. In order to provide useful information about the ecosystem as a whole, the indicators include representatives of various taxonomic groups (e.g. amphibians, birds, mammals, trees). They also includes species representing diverse habitats (forest, wetland, meadow, riparian), feeding types (e.g. photosynthesizers, herbivores, carnivores), and life history strategies (e.g. breeding birds that migrate south for the winter as well as birds that are year-round residents, dependent on sufficient resources to survive the winter). Each species was selected

based on the information that its presence provides (Table 2), with the indicator species set designed to be sufficiently large and diverse to provide the ability to investigate and draw conclusions about ecosystem condition using species' utilization of sites.

Some of these flora and fauna indicator species are found in limited numbers in the TRCA jurisdiction (e.g. bullfrog, white oak, winterberry), some have generally disappeared from the urban areas but are still found in fair numbers in the rural areas (e.g. Michigan lily, scarlet tanager, spring peeper), and others are found throughout our region, even within urban areas (Joe-pye weed, American toad, riverbank wild rye). Twenty of the indicators are (L1 to L3 ranked) Regional Species of Conservation Concern.

Lichens obtain nutrients and moisture by absorption directly from the air and the surface to which they are attached. The lichen indicators have differing light level requirements as well as tolerance/sensitivity to various types of air pollution (e.g. sulphur dioxide contained in vehicle exhaust, nitrates from fertilizer). They were initially included to investigate whether they might provide valuable data with respect to air pollution. However, with the determination that their presence/absence depended upon too many variables to support interpretation in a pollution context, they have remained as representatives of diversity.

Following are two tables; the first summarizes the current scores and ranks for the species included as indicators, while the second offers information on what the presence of each indicates, as well as factors that should be considered when interpreting its absence from habitat that might be expected to support it. As you observe your site over time, you will gain an appreciation for the habitat characteristics it contains, aspects of natural habitat that may be missing, and how it interacts with its surroundings (or is impacted by them). The reference tables will be helpful in understanding how all of the site characteristics affect the likelihood of observing each of the indicator species, and some of the reasons why various species have become Regional Species of Conservation Concern.

Table 1: Native Indicator Species Scoring and Ranking

Flora Scores & Ranks 2012

Common Name	Scientific name	Local Occurrence	Pop. National	Sens. to Development	Habitat Dependence	Total Score	L rank
Barber-pole bulrush	<i>Scirpus microcarpus</i>	1	2	4	3	10	L5
Christmas fern	<i>Polystichum</i>	1	3	5	4	13	L4
Eastern hemlock	<i>Tsuga canadensis</i>	1	4	3	5	13	L4
Foam-flower	<i>Tiarella cordifolia</i>	1	3	3	4	11	L4
Jack-in-the-pulpit	<i>Arisaema triphyllum</i>	1	3	2	3	9	L5
Marsh marigold	<i>Caltha palustris</i>	2	4	3	4	13	L4
Michigan lily	<i>Lilium michiganense</i>	1	4	3	5	13	L4
Narrow-leaved spring	<i>Claytonia virginica</i>	2	4	4	5	15	L3
Riverbank wild rye	<i>Elymus riparius</i>	2	2	4	4	12	L4
Spotted Joe-Pye weed	<i>Eupatorium m. maculatum</i>	2	2	3	3	10	L5
Star-flower	<i>Trientalis borealis ssp.</i>	1	4	4	5	14	L3
Swamp milkweed	<i>Asclepias i. incarnata</i>	2	3	4	4	13	L4
Turtlehead	<i>Chelone glabra</i>	2	3	4	5	14	L3
White cedar	<i>Thuja occidentalis</i>	1	4	1	5	11	L4
White oak	<i>Quercus alba</i>	2	5	4	5	16	L3
White pine	<i>Pinus strobus</i>	1	4	3	4	12	L4
White trillium	<i>Trillium grandiflorum</i>	1	3	4	5	13	L4
Winterberry	<i>Ilex verticillata</i>	2	4	4	5	15	L3
Zig-zag goldenrod	<i>Solidago flexicaulis</i>	2	1	3	2	8	L5

Rank	Interpretation
L1	Very high level of conservation concern throughout TRCA jurisdiction
L2	High level of conservation concern throughout jurisdiction
L3	Species of concern throughout jurisdiction
L4	Species of concern in urban matrix, not of concern in rural/natural matrix
L5	Species not of concern in any matrix
L+	Exotic (not native to the TRCA jurisdiction)

Fauna Scores & Ranks 2013

Common Name	Scientific Name	Code	Local Occ.	Pop. Trend	Pop. Tr. Jur.	Area sens.	Sens. patch is.	Sens. Dev.	Hab. dep.	+	TOTAL SCORE	L Rank
bobolink	<i>Dolichonyx oryzivorus</i>	BOBO	1	4	4	3	1	5	1	1	20	L2
ovenbird	<i>Seiurus aurocapillus</i>	OVEN	1	1	3	4	2	5	4	1	21	L2
ruffed grouse	<i>Bonasa umbellus</i>	RUGR	1	2	3	3	3	5	2	1	20	L2
American woodcock	<i>Scolopax minor</i>	AMWO	0	2	2	3	2	4	2	0	15	L3
eastern meadowlark	<i>Sturnella magna</i>	EAME	0	2	3	3	1	5	1	1	16	L3
pileated woodpecker	<i>Dryocopus pileatus</i>	PIWO	0	2	2	4	1	3	3	0	15	L3
scarlet tanager	<i>Piranga olivacea</i>	SCTA	0	2	2	4	1	4	3	0	16	L3
Virginia rail	<i>Rallus limicola</i>	VIRA	1	2	2	2	3	4	3	0	17	L3
eastern screech-owl	<i>Megascops asio</i>	EASO	0	2	2	1	2	3	3	0	13	L4
eastern wood-pewee	<i>Contopus virens</i>	EAWP	0	4	2	2	1	3	1	0	13	L4
savannah sparrow	<i>Passerculus sandwichensis</i>	SAVS	0	4	2	1	1	4	1	0	13	L4
swamp sparrow	<i>Melospiza georgiana</i>	SWSP	0	1	2	1	2	5	1	1	13	L4
wood duck	<i>Aix sponsa</i>	WODU	0	2	1	3	2	4	2	0	14	L4
green heron	<i>Butorides virescens</i>	GRHE	0	3	2	2	1	4	2	0	14	L4
bullfrog	<i>Lithobates catesbeiana</i>	BUFR	3	3	1	2	4	5	2	1	21	L2
grey treefrog	<i>Hyla versicolor</i>	TGTF	1	3	2	3	4	5	2	1	21	L2
spring peeper	<i>Pseudacris crucifer crucifer</i>	SPPE	1	2	2	3	4	5	3	1	21	L2
western chorus frog	<i>Pseudacris triseriata</i>	MICF	3	3	3	2	4	5	3	1	24	L2
wood frog	<i>Lithobates sylvatica</i>	WOFR	0	2	2	3	4	5	3	1	20	L2
northern leopard frog	<i>Lithobates pipiens</i>	LEFR	0	3	2	1	4	5	2	1	18	L3
American toad	<i>Anaxyrus americanus</i>	AMTO	0	3	2	1	4	4	0	0	14	L4
green frog	<i>Lithobates clamitans</i>	GRFR	0	2	2	1	3	4	1	0	13	L4
porcupine	<i>Erethizon dorsatum</i>	PORC	3	2	2	4	4	3	3	0	21	L2
eastern chipmunk	<i>Tamias striatus</i>	EACH	0	2	2	2	3	3	1	0	13	L4
mink	<i>Mustela vison</i>	MINK	1	2	2	3	3	3	0	0	14	L4

LO = local occurrence

PTn = population trend, continent-wide

PTt = population trend, TRCA

AS = area sensitivity SPI = sensitivity to patch isolation

SD = sensitivity to development

HD = habitat dependence

AP = additional points

Rank	Interpretation
L1	Very high level of conservation concern throughout region
L2	High level of conservation concern throughout jurisdiction
L3	Species of concern throughout jurisdiction
L4	Species of concern in urban zone, not of concern in rural
L5	Species not of concern in any matrix

Table 2: Native Indicator Species: Indications

Species	L rank	Presence indicates:	Absence may indicate one of more of:
Mammals			
Eastern chipmunk (<i>Tamias striatus</i>)	L4	<ul style="list-style-type: none"> at minimum, 1 ha. deciduous or mixed forest patch connected to other patches by hedgerows or meadow with protective cover available food supply of tree seeds/nuts, berries, mushrooms, invertebrates, eggs & nestling birds etc. leaf litter & fallen logs etc. intact, soil type & moisture content appropriate for burrowing available food supply for predators such as weasels, hawks, owls, foxes, coyotes, snakes 	<ul style="list-style-type: none"> forest fragments too small or isolated tree seed/nut production insufficient for food requirements ground layer cleared or insufficient to provide cover from predators predation by free roaming pets or natural predators where supply of available prey is reduced by ecosystem stresses invasive species dense in ground layer high competition from grey squirrels too many trails/high trail usage/off-trail human activity high
Mink (<i>Mustela vison</i>)	L4	<ul style="list-style-type: none"> vegetated riparian habitat zone 1+ km in length to provide cover and terrestrial prey species water quality high enough to support aquatic prey species undisturbed riparian areas for denning 	<ul style="list-style-type: none"> riparian zone insufficiently protected/buffered from development riparian vegetation cleared contaminated water or otherwise degraded stream/wetland habitat lack of sufficient aquatic or terrestrial food (could result from other impacts beyond riparian zone) too much disturbance along stream banks for successful denning
Porcupine (<i>Erethizon dorsatum</i>)	L2	<ul style="list-style-type: none"> relatively undisturbed contiguous or connected coniferous or mixed forest & meadow/successional patches of size over 100 ha. of which at least 10 ha. is forest road density in habitat area low or wildlife corridors available 	<ul style="list-style-type: none"> forest fragments too small for critical winter habitat contiguous natural cover area too small for summer home range tree species assemblages within forest insufficient for food requirements road kill rate too high human/pet impact within forest too high dense cover by invasives such as dog-strangling vine

Amphibians		Note: Frogs & toads are an important food supply for wetland birds and other fauna. If missing, other species and/or groups will be reduced or missing as well. There is also a global concern with respect to increases in viral and fungal diseases of amphibians. Where populations are already stressed, such diseases will have greater impacts on populations. Movement from pond to pond and mass breeding activity facilitate the spread of such diseases.	
Species	L rank	Presence indicates:	Absence may indicate one of more of:
Wood frog (<i>Lithobates sylvatica</i>)	L2	<ul style="list-style-type: none"> deciduous or mixed forest with connectivity to wetlands/vernal pools undisturbed forest floor few to no roads between forest & wetland/breeding ponds or wildlife corridor bypasses them uncontaminated water 	<ul style="list-style-type: none"> fishless wetlands/vernal pools missing or dry out too early in season in forested landscape or wetland and forest isolated or separated by barriers such as busy roads. water contaminated by road salt, pesticides or other toxins
Northern spring peeper (<i>Hyla crucifer</i>)	L2	<ul style="list-style-type: none"> at minimum, some area of forest with connectivity to wetlands/vernal pools relatively undisturbed forest floor with litter layer intact breeding wetlands not contaminated 	<ul style="list-style-type: none"> fishless wetlands/vernal pools missing or dry out too early in season forest or wetland missing or separated by barriers such as roads wetland lacking aquatic vegetation water contaminated by road salt, pesticides, other toxins
Western chorus frog (<i>Pseudacris triseriata</i>)	L2	<ul style="list-style-type: none"> at minimum, some area of contiguous fishless wetland with meadow, successional or forest habitat uncontaminated water 	<ul style="list-style-type: none"> fishless wetlands missing or isolated from terrestrial habitat riparian zone cleared of vegetation wetland lacking aquatic vegetation water contaminated by road salt, pesticides or other toxins <p>Note: The very low occurrence of this previously common species in the Toronto region suggests a higher sensitivity to one or more of the above as compared to the other frogs, or the existence of another, so far unidentified, sensitivity or impact.</p>
Northern leopard frog (<i>Lithobates pipiens</i>)	L3	<ul style="list-style-type: none"> at minimum, some area of meadow/successional habitat with connectivity to wetland (home range larger than chorus frog's) low road density over large area or wildlife corridors available uncontaminated water sufficient food supply (primarily insects) available 	<ul style="list-style-type: none"> fishless wetlands missing or isolated from terrestrial habitat, riparian zone cleared of vegetation wetland lacking aquatic vegetation water contaminated by road salt, pesticides or other toxins food supply reduced through other ecosystem impacts hunting/collecting

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American toad (<i>Anaxyrus americanus</i>)	L4	<ul style="list-style-type: none"> • at minimum, some area of meadow/successional/forest/parkland/lawn or garden habitat with connectivity to wetland • uncontaminated water • road density not too high in habitat area 	<ul style="list-style-type: none"> • water contaminated by road salt, pesticides or other toxins • road density/traffic volume or speeds high • pesticides in terrestrial habitat • insufficient food supply (primarily insects) as a result of other impacts
Green frog (<i>Lithobates clamitans</i>)	L4	<ul style="list-style-type: none"> • wetland/pond/lake with aquatic vegetation & riparian cover • permanent water deep enough for overwintering tadpoles • uncontaminated water 	<ul style="list-style-type: none"> • lack of permanent deep water; natural riparian &/or aquatic vegetation cleared; contaminated water • water contaminated by road salt, pesticides or other toxins • hunting/collecting
Bullfrog (<i>Lithobates catesbeiana</i>)	L2	<ul style="list-style-type: none"> • wetland/pond/lake with aquatic vegetation & riparian cover; permanent water deep enough for overwintering tadpoles • sufficient supply of invertebrate and small vertebrate prey • uncontaminated water. 	<ul style="list-style-type: none"> • lack of permanent deep water • natural riparian &/or aquatic vegetation cleared • water contaminated by road salt, pesticides or other toxins • hunting/collecting
Grey treefrog (<i>Hyla versicolor</i>)	L2	<ul style="list-style-type: none"> • thicket/deciduous/mixed swamp or deciduous/mixed forest connected with breeding wetlands • wetlands with emergent vegetation • uncontaminated water 	<ul style="list-style-type: none"> • fishless wetlands missing or isolated from terrestrial habitat • riparian zone cleared of vegetation • wetland lacks aquatic vegetation • water contaminated by road salt, pesticides, other toxins

Birds		Note: Many birds return to the same nesting sites year after year, with their young eventually establishing territories in the immediate vicinity. As habitat is lost within our region, birds returning to affected areas will often be unable to find an unoccupied alternate location to breed.	
Species	L rank	Presence indicates:	Absence may indicate one of more of:
American woodcock (<i>Scolopax minor</i>)	L3	<ul style="list-style-type: none"> • meadow/successional habitat patch close to forest/swamp patch or forest with openings • undisturbed ground (ground nester) • understory & ground layer intact (fallen logs etc.) • sufficient soil invertebrate food supply, especially earthworms 	<ul style="list-style-type: none"> • meadows cleared/developed • human disturbance (flushing) in courting or nesting areas • predation by free roaming pets, especially in nesting areas • increased predation by natural predators where overall supply of prey is reduced
Ruffed grouse (<i>Bonasa umbellus</i>)	L2	<ul style="list-style-type: none"> • deciduous or mixed forest/swamp usually with aspen • understory & ground layer intact, including leaf litter & fallen logs • undisturbed ground (ground nester) • supply of variable foods throughout all seasons (catkins, buds, twigs, seeds, berries, fruit, forbs, insects), especially winter (aspen) 	<ul style="list-style-type: none"> • forest clearing or forestry activities, logs/snag removal • disturbance & flushing by human activities/pets • predation by free roaming pets • hunting
Eastern screech owl (<i>Megascops asio</i>)	L4	<ul style="list-style-type: none"> • mature deciduous forest or swamp or woodland with dead standing trees • existing tree cavities or nest boxes • sufficient supply of variety of prey foods (wide variety of invertebrate & small vertebrate prey to the size of a chipmunk) 	<ul style="list-style-type: none"> • forest clearing or forestry activities, removal of snags • forest that supports great horned owls • depletion of local prey supply
Wood duck (<i>Aix sponsa</i>)	L3	<ul style="list-style-type: none"> • mature deciduous forest close to wetland with aquatic vegetation, or swamp with dead standing trees & intact downfall • existing tree cavities or nest boxes • sufficient supply of fruits, seeds, herbaceous water plants and aquatic invertebrate prey 	<ul style="list-style-type: none"> • forest clearing or forestry activities, removal of snags & fallen logs especially around swamps • wetland removal or separation of forest from wetland • removal of aquatic vegetation • disturbance (flushing) by human or pet activity

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Pileated woodpecker (<i>Dryocopus pileatus</i>)	L3	<ul style="list-style-type: none"> large mature forest area (130 ha. or more), or multiple mature forest patches amounting to high coverage across the landscape intact forest structure, i.e. snags & fallen logs including tall snags (for nest cavity building) sufficient dead wood with carpenter ants & other wood boring insects for food (size of forest area needed depends on availability of food supply) likely presence of other hole-nesting birds, including other woodpeckers and secondary cavity nesters such as wood duck & some owls 	<ul style="list-style-type: none"> forest clearing or forestry activities, removal of snags & fallen logs mature forest missing or patches too small or far apart to provide food supply and nest sites
Eastern wood pewee (<i>Contopus virens</i>)	L4	<ul style="list-style-type: none"> deciduous or mixed forest or woodland with relatively open understory of at least 4 ha. sufficient supply of flying insect food 	<ul style="list-style-type: none"> excessive understory growth of invasives such as species of buckthorn predation by increased populations of grey squirrels in urban environments predation by free roaming cats
Ovenbird (<i>Seiurus aurocapilla</i>)	L3	<ul style="list-style-type: none"> mature deciduous or mixed forest patch greater than 4 ha., most likely over 6 ha. & having interior habitat (more than 100m from edge) intact leaf litter layer with sufficient supply of insect food undisturbed ground layer (ground nester) 	<ul style="list-style-type: none"> forest patches too small or isolated forest ground layer cleared dense understory cover by invasives such as dog-strangling vine predation and disturbance by free roaming pets forest disturbance through heavy trail use or off trail human activity
Scarlet tanager (<i>Piranga olivacea</i>)	L3	<ul style="list-style-type: none"> mature mixed or deciduous forest patch large enough to have some interior habitat (more than 100m from edge) sufficient supply of insect & other foods available, especially lepidopteran larvae (caterpillars) during breeding season, berries/seeds late summer likely presence of other area sensitive forest species 	<ul style="list-style-type: none"> forest patches too small or overall forest cover too low in the landscape high level of nest predation & brood parasitism (i.e. cowbirds) high level of forest disturbance & noise - heavy trail use or off trail human activity reduced insect population through spraying programs for pests
Swamp sparrow (<i>Melospiza georgiana</i>)	L4	<ul style="list-style-type: none"> marsh, thicket swamp, swamp, fen or bog/peatland sufficient food supply, insects during breeding and berries/seeds prior to migration 	<ul style="list-style-type: none"> wetland removal or hydrology changes impacting wetlands chemical pesticides or other contaminants

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Indicator species	L rank	Presence indicates:	Absence may indicate one of more of:
Green heron (<i>Butorides virescens</i>)	L3	<ul style="list-style-type: none"> isolated swamp forest/thicket swamp not disturbed by human activity sufficient supply of food especially amphibians, invertebrates 	<ul style="list-style-type: none"> removal of wetlands, hydrology changes resulting in drying out of wetlands food supply missing through other impacts such as water contamination, especially reduction of amphibians
Virginia rail (<i>Rallus limicola</i>)	L3	<ul style="list-style-type: none"> shallow cattail marsh, meadow marsh or thicket swamp water depth less than 15" in nesting area food supply of aquatic invertebrates & wetland plant seeds 	<ul style="list-style-type: none"> removal of wetlands hydrology changes resulting in drying out of wetlands or flooding during summer nesting period
Bobolink (<i>Dolichonyx oryzivorus</i>)	L3	<ul style="list-style-type: none"> grassland, meadow, pastureland, grain or hayfields larger than 10 ha. undisturbed ground (ground nester) food supply of insects and grass/grain seeds 	<ul style="list-style-type: none"> meadows too small or missing disturbance in meadows - human activity, free roaming pets hayfields mowed before nesting completed
Eastern meadowlark (<i>Sturnella magna</i>)	L4	<ul style="list-style-type: none"> grassland, meadows & pastures larger than 5 ha. undisturbed ground (ground nester) food supply of insects 	<ul style="list-style-type: none"> meadow habitat loss disturbance in meadows - human activity, free roaming pets
Savannah sparrow (<i>Passerculus sandwichensis</i>)	L4	<ul style="list-style-type: none"> meadow, grassland, old fields, early successional habitat food supply of insects & seeds 	<ul style="list-style-type: none"> meadow habitat loss disturbance in meadows - human activity, free roaming pets

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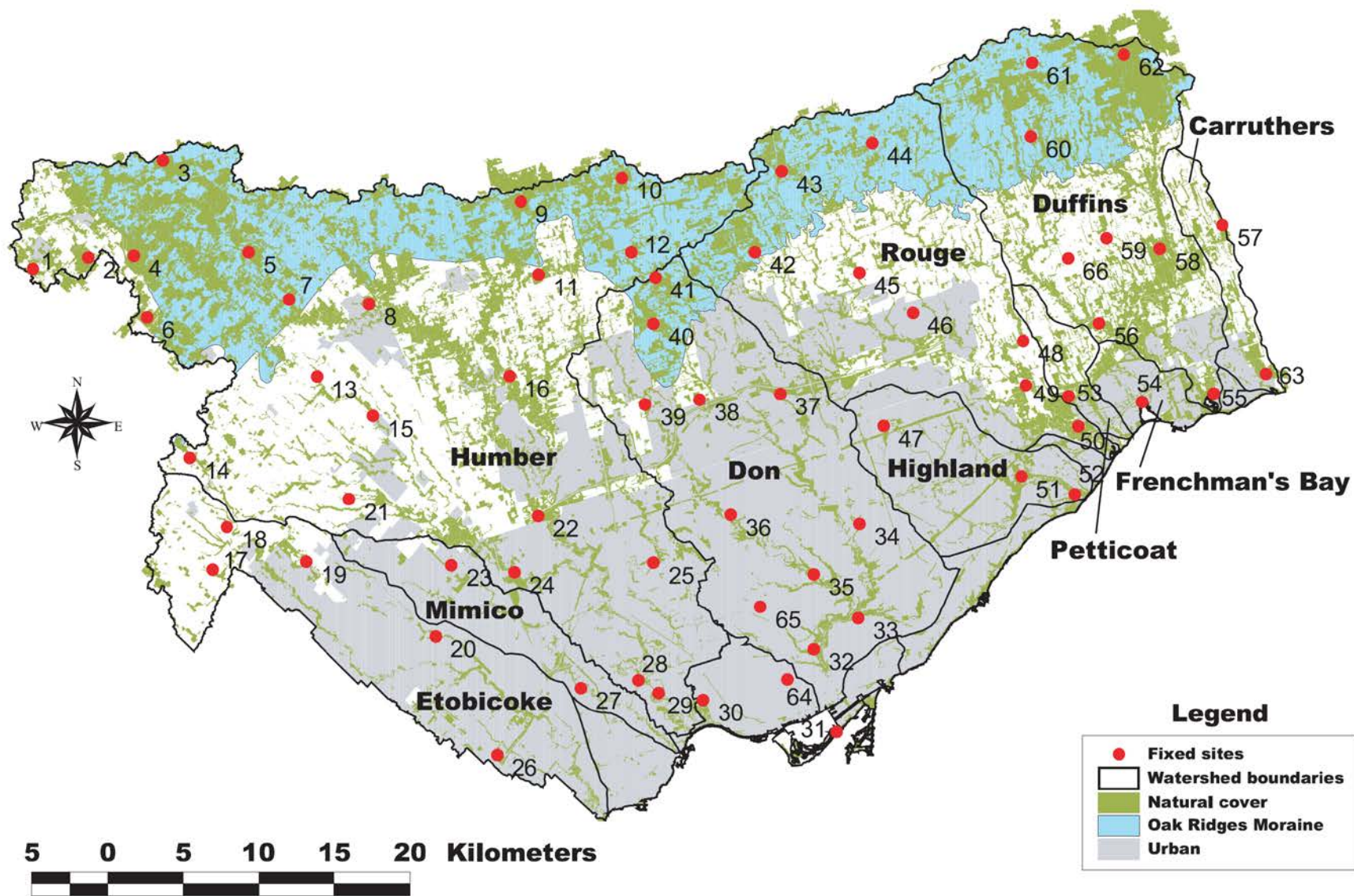
Plants			
Species	L rank	Presence indicates:	Absence may indicate one of more of:
Marsh Marigold (<i>Caltha palustris</i>)	L4	<ul style="list-style-type: none"> swamp, thicket swamp or meadow marsh 	<ul style="list-style-type: none"> competition from invasive species such as purple loosestrife altered hydrology; reduction or elimination of wetland swamps & meadow marshes
Jack-in-the-pulpit (<i>Arisaema triphyllum</i>)	L4	<ul style="list-style-type: none"> moist coniferous or mixed forest or swamp 	<ul style="list-style-type: none"> forest floor disturbance through heavy use invasive species such as garlic mustard, dog-strangling vine
Narrow-leaved Spring Beauty (<i>Claytonia virginica</i>)	L3	<ul style="list-style-type: none"> mature deciduous forest 	<ul style="list-style-type: none"> forest floor disturbance invasives such as garlic mustard, dog-strangling vine
White Trillium (<i>Trillium grandiflorum</i>)	L3	<ul style="list-style-type: none"> upland deciduous/mixed forest 	<ul style="list-style-type: none"> forest floor disturbance invasive species increased herbivory by overpopulation of white-tailed deer
Foam flower (<i>Tiarella cordifolia</i>)	L4	<ul style="list-style-type: none"> moist coniferous or mixed forest or swamp 	<ul style="list-style-type: none"> forest floor disturbance invasive species
Star flower (<i>Trientalis borealis</i> ssp. <i>borealis</i>)	L3	<ul style="list-style-type: none"> mature moist coniferous or mixed forest or swamp 	<ul style="list-style-type: none"> forest floor disturbance invasive species
Michigan Lily (<i>Lilium michiganense</i>)	L3	<ul style="list-style-type: none"> moist/wet meadow, floodplain 	<ul style="list-style-type: none"> reduction/clearing of vegetation along streams collection/picking introduced Asian lily beetle
Turtlehead (<i>Chelone glabra</i>)	L3	<ul style="list-style-type: none"> wetland, meadow marsh, floodplain 	<ul style="list-style-type: none"> reduction/clearing of vegetation along streams invasive species such as <i>Phragmites</i> sp.

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Indicator species	L rank	Presence indicates:	Absence may indicate one of more of:
Swamp Milkweed (<i>Asclepias incarnata</i> <i>ssp. incarnata</i>)	L4	<ul style="list-style-type: none"> • thicket swamp, meadow marsh, floodplain 	<ul style="list-style-type: none"> • removal of wetland, hydrology changes • reduction/clearing of vegetation along streams • invasive species
Spotted Joe-pye Weed (<i>Eupatorium maculatum</i> <i>ssp. maculatum</i>)	L5	<ul style="list-style-type: none"> • thicket swamp, meadow marsh, floodplain 	<ul style="list-style-type: none"> • removal of wetland, hydrology changes • reduction/clearing of vegetation along streams
Barber-pole bulrush (<i>Scirpus microcarpus</i>)	L4	<ul style="list-style-type: none"> • riparian sandbar, shallow marsh, meadow marsh 	<ul style="list-style-type: none"> • removal of wetland • reduction/clearing of vegetation along streams • increased herbivory - e.g. white-tailed deer, Canada geese
White Oak (<i>Quercus alba</i>)	L3	<ul style="list-style-type: none"> • dry forest, savannah, woodland 	<ul style="list-style-type: none"> • elimination of natural fires in landscape • invasive species • increased herbivory by high grey squirrel population
Riverbank Wild Rye (<i>Elymus riparius</i>)	L4	<ul style="list-style-type: none"> • floodplain 	<ul style="list-style-type: none"> • hydrology - reduction of natural flooding • removal of riparian vegetation
Zig-zag Goldenrod (<i>Solidago flexicaulis</i>)	L5	<ul style="list-style-type: none"> • forest openings/trails 	<ul style="list-style-type: none"> • trampling off trails
Christmas fern (<i>Polystichum acrostichoides</i>)	L3	<ul style="list-style-type: none"> • moist forest 	<ul style="list-style-type: none"> • heavy trail/off trail use - trampling • invasive species such as garlic mustard
Winterberry (<i>Ilex verticillata</i>)	L3	<ul style="list-style-type: none"> • thicket swamp, deciduous swamp, bog 	<ul style="list-style-type: none"> • wetland removal or high silt loading • hydrology changes • contamination of water
Eastern hemlock (<i>Tsuga canadensis</i>)	L4	<ul style="list-style-type: none"> • moist coniferous, mixed forest or swamp 	<ul style="list-style-type: none"> • changes in hydrology and surface water (drying out, sediment loading) • surface contamination • increased herbivory
White pine (<i>Pinus strobus</i>)	L4	<ul style="list-style-type: none"> • upland coniferous, mixed forest or plantation 	<ul style="list-style-type: none"> • historical logging eliminated most of population • continuing forestry • surface contamination • invasive species
White cedar (<i>Thuja occidentalis</i>)	L4	<ul style="list-style-type: none"> • coniferous forest or swamp, often included in restoration plantings 	<ul style="list-style-type: none"> • surface contamination • hydrology changes • invasive species

Lichens		Note: Lichens obtain their moisture and nutrients from the air and the surface on which they attach. As a group they are susceptible to high levels of air pollutants and to drying out.	
Indicator species	L rank	Presence indicates:	Absence may indicate one of more of:
Candleflame (<i>Candelaria concolor</i>)	NA	<ul style="list-style-type: none"> • hardwood trees, dead trees and wood posts in open areas • high level of nutrients in air or substrate • near roads & agricultural fields 	<ul style="list-style-type: none"> • removal of snags • heavy traffic related and industrial air pollution • dry or low light (shaded) conditions
Mealy rosette (<i>Physcia millegrana</i>)	NA	<ul style="list-style-type: none"> • hardwood trees, dead trees and wood posts in open areas • high level of nutrients in air or substrate • near roads & agricultural fields 	<ul style="list-style-type: none"> • removal of snags • heavy traffic related and industrial air pollution • dry conditions
Common greenshield (<i>Flavoparmelia caperata</i>)	NA	<ul style="list-style-type: none"> • moist deciduous forests, swamps, thicket swamps • clean air 	<ul style="list-style-type: none"> • removal of snags • roads too close • traffic related and other air pollution • dry conditions
Hammered shield (<i>Parmelia sulcata</i>)	NA	<ul style="list-style-type: none"> • moist deciduous forests, swamps, thicket swamps, open areas 	<ul style="list-style-type: none"> • removal of snags • heavy traffic related and industrial air pollution • dry conditions
Hooded sunburst (<i>Xanthoria fallax</i>)	NA	<ul style="list-style-type: none"> • hardwood trees, dead trees and wood posts in open areas • high level of nutrients in air or substrate • near roads & agricultural fields 	<ul style="list-style-type: none"> • removal of snags • heavy traffic related and industrial air pollution • dry or low light conditions
Rough speckled shield (<i>Punctelia rudecta</i>)	NA	<ul style="list-style-type: none"> • moist deciduous forests, swamps, thicket swamps • clean air 	<ul style="list-style-type: none"> • removal of snags • roads too close • traffic related and other air pollution • dry conditions

Map 1 Terrestrial Volunteer Monitoring Fixed Sites



3. YOUR LINKS

3.1 Training, Field Trips

There is one training session for each season, for a total of four throughout the year. They usually occur in March (Spring), May (Summer), September (Fall) and late November/early December (Winter). Volunteers attend these sessions in order to familiarize themselves with the survey protocol as well as to learn how to find, and successfully identify, the indicator species. Attendance at training is required prior to doing your first survey for that season. If training is missed, you will need to have a trained volunteer accompany you in order to complete it.

To complement these sessions, field trips will be planned occasionally for volunteers to have the opportunity to hear the calls of amphibians, learn where to find certain flora species, hear the song of some songbirds, or gain other field knowledge/ experience. If you have suggestions on field trip subjects that interest you or species you would like the opportunity to observe in the field, please inform the coordinator.

Occasionally other events occur, such as an appreciation event for volunteers or special presentations of reports resulting from the program or other projects/information of interest.

3.2 Submitting Data

It is critical that you submit your data online as soon as you have completed each survey. This way details and comments will be fresh in your mind, and the coordinator will be able to immediately view the data. Data are submitted online at:

www.trcavolunteerdata.ca

The home page contains links to training presentations and reports, which are public documents. However the site requires that you log in prior to submitting data. This involves entering three pieces of information as follows:

1. User name: in the form 834XX, where XX is your site #.
2. Password: initially your 10 digit home telephone # with no dashes or spaces. Contact the coordinator to make a change.
3. Site number: Enter or select your site number from the drop-down list.

The online system permits you to enter data, but not to change or delete it once submitted. Should you make a mistake, please advise the coordinator who can make the necessary change(s).

3.3 Reviewing Your Site's Data Online

By following the “[data summary](#)” link, you can review all data entered for your site. Use this function to periodically confirm that you have entered data for all the visits you have completed. You may also be interested in seeing what species previous volunteers have observed on the site, but be careful not to allow previous observations to bias your expectations as to what you will or will not observe. Conditions and species assemblages on sites change from year to year, and objectivity is critical to good science.

The data quality control process includes spot checking some paper data sheets to the online data. For this reason data sheets are also e-mailed or mailed to the coordinator, or they may be handed in at the next training session.

3.4 Staff Contact and Other resources

The volunteer coordinator provides the orientation and training and is available to answer questions or provide help as needed. This person is your main contact with TRCA. Should you have questions or concerns unrelated to this program, feel free to contact the coordinator who will direct you to the information, provide answers, contact other staff as necessary and/or put you in touch with other appropriate contact(s).

In addition to the program website, the main TRCA website www.trca.ca is also a good resource. The monitoring section of the site at <https://trca.ca/conservation/environmental-monitoring/> is particularly relevant, containing information on all of the current monitoring programs, highlights of recent findings and links to published reports and other resources.

3.5 Data and Reports

As data are analyzed and reported on for the overall program, current volunteers and past volunteers who have chosen to remain on the volunteer alumni e-mail list are informed. Presentation of results and interpretation is included in training meetings or special presentation events with an opportunity provided to get clarification if desired.

Following is a list of Terrestrial Monitoring Program publications (in reverse date order). All are available for download via the links:

Terrestrial biodiversity in the Toronto region 2003 - 2012: a decade of monitoring under the TVMP. December 2013. <http://www.trca.on.ca/dotAsset/182332.pdf>

Severity of invasion by invasive plant indicators at Terrestrial Volunteer Monitoring Program sites 2009 - 2011. July 2012. <http://www.trca.on.ca/dotAsset/143824.pdf>

TRCA Terrestrial Volunteer Monitoring Program: Monitoring Results 2002 - 2007. June 2008. www.trca.on.ca/TerrestrialNaturalHeritage

TRCA Terrestrial Volunteer Monitoring Program: Progress Report. December, 2006.

4. SITE INFORMATION

4.1 Site Locator Map

This map provided in this manual shows the general site location, including roads, watercourses, and access points for each fixed site.

4.2 Landowner Instructions and Contact Log

A landowner contact log form is provided in this manual for sites under private ownership, along with instructions on access/parking, type of landowner contact required (if any) and any special instructions specific to the individual site. The coordinator reviews this information with the new volunteer during the site assignment and orientation meeting.

4.3 Site Aerial Photographic Map

This map provides an aerial photographic view of each fixed site. It will help you navigate through the site and recognize where the site boundaries are. New maps will be provided as the photography is updated.

4.4 Vegetation Community Map

This coded map provides further information for the volunteer observer. It shows vegetation community type boundaries and names the types of forest, wetland and meadow found. It is produced following an Ontario Ministry of Natural Resources protocol called the *Ecological Land Classification System for Southern Ontario*. It will be particularly helpful when the training has indicated that you should look for a particular species in a particular habitat type (e.g. moist deciduous forest, thicket swamp, cattail marsh).

The vegetation community map will also be useful in navigating around your site, particularly as you become more familiar with tree species and can identify which species of tree or trees are most abundant in the immediate area around you. Matching this up with the appropriate coded area on the map will help you pin down your location on the site. Observing how the vegetation changes as you move about and comparing that to your map will be interesting and informative. What appears initially as a jumble of trees or "forest", for example, may be seen more clearly over time as a series of distinguishable forest communities that grade into each other.

5. BASIC FIELD PROTOCOL

5.1 Seasonal Schedule

Indicator species surveys are spread out over four seasons of the year for the following reasons:

- to look for the species at the most opportune time to observe them, or when observation provides the best evidence that the site provides breeding habitat
- to keep the training and learning to a manageable level; and,
- to provide volunteer opportunities throughout the year.

You will be observing most of the indicator species in spring and summer, mapping trails and recording lichens in fall, and looking for animals and/or their tracks, an owl, and selected coniferous trees in winter.

5.2 Mapping/sketching Trails

Formal (gravel, paved, and/or marked) and informal (side paths) trails are sketched by volunteers on an aerial photo in the fall for each fixed site. Once an initial trail map has been completed, subsequent years' fall surveys involve confirming or updating them. These maps are recorded digitally in the TRCA's geographical information system. We use the trail information to get an idea of the degree of human use on fixed sites. Trails facilitate the entry of humans and animal predators into natural areas. Program results for the first ten years of monitoring show that human access to sites is negatively correlated with species richness. This suggests that there are indicator species sensitive to the types of impact that result when people hike trails in natural areas.

The total length of trail will be calculated and monitored over time.

Seasonal Schedule of /Survey visits

Season	Month	Indicator	
		Fauna/Trails	Flora/Lichens
Winter	January or February (one 1½ hr. early morning visit)	<ul style="list-style-type: none"> ▪ porcupine ▪ mink ▪ ruffed grouse 	<ul style="list-style-type: none"> ▪ eastern hemlock ▪ white pine ▪ eastern white cedar
	March (one ½ hr. visit at dusk)	<ul style="list-style-type: none"> ▪ eastern screech-owl 	
Spring	April (two 1 hr. evening visits)	<ul style="list-style-type: none"> ▪ American woodcock ▪ spring peeper ▪ wood frog ▪ western chorus frog ▪ northern leopard frog ▪ American toad 	
	May (one 2 hr. early morning visit)	<ul style="list-style-type: none"> ▪ pileated woodpecker ▪ wood duck 	<ul style="list-style-type: none"> ▪ marsh marigold ▪ white trillium ▪ Jack-in-the-pulpit ▪ narrow-leaved spring beauty ▪ foam flower ▪ star flower
Summer	June (two 2 hr. evening fauna visits)	<ul style="list-style-type: none"> ▪ eastern wood-pewee ▪ ovenbird ▪ scarlet tanager ▪ swamp sparrow ▪ Virginia rail ▪ green heron ▪ bobolink ▪ savannah sparrow ▪ eastern meadowlark ▪ green frog ▪ grey treefrog ▪ bullfrog 	<ul style="list-style-type: none"> ▪ Michigan lily ▪ riverbank wild rye ▪ turtlehead ▪ swamp milkweed ▪ spotted Joe-pye weed ▪ barber-pole bulrush ▪ white oak ▪ common/glossy buckthorn ▪ dog-strangling vine ▪ garlic mustard ▪ common reed ▪ periwinkle ▪ Himalayan balsam ▪ European frogbit
	July & August (one 2 hr. daytime flora visit each month)		
Fall	October (one 3 hr. daytime visit)*	<ul style="list-style-type: none"> ▪ eastern chipmunk ▪ trail mapping* 	<ul style="list-style-type: none"> ▪ Christmas fern ▪ winterberry ▪ zigzag goldenrod ▪ mealy rosette lichen ▪ candleflame lichen ▪ hooded sunburst lichen ▪ rough speckled shield lichen ▪ common greenshield lichen ▪ hammered shield lichen

* trail mapping may be carried out on a separate fall visit, depending on the density of trails to be mapped and volunteer preference. **Exotic invasive indicator are species highlighted bold.**

5.3 Frequency, effort and planning your visits

In order to compare data and report on the health of the region, the level of effort put into collecting data and the frequency of site visits must be standardized. Following is a summary of site visits and time to be spent collecting data for each season. The maximum yearly time spent observing on site is 17 hours (but don't forget preparation and travel time). More detail is included in the seasonal protocols (Sections 7, 8, 9, and 10).

Season	Month	Indicator Species	Frequency	Effort	Total
Winter	Jan/Feb	trees, mink, porcupine, ruffed grouse	1 morning	1.5 hours	2 hours
	March	screech owl	1 evening	30 min.	
Spring	April	frogs, Am. woodcock	2 evenings	2 hours	4 hours
	May	spring wildflowers	1 morning	2 hours	
Summer	June	songbirds, frogs	2 evenings	4 hours	8 hours
	Jul/Aug	native & exotic flora	2 daytime	4 hours	
Fall	Oct.	flora, lichens, chipmunk, trails	1 daytime	3 hours	3 hours

When planning your survey, review the species training and your field guide pages in conjunction with your aerial photo and ELC map. Try to distribute your time so that you can travel the entire site. Aim first for the typical habitats of the species you are seeking, then the less favoured habitats.

You only need to find one individual of the species within the site boundaries to record the species as present. The survey may be completed early if you find every desired species in less than the allotted time for that visit, in which case your survey ends and you record your end time. The fewer indicator species found on a site, the more walking you will need to do and the more likely you will be to use up your allotted time. That's okay, it's not a competition between sites or observers. If you continue your search, let's say out of curiosity, and find an indicator species after your survey time has elapsed, do not adjust your data record, but please enter those findings in the comment section. We stress the importance of having all observers record data in the same way, as this allows us to compare the data from different sites. Similarly, be careful to respect the site boundaries when recording your data. If an indicator species is observed outside the boundaries, do not check its characteristics on your data sheet, but enter it as a comment only.

While the survey visit time periods are designed to cover the most likely period in which plant indicators will be flowering, variability in temperatures year to year should be taken into account when deciding whether to go early or late in the designated month. Most of the selected species bloom for a relatively long time in May, July and August

respectively, so it should not be too difficult to time your visit well.

Spring amphibian species visits will introduce the greatest variability into your schedule, due to the effect of weather. The training will provide you with guidelines for planning your visit around the weather to avoid needing to repeat a visit. The temperature needs to be above a specific minimum for each of the frogs/toad, and wind can interfere with your ability to hear some frogs and certain birds. If weather changes while you're out, or is different at your site than what it was at home, in spite of planning you may need to go back to the site another evening to complete the survey. Do not count the earlier time spent if poor results were obviously weather related. Although nature will always provide mystery, over time you will get a feel for when the conditions are likely to be good for each species. Gaining this experience can be very satisfying and should add to the appeal of looking for these interesting species.

5.4 Equipment

Following is a list of required items that you will need to complete your surveys as well as some suggested items that you may want to bring.

Required equipment:

- clipboard
- species field guide photos with observation characteristics (from this manual)
- data sheet for appropriate visit
- aerial orthophoto map
- vegetation community map
- audio playback device with speakers and fauna calls (March and June only)
- flashlight (evening/night visits)
- writing utensils
- ruler

Suggested equipment:

- binoculars
- small notebook
- additional field guides (e.g. Wildflowers, birds, ...)
- camera
- hand lens or magnifying glass - 5 x magnification (especially in Fall)
- paper bags (for lichen collection)
- small knife (for lichen collection)
- bug spray or bug jacket
- sunscreen (on summer visits)
- compass or GPS unit
- cell phone
- rubber boots or hip waders (on some sites/some visits)
- snowshoes (winter - some sites)

5.5 Data Records

Seasonal fauna and flora photos and identifying characteristics are provided in the field guide. The guide has a primary, a secondary, and in most cases, a tertiary identifying characteristic for each species. These characteristics are reproduced on the data sheet, with check boxes. When a species is observed and identified as the species in question, it is important that each characteristic be individually confirmed, then checked off on the data sheet only if it matches. If a characteristic does not match or you cannot observe it, although you believe it is indeed the correct species, do not check the characteristic that is not observed, and add a comment. Your comment should explain how you know it is the correct identification without the unmatched characteristic. This will help to ensure that the data is accurate and consistent between sites and between years. If, as you attempt to confirm the characteristics, you determine that what you observe is not the species to be recorded, do not check any of the characteristics, even though one (such as leaf shape) may match.

For fauna, the instructions indicate whether you should search for the species by sight or by ear. For example, a pileated woodpecker is easier to identify visually than by its call, while the secretive Virginia rail is better found by its call. Flora are surveyed during their blooming season; however, for some species the flower may not be the primary identifier. For example, the bloom of a foam-flower is not distinctive enough to identify the plant without also observing the hairy, maple-like leaves at ground level.

A fresh data sheet is to be completed each time you survey your site. Request more sheets as needed, and /or pick them up at the training sessions. Please be sure to complete all of the visit-related data in the spaces provided, including your name (observer name), site #, date of the survey, including the month, day, and **year**, the start time and end time of the survey (using the 24 hour clock format), temperature in °C, whether there is any precipitation (rain, snow), and the cloud cover in approximate 10% increments (i.e. 0%, 10%, 20% etc.). The comments section provides the opportunity to add information of interest to us, reminders for yourself (for example where you found a species), and to record species that were seen during a visit other than the protocol visit for them, outside of the site boundaries or beyond the survey time limit.

Digital photos can be very helpful in the case of plant or animal track identifications. It is important to capture all of the primary, secondary and/or tertiary identification characteristics in your photo(s). Sometimes two or three shots will be needed to get them all. Scale is important, particularly when photographing lichens and animal tracks. A ruler with clear markings should be placed in line with the feature to be measured and included in the picture.

If you have taken photos, and would like to share them with the coordinator, please do not e-mail them. Instead e-mail the coordinator that you have photos and s/he will send a link to the site's drop box file. When you save your photos in that file, the coordinator will receive an automatic notification that they are there, will view them and will respond to you directly.

5.6 Impact of the Monitoring Activity

The activities of volunteers must have a minimal impact on the fixed sites. As you travel the site please minimize the amount of trampling of vegetation and disturbance to fauna. Please do not enter private property beyond the mapped 10 hectare site and its access, as per the agreement with landowners. Volunteers, must not "improve" the site by picking up litter or removing invasive plants, for example. We are observers only.

5.7 Using Bird song/call playback

Several bird species are surveyed by calling them out with recordings of their songs or calls. They may be nocturnal, like the eastern screech owl, or hidden, like the Virginia rail (in cattails) and the scarlet tanagers (high in the forest canopy). These species vocalize with unpredictable timing and so can easily be missed on a site. The swamp sparrow, on the other hand, is not shy but is relatively similar to other little brown sparrows that trill. In this case, it is the clear response of this bird to a recording of its species which identifies it as the swamp sparrow. Using playback of recordings, you will be calling out some of the bird species during your surveys.

These birds will respond to what they hear as another male of their species intruding upon their breeding territory. Normally, confrontations occur through song and very few fights develop. But even territory defence by song is stressful to the birds. So once you have succeeded in getting their attention, and are able to confirm the species as the one for which you are surveying, you must stop playing the recording. The bird may remain agitated for a long time after, allowing you to experience its song while also allowing it to settle down eventually.

6. SAFETY

The following must be considered while planning for your site visit, preparing to enter your site, and while in your site.

6.1 General Surveys

1. Please conduct all surveys with your field partner. Should your regular field partner be unavailable you may find your own alternate, or if that is not possible, advise the coordinator. It is possible that another volunteer will be available to accompany you. In any case, surveys are never to be conducted alone. You should also tell someone who is not accompanying you where and when you are doing each survey and when you plan to return. Make sure they know exactly where your site is located.
2. Dress appropriately for the season and time of day. It is better to be prepared for, rather than surprised by, inclement weather. Long pants are needed for protection from vegetation, insects, and ticks even when doing summer surveys. Proper footwear should be worn to stay warm and dry, and to prevent slipping. Since you will need to move around off trails and on uneven and wet ground, running shoes are not sufficient. Hiking boots are strongly recommended.
3. Be alert and aware of your surroundings. Note people, animals, noxious plants (see information for poison ivy and giant hog-weed at the end of this section), trip hazards, leaning trees and wasp nests. Do not survey on very windy days, since trees do fall.
4. Carry water and drink plenty of fluids at all seasons, not only during hot and humid weather.
5. When working around water or ice be alert and keep your distance; don't take chances. Do not walk on ice-covered water bodies during surveys.
6. No field work is to be conducted during thunderstorms. Avoid going on a day when storms are expected. Be aware of weather while surveying so that you can leave the site before the storm arrives, should conditions change. While leaving, do not walk across open fields or take cover under single trees. If you are overtaken by a sudden storm and do not have time to leave, seek low-lying areas away from the tallest trees until the storm passes.
7. It is surprisingly easy to become disoriented while moving through forests, particularly when you are not following a trail. While you may not be "lost" for long, it does distract you from the survey and waste time. An inexpensive compass is highly recommended. Using your aerial photo map, you will be able to determine the best headings to use in search patterns of the site, as well as to return to access points.
8. The dashboard sign is provided to let people know why your car is parked where it is. Using it is optional depending on the site, parking location etc. If parking on

a private landowner's property it should always be used.

9. If you have any concerns regarding safety on your site, including your ability to move around it safely, or any activities by other people that concern you, please advise the coordinator, who will work with you or others to eliminate the concern. It may be possible to change to another site if you find the terrain or another aspect of your assigned site too rigorous. Different sites have differing levels of difficulty.

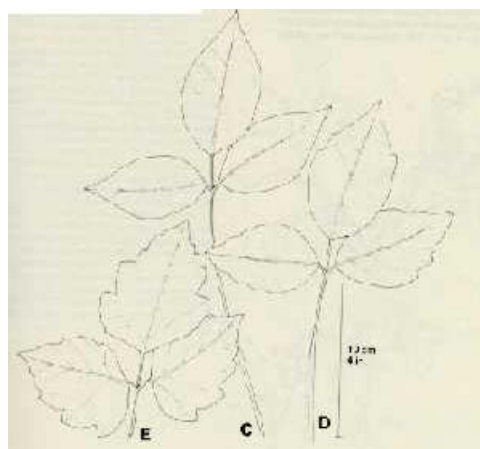
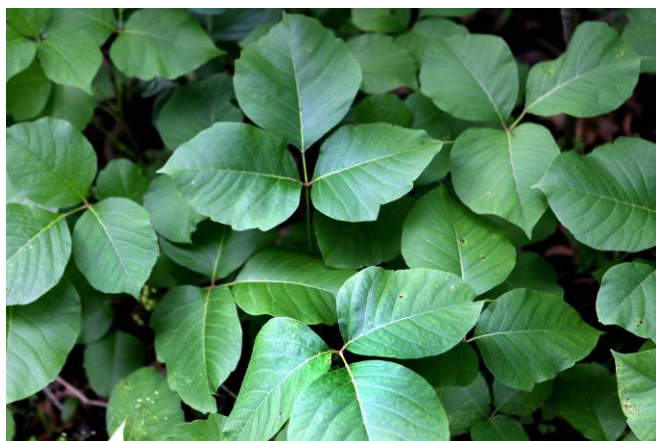
6.2 Additional Safety Notes for Night Surveys

1. You should walk your site during the daylight hours to become familiar with the area before conducting any evening surveys. Note landmarks for navigating as well as areas that could be dangerous when walking through the site in the dark such as downed fences and metal bars, loose sediments and steep slopes. Plan your night travel to avoid them.
2. Park your vehicle in a safe place. Avoid parking on the roadside; if this is unavoidable do not park on bends in the road. On rural roads, park where the vehicle can be placed completely off the travelled part of the road.
3. Avoid walking on the roadside; if this is unavoidable walk on the side opposing traffic; be alert and wear a reflective vest. Vests are provided by TRCA should you need one. Contact the coordinator in this case.
4. Take a light on evening surveys even if you plan to be finished before dark, in case you are delayed. Two small lights are better than one larger one. You don't need a lot of light to safely exit the site, but might need a backup if one light fails. A small keychain light or a mini-light that stays with you on all surveys as a backup is a great idea.
5. A compass is even more valuable at night than during the daytime. It is very easy to become disoriented at night.

6.3 Poison Ivy

Poison ivy (*Rhus radicans*) is a noxious plant to which many people have an allergy. Touching the plant can result in skin blistering and itching in sensitive individuals. A person who does not react to it at first exposure may begin reacting following multiple exposures, so contact with this plant should be avoided by everyone.

Poison ivy is found either in a low growing form that spreads across the ground, or a climbing form. It has leaflets in sets of three, with the centre one on a longer stalk than the other two (see picture below). Leaflet clusters are alternate on the stem, and the plant does not have thorns. The leaflets have a variable edge shape, from smooth to somewhat lobed.



6.4 Giant Hog-weed (*Heracleum mantegazzianum*)

Giant hog-weed is a non-native (exotic) plant that has been found at a few locations within the TRCA jurisdiction. It is a very large flowering perennial that may cause severe skin irritations. Contacting the sap of this plant may increase the sensitivity of some people's skin to sunlight. The resulting dermatitis is more like a burn than a rash and is sometimes referred to as false or artificial sunburn, causing painful, burning blisters. Blisters or blotches are likely to develop when sap comes into contact with moist skin in the presence of sunlight. People who have come in contact with this plant have reported symptoms that continue for months!

Both the leaves and flower heads (see below) are very large, which makes identifying it not very difficult. If seen, please avoid all parts of it, and please advise the coordinator of the location in which it was found.

Note that there are a couple of related, native species that are similar but smaller. You should avoid touching any of these plants.

The woman in the picture below was unaware of the identification of the plant and the health concern when she stood in the picture to provide scale. No-one should do this.



WORKPLACE HAZARD ASSESSMENT

Date of Assessment:	June 1, 2012
Project/Program/Event/Site:	Terrestrial Volunteer Monitoring Program
Project Manager:	Theresa McKenzie
Site Supervisor:	
Program Dates:	Ongoing – long term monitoring program
Location:	56 TVMP fixed sites distributed through the jurisdiction
Contractor/Partners:	Trained volunteers
Type of Work:	Terrestrial biological survey/monitoring

Project Description/Activities/Purpose:
Volunteers visit their assigned site, located in a natural area, 10 times each year. Working in pairs, they hike through the 10 hectare site looking for a set list of plants and animals, recording those they observe.

Identification of Site Specific Hazards and Mitigation of Hazards	
Hazard	Mitigation = avoidance
Working alone	Volunteers must never conduct a site visit without an adult field partner. If a hazard is encountered, or an accident of any kind occurs, there must be another responsible adult present to assist the endangered or injured party. If the usual field partner is not available to do a specific visit, another appropriate adult may be recruited to accompany the primary volunteer. If none is available, the visit must be postponed.
Water	Avoid entering any water bodies or crossing any ice in winter. Sites have been designed to eliminate the need to do so while conducting terrestrial biological surveys. Stay well back from the edges of stream banks to avoid a slip that could result in entering the water inadvertently. Site boundaries drawn on maps/photos often follow the edge of the watercourse. Surveying in these areas is to be done from a safe buffer distance from the edge if stream banks are steep or eroded, or if the watercourse contains water over 6" deep, or if water of any depth is fast moving. Particularly avoid watercourses after a heavy rain, when they may contain a greater volume of water than usual or fast moving water.
Slopes	Avoid navigating steep slopes; travel along the top or bottom to less steep area, using the aerial photo as a guide, and traverse the slope there.
People	If other people are encountered whose demeanour or activity is concerning, avoid interacting with them, leave the site immediately and inform the Coordinator of the specific concern. Note that some sites may have people residing in makeshift housing or tents on them. Our past experience has been that such people avoid us, as they do not wish to be noticed. It is best to give them a wide berth, avoid interaction and advise the coordinator following the visit. If any persons are considered a serious immediate threat to you or your partner, do not hesitate to call 911.
Hunting	If any evidence of hunting activity is observed, leave the site immediately and inform the Coordinator. Do not confront other persons on the site in any way. Such activity is most likely to occur during hunting season, i.e. the

	October visit. Hunting is legally permitted only on site 4, a private property wherein the landowner manages the activity. Site 4 volunteers are required to contact the Property Manager for permission prior to each visit and will be informed of times when they cannot survey due to approved hunting activity. Should they nevertheless encounter hunting while surveying, they are to leave the site and inform both the Property Manager and the Coordinator. Safety vests are available on loan from the coordinator, and are provided to volunteers monitoring rural sites. Volunteers are instructed to wear vests on these sites during fall visits.
Roads	If your site abuts a road, avoid walking along the roadside. Enter the site and walk well in from the road.
Noxious plants	Refer to the volunteer manual for identification information/photos of poison ivy and giant hogweed. Avoid touching either of these noxious plants if encountered. Poison ivy is likely to be present on all sites. Giant hogweed has been observed just outside the boundary of site 11. Volunteers for this site have been advised of the exact location and the potential for it to spread to nearby areas. Other native and exotic plants may have minor (stinging nettle) or more severely noxious properties, or may be poisonous to eat. Avoid contact with unknown plants. Wear long-sleeved shirts, long pants, and hiking boots or rubber boots while surveying.
Insects/Allergies	<p>Most insects are irritants rather than hazards. However, some mosquitoes can carry West Nile Virus and transmit it to humans. Please refer to the West Nile Virus information brochure in the volunteer manual, and consider the application of DEET-containing insect repellent to the clothing and areas of exposed skin during site visits in May, June, July and August.</p> <p>Wasp or bee stings may result in an allergic reaction in some people. In some cases such a reaction can be very serious, even life-threatening. Be aware of your surroundings while surveying. Listen and watch as you walk. If you hear the buzzing of wasps or bees, stop and identify the location of the source before continuing. Avoid disturbing them in any way, and move away. If a bee/wasp does land on exposed skin, it is best to blow on it to encourage it to move on, as this is interpreted by the insect as wind and will not stimulate a sting in response. Do not slap or brush at the insect, as this may stimulate a sting. Be aware that there are some bees/wasps that build nests underground. If you observe a swarm, watch where you step to avoid disturbing a nest and provoking them.</p> <p>If you are aware that you are allergic to anything, advise your field partner of the fact, and what needs to be done if a reaction occurs. If you carry an Epi-pen, make sure that it is current, that you carry it on your person during all site visits, and that your field partner knows where to find it and how to use it in the event of a sudden extreme reaction that disables your ability to employ it yourself.</p>
Ticks	One genus of tick that can be found in our area is known to carry Lyme disease, babesiosis and other diseases that can be transmitted to humans and cause significant illness. Refer to public health website links: http://www.health.gov.on.ca/en/public/publications/disease/lyme.aspx for

	<p>additional information and to learn to identify these black-legged ticks (<i>Ixodes</i> sp.) in both the nymph and adult life stages. While these ticks are currently rare in our area, they are being encountered more frequently over time, and could be present in low density virtually anywhere. Wear long-sleeved shirts, long pants, and hiking boots or rubber boots while surveying. Tuck pants into socks or wear gaiters, to reduce the likelihood of ticks getting under your clothing. Do not sit or lie on the ground in vegetated areas. Following any visit to a natural area, you should first check your clothing and exposed skin for ticks, then change your clothing wash and dry field clothes prior to next use. Conduct a tick-check of all areas of skin, taking particular care to note any small black dot that could be a nymph tick. If found, remove carefully using tweezers. Pull the tick gently but firmly out in the reverse direction of entry, without twisting or squeezing. Viewing the video at link www.youtube.com/watch?v=0wotB38WrRY will be very helpful in understanding how to remove a tick safely. Without touching it directly, place the tick live in a small container with a drop of water and take it with you to your doctor's office or clinic, where you should be assessed by a doctor to determine whether your exposure to the tick was sufficiently long that you should be given antibiotics. If unable to remove the tick safely yourself, visit your doctor/clinic for assistance in doing so.</p> <div data-bbox="506 919 1193 1270"> <p>The diagram consists of two parts, A and B. Part A shows a dark, oval-shaped tick embedded in a cross-section of human skin. The tick's legs are visible on the sides. Part B shows the same tick being pulled out of the skin. A blue arrow points upwards from the tick, indicating the direction of removal. The tick is shown being pulled straight out, without twisting or squeezing.</p> </div>
Fences	<p>Avoid the need to climb fences. The fencing in and around TVM sites is often old, and no longer maintained, or it forms the boundary of your site and should not be crossed. If within the site, find a break or opening through which to travel and take care not to trip on exposed remaining portions of fencing, which may be sharp, contain barbed wire, or be obscured by vegetation at ground level.</p>
Weather/ hyperthermia/ hypothermia	<p>Always check the weather forecast prior to conducting a survey visit. No survey visits are to be conducted during thunderstorms or high winds. In general, avoid inclement weather (rain, snow, very high or very low temperatures). In the event that a sudden thunderstorm or lightening catches you on the site, leave immediately if you can do so without crossing an open area. If you cannot safely leave, then move downhill and remain at the lowest elevation possible until the immediate danger has passed.</p> <p>Always carry water with you and remain hydrated throughout the activity. Hiking through rough terrain will make you thirsty, especially, but not only,</p>

	<p>when the weather is warm. Walking through snow in winter will have a similar effect. Avoid conducting surveys on very hot days, as the level of exertion could result in heat exhaustion or heat stroke. If you do feel yourself overheating, advise your partner, rest, and drink some water. If you are uncomfortably hot, curtail the visit to avoid progressing to heat exhaustion.</p> <p>Always dress for the weather. In cold temperatures, include a hat and gloves/mitts. Dress in layers so that you can adjust according to the level of exertion and changing temperature. If you are becoming uncomfortably cold, or get wet feet on a cold day, curtail the visit to avoid hypothermia.</p>
Hazard trees	<p>Older trees or those with damage, injury, or disease, may be weak and may fall at any time. Be aware of trees that are leaning, creaking, or moving in very little wind and avoid the areas in which they are located. Take note of their height to determine how wide a berth to give them in case they fall. Avoiding visiting the site during high wind is particularly important in this regard, since this is the most likely time for a weak tree to fall.</p>
Dumps/ foreign objects	<p>Many natural areas are adjacent to human residences. They may contain historic, or even current, dumps of household rubbish, old cars, metal bed springs, broken glass or other hazardous materials. Learn where such dumps or areas of foreign objects occur on your site and avoid walking through them. Remember that discarded items may be obscured by vegetation at ground level. Wear hiking or rubber boots. Running shoes do not provide sufficient protection.</p>
Moving in darkness	<p>For evening visits, be sure to take a flashlight/headlight along. It is best to carry two small lights rather than one large one, in case batteries run out or a bulb breaks. While standing still to listen for frogs or owls, turn the light off, then turn it back on and use it while moving.</p>

Relevant Health and Safety Policies:

1. ACCIDENTS - VISITOR / VOLUNTEER
2. HEAT STRESS
3. WORK IN EXTREME COLD
4. GENERAL ROAD SAFETY

PPE Required: None

Certifications Required: None

Emergency Response Plan:

1. In the event of emergency assistance being required, the volunteer should not hesitate to call 911. If the volunteers own cell phones, they should always have them fully charged and carry them with them while conducting surveys. It is important to keep track at all times of exactly where you are located on the site, and to be prepared to provide the street address or major intersection with additional description of the exact site location.
2. Following any emergency, or situation for which medical assistance was solicited, volunteers must contact the coordinator, or failing to connect with the coordinator, one of the two alternate emergency contacts noted on the first page of the volunteer manual to report the incident. This should be done as soon as the incident is handled and the person at risk or injured has professional help. TRCA is required by law to report any incident resulting in an injury to the Ontario Ministry of Labour, and is required to so do within 24 hours.
3. Volunteers are requested to advise the coordinator of any condition on a site, or any situation that is, or could become, a safety concern for themselves or others.

Water Rescue Plan

Notwithstanding the fact that volunteers must not enter water or cross ice, and are to avoid steep stream banks, the edges of fast moving water or other areas where there is a possibility of falling into water of a depth in which drowning could occur, the water rescue plan in the event of a person ending up in the water is as follows:

1. If the partner is able to safely extend a tree branch, or other long object to assist the fallen party in getting out of the water, they should do so. However, if the area is slippery or there is any other reason why it is not safe to do so, they must refrain. In the case of moving water, they may be able to move along the shore in a downstream direction and extend or throw a long or buoyant object (branch, small log) ahead of a person being carried in the current. Calling 911 for assistance is the best approach, if there is any danger in providing other assistance. If a person has been in the water for any length of time, or is exhibiting any evidence of having taken in water while in it, 911 should be called even if they manage to exit the water with or without assistance.
2. If a person who has been in the water is not breathing or is having difficulty breathing when removed or exited from the water, 911 should be called, they should be placed on their side in a position such that any fluid in the mouth can drain out freely. If not breathing, they should be first quickly placed in this position, the mouth checked for foreign objects, or the tongue blocking the airway, any obstructions removed, then rolled to their back. Once in this position, the head should be tilted back and mouth to mouth resuscitation initiated, and continued until assistance arrives. Ideally, all persons should be trained in first aid including resuscitation and CPR. If you are not, consider the value of obtaining this training.

7. WINTER SURVEY

7.1 Winter Protocol

January to February

One **early** morning (before 9 am.), 1.5 hours.

Early morning is best for looking for many animals. Some are wholly or primarily nocturnal and need to be observed early while they are still active. All fauna are easier to observe when there are not other people, dogs etc. around. Look for mink and mink tracks along stream sides, lake shores, ponds and wetlands as they do not stray far from water. If you find a dead porcupine or mink on your site, please record them in the same way you would if they were alive. Follow tracks of grouse, especially if they are fresh, and they could lead you to a roosting place and a direct observation. The wing whirr is much louder and more explosive than that of other brown birds of comparable size, and grouse often fly off from the ground. Of the three fauna indicator species, the least sensitive to human presence and urbanization is the mink although they are sensitive to water pollution. Still, none of them are likely to be very easy to find.

March

One evening at or just after dusk, 30 minutes.

After supper, head out to your site. Investigate habitat where there is tree cover (forest is best), especially if there are older trees with cavities for a screech owl. They tend to like forests near water. Take your time in playing the song for them, and wait for 2-3 minutes after each try before moving on. Also keep your body movement and voice to a minimum. Be patient, as the owl, or even both members of a pair, may be watching you before they decide to respond to what they think is another owl in their territory. Then again, they may respond within seconds! Once the owl calls back, do not play the call any more, but remain still as the owl(s) may fly in very close to get a look at you, giving you the opportunity for a visual observation. It's a great experience to hear them and wonderful time to be out even if you do not. They are not exceedingly rare and may be observed on sites within the urban zone where appropriate habitat is found.

Winter Survey Summary

NOT TO BE USED FOR RECORDING DATA

- digital orthophoto map
- vegetation community map
- audio player for visit #3
- binoculars (optional)
- field guide photo sheets for winter
- data sheet(s)
- flashlight (for evening surveys)
- writing utensils
- ruler
- hand lens (for flora surveys)
- small notebook
- clipboard - leave binder behind and only bring pages required for visit

Please enter your data online as soon as the visit is done, and return data sheets when you have completed all your surveys for the season.

It is important for data analysis that we receive your survey results promptly. Thank you.

Species by visit * please read protocol and conduct survey accordingly*

Visit #1 January or February - 1.5 hour

mink porcupine ruffed grouse white pine white cedar eastern hemlock

Visit # 2 March - 1/2 hour

eastern screech owl

[illegible]

Winter Visit #1 Data Sheet

Observer name: _____ Date (month/day/year): _____

Site #: _____ Temperature: _____ (°C)

Start Time (use 24 hr clock): _____ % Cloud Cover: _____

End Time (use 24 hr clock): _____ Precipitation: _____

mink (*Mustela vison*)

✓

Primary: one foot long and skinny with furry tail ☐

Secondary: black/brown in colour (small white spot under chin often visible) ☐

Tertiary: tracks are in 2-2 bounding pattern; near water; to 4" wide per pair; pairs between 11" and 38" apart; trail may contain slides up to 4" wide ☐

porcupine (*Erethizon dorsatum*)

Primary: black, dark grey or dark brown ☐

Secondary: no mask on face or bands on tail ☐

Tertiary: trail in snow is 5 to 9" wide, showing body drag all along its length, may contain urine trails; porcupine sign includes **fresh** stripping of bark from trees (add comment describing observation if this characteristic is checked; digital photo with scale if possible) ☐

ruffed grouse (*Bonasa umbellus*)

Primary: when flushed – brown bird with loud wing flutter ☐

Secondary: tracks chicken sized - raised hind toe often not seen in track ☐

Tertiary: chicken-sized bird ☐

eastern hemlock (*Tsuga canadensis*)

Primary: single, flat needles on a small stalk in a flat arrangement on branch ☐

Secondary: needles very short with pale stripes on back ☐

white pine (*Pinus strobus*)

Primary: soft needles in clusters of five ☐

Secondary: cones open loosely, elongated (8-20cm) and woody ☐

white cedar (*Thuja occidentalis*)

Primary: evergreen tree with flat scaly leaves, not needles ☐

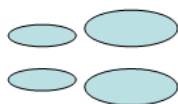
Secondary: tiny brown cones in clusters ☐

Comments:

Identifying trail patterns

- Size/shape of footprint
- Trail pattern

- Bounding



Mice, squirrels,
rabbits/hares

- 2-2 bounding



Weasels, fisher,
otter

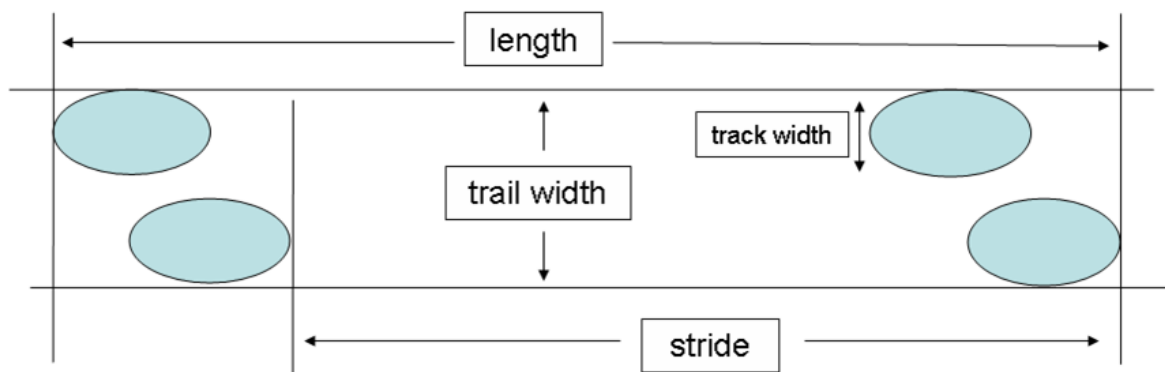
- Alternating



Porcupine, raccoon,
muskrat, beaver,
coyote

Measuring tracks & trails

- Track length
- Track width (single footprint) & Trail width (set of two)
Stride



- Photograph with a ruler

Winter Visit #2 Data Sheet

Observer name: _____ Date (month/day/year): _____

Site #: _____

Start Time (use 24 hr clock): _____ Temperature: _____ (°C)

End Time (use 24 hr clock): _____ % Cloud Cover: _____

Precipitation: _____

Eastern screech owl (*Megascops asio*) ☒

Primary: Call is a mournful horse-like whinny and/or a deep trill ☐

Secondary: Sings at night, responds to recording ☐

Tertiary: Appears to be about the same size as a grey squirrel ☐

Comments:

Winter Visit #1 Data Sheet

Observer name: _____ Date (month/day/year): _____

Site #: _____ Temperature: _____ (°C)

Start Time (use 24 hr clock): _____ % Cloud Cover: _____

End Time (use 24 hr clock): _____ Precipitation: _____

mink (*Mustela vison*)

✓

Primary: one foot long and skinny with furry tail ☐

Secondary: black/brown in colour (small white spot under chin often visible) ☐

Tertiary: tracks are in 2-2 bounding pattern; near water; to 4" wide per pair; pairs between 11" and 38" apart; trail may contain slides up to 4" wide ☐

porcupine (*Erethizon dorsatum*)

Primary: black, dark grey or dark brown ☐

Secondary: no mask on face or bands on tail ☐

Tertiary: trail in snow is 5 to 9" wide, showing body drag all along its length, may contain urine trails; porcupine sign includes **fresh** stripping of bark from trees (add comment describing observation if this characteristic is checked; digital photo with scale if possible) ☐

ruffed grouse (*Bonasa umbellus*)

Primary: when flushed – brown bird with loud wing flutter ☐

Secondary: tracks chicken sized - raised hind toe often not seen in track ☐

Tertiary: chicken-sized bird ☐

eastern hemlock (*Tsuga canadensis*)

Primary: single, flat needles on a small stalk in a flat arrangement on branch ☐

Secondary: needles very short (1 cm.) with pale stripes ☐

white pine (*Pinus strobus*)

Primary: soft needles in clusters of five ☐

Secondary: cones open loosely, elongated (8-20cm) and woody ☐

white cedar (*Thuja occidentalis*)

Primary: evergreen tree with flat scaly leaves, not needles ☐

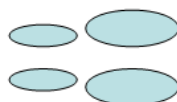
Secondary: tiny brown cones in clusters ☐

Comments:

Identifying trail patterns

- Size/shape of footprint
- Trail pattern

- Bounding



Mice, squirrels,
rabbits/hares

- 2-2 bounding



Weasels, fisher,
otter

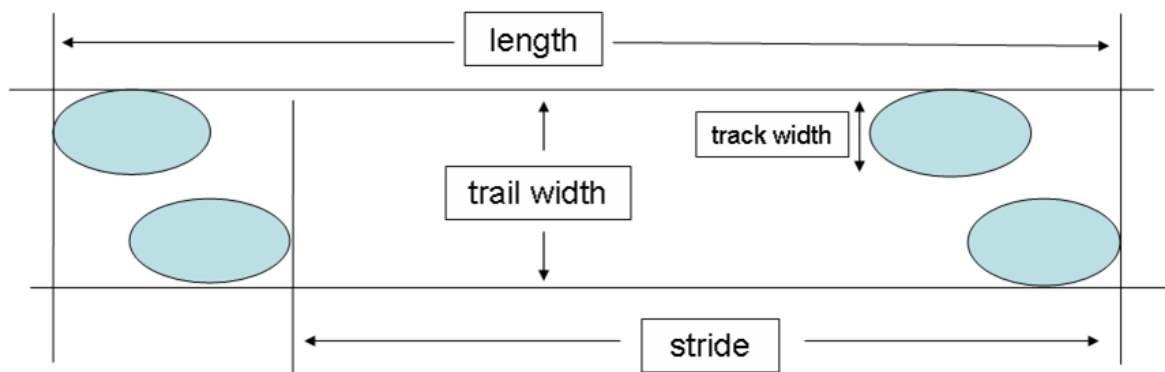
- Alternating



Porcupine, raccoon,
muskrat, beaver,
coyote

Measuring tracks & trails

- Track length
- Track width (single footprint) & Trail width (set of two)
Stride



- Photograph with a ruler

Winter Visit #2 Data Sheet

Observer name: _____ Date (month/day/year): _____

Site #: _____

Start Time (use 24 hr clock): _____ Temperature: _____ (°C)

End Time (use 24 hr clock): _____ % Cloud Cover: _____

Precipitation: _____

Eastern screech owl (*Megascops asio*) ☒

Primary: Call is a mournful horse-like whinny and/or a deep trill ☐

Secondary: Sings at night, responds to recording ☐

Tertiary: Appears to be about the same size as a grey squirrel ☐

Comments:

8. SPRING SURVEY

8.1 Spring Protocol

April

Two evenings, beginning at sundown, one hour each.

Spring surveys include evening work for woodcocks, frogs and toads, and are mainly surveys by ear. American woodcocks perform their nuptial flights at sundown from mid-March to mid-May, and so can be surveyed at the same time as frogs and toads. Seek the woodcock first, at/just after sundown, then the frogs and toad between ½ -1 hour after sundown.

Temperatures normally rise slowly in spring, and cue wood frogs, spring peepers and chorus frogs to start singing in early April; leopard frogs and American toads in mid-April. Lately, spring temperatures have often risen so fast, or risen and fallen that it has become trickier to survey at the appropriate time. Keep in mind, wood frogs tend to finish their breeding calls as soon as it gets warmer, so it is important not to miss them. The others call for a longer period of time. It is best to monitor the night time temperatures from the beginning of April and time your surveys accordingly, using the temperatures in the table below as a guide, rather than planning based on the time of the month. Most sites should support the American toad. The four spring frogs are more sensitive to urbanization.

Optimal breeding periods for amphibians

	Early Breeders	Middle Breeders
Months	early April to mid May	mid-April to late May
Air Temperature	greater than 5°C after dark	greater than 10°C after dark
Species	wood frog spring peeper chorus frog northern leopard frog	American toad northern leopard frog

May

One **early** morning (between dawn & 9 am.), two hours.

Wood ducks need to be surveyed before they have been disturbed by people. So it is recommended to look for them well before 9am. Wood ducks will notice you long before you find them. And once wood ducks fly off they are more difficult to identify. So it is good to practice “sneaking up” on wetlands and looking ahead for them before they decide to react and fly away. This skill takes a little bit of experience but the successful identification and lengthy observations of these colourful creatures is well worth the effort.

Pileated woodpeckers, marsh marigold, jack-in-the-pulpit, spring beauty, white trillium, foam-flower, and star-flower can be surveyed on the same day later that morning.

Spring Survey Summary

NOT TO BE USED FOR RECORDING DATA

- digital orthophoto map
- vegetation community map
- audio player
- binoculars (optional)
- field guide photo sheets for spring
- spring data sheets
- flashlight (for evening surveys)
- writing utensils
- ruler
- small notebook
- clipboard - leave binder behind and only bring pages required for visit

Please enter your data online as soon as the visit is done, and return data sheets when you have completed all your surveys for the season.

It is important for data analysis that we receive *your survey* results promptly. Thank you.

Species Checklists

* please read protocol and conduct survey accordingly*

Visit #1 Early April - 1 hour

woodcock wood frog spring peeper chorus frog leopard frog* American toad*

* Most likely to hear mid-late April

Visit # 2 Mid-Late April - 1 hour

woodcock wood frog spring peeper chorus frog leopard frog American toad

Visit # 3 May - 2 hours

wood duck white trillium foam-flower pileated woodpecker marsh marigold
spring beauty Jack-in-the-pulpit star-flower

[illegible]

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Spring Visit # 1 & # 2 Data Sheet

Observer Name: _____ Date: Visit #1 _____

Site Number: _____ Date: Visit #2 _____

Survey Start Time (24 hr clock): #1 _____ #2 _____

Survey End Time (24 hr clock): #1 _____ #2 _____

Temperature (OC): #1 _____ #2 _____

% cloud cover: #1 _____ #2 _____

Precipitation: #1 _____ #2 _____

American woodcock (*Scolopax minor*)

#1 #2

Primary: Call note is a nasal 'peent' from the ground ☐ ☐

Secondary: Chipping trill during courtship flights ☐ ☐

Tertiary: size of a small, plump, downtown pigeon ☐ ☐

Wood frog (*Lithobates sylvatica*)

Primary: Call is a hoarse clacking sound (group may sound like quiet ducks quacking) ☐ ☐

Secondary: Black raccoon-like mask on side of the face ☐ ☐

Spring peeper (*Pseudacris crucifer crucifer*)

Primary: Call is a single note 'peep' with an upward slur ☐ ☐

Secondary: Territorial call - similar to chorus frog call, but less dry sounding; intermittent ☐ ☐

Striped (Western) chorus frog (*Pseudacris triseriata*)

Primary: Call is a short rising trill like thumb nail running over a comb ☐ ☐

Northern leopard Frog (*Lithobates pipiens*)

Primary: Snores with interspersed grunts (soft voice) ☐ ☐

American toad (*Anaxyrus americanus*)

Primary: Call is a long trill lasting up to 30 seconds ☐ ☐

Comments:

Spring Visit #3 Data Sheet

Observer name: _____ Date (month/day/year): _____

Site #: _____ Temperature: _____ (°C)

Start Time (use 24 hr clock): _____ % Cloud Cover: _____

End Time (use 24 hr clock): _____ Precipitation: _____

Wood duck (*Aix sponsa*)



Primary: Male has a swept-back crest and is brilliantly coloured ☐

Secondary: A medium sized duck (smaller than a mallard) ☐

Pileated Woodpecker (*Dryocopus pileatus*)

Primary: Solid black back and bright red crest ☐

Secondary: Crow-sized, with white wing markings visible in flight ☐

Marsh marigold (*Caltha palustris*)

Primary: Waxy yellow flowers like large buttercups ☐

Secondary: Large roundish or kidney-shaped, shiny leaves ☐

Tertiary: Found in wetlands ☐

Jack-in-the-pulpit (*Arisaema triphyllum*)

Primary: Flower stalk has over-arching hood, hood has purplish stripes ☐

Secondary: leaves are three-parted with veins arranged in a feather pattern; top & bottom halves of leaf not symmetrical ☐

Narrow-Leaved Spring Beauty (*Claytonia virginica*)

Primary: Low-growing with narrow grass-like leaves that do not narrow towards the base ☐

Secondary: Small flowers with pink lines on white or light pink petals ☐

Tertiary: Found in moist, deciduous forest ☐

White Trillium (*Trillium grandiflorum*)

Primary: Leaves and flower parts in threes ☐

Secondary: Flowers white - or pale pink when aging ☐

Tertiary: Leaf veins branching, curved, not parallel ☐

Foam-flower (*Tiarella cordifolia*)

Primary: Hairy leaves, maple-leaf shaped, at ground level only ☐

Secondary: White columnar shaped flower cluster on leafless stalk ☐

Tertiary: Found in mixed forests and cedar swamps ☐

Star-flower (*Trientalis borealis* ssp. *borealis*)

Primary: Small plant with one whorl of leaves ☐

Secondary: Small white star-shaped flowers ☐

Tertiary: In coniferous or mixed forest, swampy or dry ☐

Comments:

Spring Visit # 1 & # 2 Data Sheet

Observer Name: _____ Date: Visit #1 _____

Site Number: _____ Date: Visit #2 _____

Survey Start Time (24 hr clock): #1 _____ #2 _____

Survey End Time (24 hr clock): #1 _____ #2 _____

Temperature (°C): #1 _____ #2 _____

% cloud cover: #1 _____ #2 _____

Precipitation: #1 _____ #2 _____

American woodcock (*Scolopax minor*)

#1 #2

Primary: Call note is a nasal 'peent' from the ground ☐ ☐

Secondary: Chipping trill during courtship flights ☐ ☐

Tertiary: size of a small, plump, downtown pigeon ☐ ☐

Wood frog (*Lithobates sylvatica*)

Primary: Call is a hoarse clacking sound (group may sound like quiet ducks quacking) ☐ ☐

Secondary: Black raccoon-like mask on side of the face ☐ ☐

Spring peeper (*Pseudacris crucifer crucifer*)

Primary: Call is a single note 'peep' with an upward slur ☐ ☐

Secondary: Territorial call - similar to chorus frog call, but less dry sounding; intermittent ☐ ☐

Striped (Western) chorus frog (*Pseudacris triseriata*)

Primary: Call is a short rising trill like thumb nail running over a comb ☐ ☐

Northern leopard Frog (*Lithobates pipiens*)

Primary: Snores with interspersed grunts (soft voice) ☐ ☐

American toad (*Anaxyrus americanus*)

Primary: Call is a long trill lasting up to 30 seconds ☐ ☐

Comments:

Spring Visit #3 Data Sheet

Observer name: _____ Date (month/day/year): _____

Site #: _____ Temperature: _____ (°C)

Start Time (use 24 hr clock): _____ % Cloud Cover: _____

End Time (use 24 hr clock): _____ Precipitation: _____

Wood duck (*Aix sponsa*)



Primary: Male has a swept-back crest and is brilliantly coloured ☐

Secondary: A medium sized duck (smaller than a mallard) ☐

Pileated Woodpecker (*Dryocopus pileatus*)

Primary: Solid black back and bright red crest ☐

Secondary: Crow-sized, with white wing markings visible in flight ☐

Marsh marigold (*Caltha palustris*)

Primary: Waxy yellow flowers like large buttercups ☐

Secondary: Large roundish or kidney-shaped, shiny leaves ☐

Tertiary: Found in wetlands ☐

Jack-in-the-pulpit (*Arisaema triphyllum*)

Primary: Flower stalk has over-arching hood, hood has purplish stripes ☐

Secondary: leaves are three-parted with veins arranged in a feather pattern; top & bottom halves of leaf not symmetrical ☐

Narrow-Leaved Spring Beauty (*Claytonia virginica*)

Primary: Low-growing with narrow grass-like leaves that do not narrow towards the base ☐

Secondary: Small flowers with pink lines on white or light pink petals ☐

Tertiary: Found in moist, deciduous forest ☐

White Trillium (*Trillium grandiflorum*)

Primary: Leaves and flower parts in threes ☐

Secondary: Flowers white - or pale pink when aging ☐

Tertiary: Leaf veins branching, curved, not parallel ☐

Foam-flower (*Tiarella cordifolia*)

Primary: Hairy leaves, maple-leaf shaped, at ground level only ☐

Secondary: White columnar shaped flower cluster on leafless stalk ☐

Tertiary: Found in mixed forests and cedar swamps ☐

Star-flower (*Trientalis borealis* ssp. *borealis*)

Primary: Small plant with one whorl of leaves ☐

Secondary: Small white star-shaped flowers ☐

Tertiary: In coniferous or mixed forest, swampy or dry ☐

Comments:

9. SUMMER SURVEY

9.1 Summer Protocol

June

Two evenings, 2 hours each, the first visit in the first 2 weeks of June, the second visit between the 15th and 30th of June, with at least one week between the 2 visits. This allows us to establish whether bird species are remaining on a territory over a period of time. If found on one visit they are classified as possible breeders. If found on both visits, the likelihood that they are breeding is higher and they are classified as probable breeders.

This survey involves doing bird surveys before sundown and then frog surveys after sundown. When playing the songs for the tanager, swamp sparrow and Virginia rail, be very patient and do not overplay the tape. Some birds will respond right away, others will inspect the situation first. Once a bird responds, do not call back to it so it is not discouraged or stressed. Conduct your bird surveys from 7:30 to 9:00 pm, then take a break, and conduct your frog surveys at 9:30 pm.

In the forest, search for the wood-pewee, ovenbird, and tanager. In the wetlands, seek out swamp sparrow, Virginia rail and green heron. In the meadows, look for bobolink, meadowlark and savannah sparrow. Then, after sundown listen for green frog, bullfrog and grey treefrog. You will likely be on your way home around 10:00 pm.

Optimal breeding periods for amphibians

	Late Breeders
Months	late May to late July
Air Temperature	greater than 17 ⁰ C after dark
Species	grey treefrog green frog bullfrog

July & August

Two daytime visits, one each month, 2 hours each.

The mid-summer surveys are for flora observations so they are not sensitive to time-of-day or weather. Hence, this allows for more leisurely scheduling. Record fauna species under “comments” only. Conduct one survey in early July to capture the Michigan lily in bloom. The other summer native indicator plant species and invasives may be found at that time as well. In the wetlands and along streams, look for turtlehead, swamp milkweed, Joe Pye weed, barber-pole bulrush, Phragmites, glossy buckthorn, Himalayan balsam and European frog-bit. In the meadows, look for common buckthorn, dog-strangling vine and garlic mustard. The latter 3 invasives along with common buckthorn and periwinkle will also be found in forests. White oak will be found in dryer, sandy soils.

Conduct another survey in mid-August for the wild rye to start drooping characteristically, and to observe any of the species that you did not find in July.

Summer Survey Summary

NOT TO BE USED FOR RECORDING DATA

- digital orthophoto map
- vegetation community map
- audio tape or CD and player
- binoculars (optional)
- field guide photo pages for summer
- summer data sheets
- flashlight (for evening surveys)
- writing utensils
- ruler
- hand lens (for flora surveys)
- small notebook
- clipboard - leave binder behind and only bring pages required for visit

Please enter your data online as soon as the visit is done, and return data sheets when you have completed all your surveys for the season.

It is important for data analysis that we receive your survey results promptly. Thank you.

Species Checklists

* please read protocol and conduct survey accordingly

Visit #1 Early June - evening - 2 hours

before sundown: eastern wood-pewee scarlet tanager green heron bobolink
ovenbird swamp sparrow Virginia rail eastern meadowlark
savannah sparrow

after sundown: green frog bullfrog grey treefrog

Visit # 2 Mid-Late June - evening - 2 hours

before sundown: eastern wood-pewee scarlet tanager green heron bobolink
ovenbird swamp sparrow Virginia rail eastern meadowlark
savannah sparrow

after sundown: green frog bullfrog grey treefrog

Visit # 3 Early July - daytime - 2 hours

Michigan lily Joe Pye weed dog-strangling vine glossy buckthorn
turtlehead barber-pole bulrush garlic mustard periwinkle
swamp milkweed white oak common buckthorn Himalayan balsam
European frog-bit

Visit # 4 Mid August - daytime - 2 hours

Michigan lily Joe Pye weed dog-strangling vine glossy buckthorn
turtlehead barber-pole bulrush garlic mustard periwinkle
swamp milkweed white oak common buckthorn Himalayan balsam
riverbank wild rye European frog-bit

[illegible]

[illegible]

Summer Data Sheet Visit #1 and #2

Observer Name: _____ Date: Visit #1 _____

Site Number: _____ Date: Visit #2 _____

Survey Start Time (24 hr clock): #1 _____ #2 _____

Survey End Time (24 hr clock): #1 _____ #2 _____

Temperature (OC): #1 _____ #2 _____

% cloud cover: #1 _____ #2 _____

Precipitation: #1 _____ #2 _____

Eastern wood-pewee (*Contopus virens*)

#1 #2

Primary: call is 'pee-a-wee' and a down-slurred 'pee-ur' ☐ ☐

Secondary: little grey/brown bird ☐ ☐

Tertiary: same length as a house sparrow, but somewhat slimmer ☐ ☐

Ovenbird (*Seiurus aurocapillus*)

Primary: call is a loud repeated 'teach'er, teach'er' ☐ ☐

Secondary: forest habitats ☐ ☐

Tertiary: same size as a house sparrow ☐ ☐

Scarlet tanager (*Piranga olivacea*)

Primary: red bird with black wings ☐ ☐

Secondary: call includes "chick-burr" ☐ ☐

Tertiary: halfway between a cardinal and a house sparrow in size ☐ ☐
(responds to tape - play in upland forest)

Swamp sparrow (*Melospiza georgiana*)

Primary: song a slow, flat, non-musical trill (chip-chip-chip-...) ☐ ☐

Secondary: wetland habitat (marsh or thicket swamp) ☐ ☐

Tertiary: slightly smaller than a house sparrow ☐ ☐
(responds to tape - play in wetland)

Green heron (*Butorides virescens*)

Primary: crow-sized heron (in flight, legs extend beyond tail) ☐ ☐

Secondary: orange legs, dark back (in shade), or with iridescent green/chestnut colours (in sun) ☐ ☐

Tertiary: call a loud, sharp squawk ☐ ☐

Virginia rail (<i>Rallus limicola</i>)	#1	#2
Primary: song is a descending 'wak-wak-wak...' also 'kidick, kidick, kidick'	<input type="checkbox"/>	<input type="checkbox"/>
Secondary: in cattail marsh or thicket swamp.....	<input type="checkbox"/>	<input type="checkbox"/>
Tertiary: slightly larger than a starling (stands taller on longer legs)	<input type="checkbox"/>	<input type="checkbox"/>
(responds to tape - play in cattail wetlands)		
Bobolink (<i>Dolichonyx oryzivorus</i>)		
Primary: black front, white back, yellowish top of head	<input type="checkbox"/>	<input type="checkbox"/>
Secondary: found in fields	<input type="checkbox"/>	<input type="checkbox"/>
Tertiary: slightly smaller than a starling	<input type="checkbox"/>	<input type="checkbox"/>
Eastern meadowlark (<i>Sturnella magna</i>)		
Primary: bright yellow breast with a black V	<input type="checkbox"/>	<input type="checkbox"/>
Secondary: found in fields	<input type="checkbox"/>	<input type="checkbox"/>
Tertiary: about same size as a starling	<input type="checkbox"/>	<input type="checkbox"/>
Savannah sparrow (<i>Passerculus sandwichensis</i>)		
Primary: song is a slightly buzzy, mechanical 'tsit-tsit-tsit, tseeee-tsaay', the last note being lower	<input type="checkbox"/>	<input type="checkbox"/>
Secondary: found in fields	<input type="checkbox"/>	<input type="checkbox"/>
Tertiary: slightly smaller than house sparrow	<input type="checkbox"/>	<input type="checkbox"/>
Green frog (<i>Lithobates clamitans</i>)		
Primary: call is a 'gunk', sounding like a loose banjo string being plucked	<input type="checkbox"/>	<input type="checkbox"/>
(careful - listen to the recording, some calls similar to bullfrog)		
Secondary: ridges down entire length of back	<input type="checkbox"/>	<input type="checkbox"/>
Bullfrog (<i>Lithobates catesbeiana</i>)		
Primary: call is a deep 'jug-o-rum'	<input type="checkbox"/>	<input type="checkbox"/>
Secondary: ridge on back curves around tympanum (eardrum - the large circle behind the eye)..	<input type="checkbox"/>	<input type="checkbox"/>
Grey treefrog (<i>Hyla versicolor</i>)		
Primary: song is a slow, loose trill every few seconds	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

Summer Data Sheet Visit #1 and #2

Observer Name: _____ Date: Visit #1 _____

Site Number: _____ Date: Visit #2 _____

Survey Start Time (24 hr clock): #1 _____ #2 _____

Survey End Time (24 hr clock): #1 _____ #2 _____

Temperature (OC): #1 _____ #2 _____

% cloud cover: #1 _____ #2 _____

Precipitation: #1 _____ #2 _____

Eastern wood-pewee (*Contopus virens*)

#1 #2

Primary: call is 'pee-a-wee' and a down-slurred 'pee-ur' ☐ ☐

Secondary: little grey/brown bird ☐ ☐

Tertiary: same length as a house sparrow, but somewhat slimmer ☐ ☐

Ovenbird (*Seiurus aurocapillus*)

Primary: call is a loud repeated 'teach'er, teach'er' ☐ ☐

Secondary: forest habitats ☐ ☐

Tertiary: same size as a house sparrow ☐ ☐

Scarlet tanager (*Piranga olivacea*)

Primary: red bird with black wings ☐ ☐

Secondary: call includes "chick-burr" ☐ ☐

Tertiary: halfway between a cardinal and a house sparrow in size ☐ ☐
(responds to tape - play in upland forest)

Swamp sparrow (*Melospiza georgiana*)

Primary: song a slow, flat, non-musical trill (chip-chip-chip-...) ☐ ☐

Secondary: wetland habitat (marsh or thicket swamp) ☐ ☐

Tertiary: slightly smaller than a house sparrow ☐ ☐
(responds to tape - play in wetland)

Green heron (*Butorides virescens*)

Primary: crow-sized heron (in flight, legs extend beyond tail) ☐ ☐

Secondary: orange legs, dark back (in shade), or with iridescent green/chestnut colours (in sun) ☐ ☐

Tertiary: call a loud, sharp squawk ☐ ☐

Virginia rail (<i>Rallus limicola</i>)	#1	#2
Primary: song is a descending 'wak-wak-wak...' also 'kidick, kidick, kidick'	<input type="checkbox"/>	<input type="checkbox"/>
Secondary: in cattail marsh or thicket swamp.....	<input type="checkbox"/>	<input type="checkbox"/>
Tertiary: slightly larger than a starling (stands taller on longer legs)	<input type="checkbox"/>	<input type="checkbox"/>
(responds to tape - play in cattail wetlands)		
Bobolink (<i>Dolichonyx oryzivorus</i>)		
Primary: black front, white back, yellowish top of head	<input type="checkbox"/>	<input type="checkbox"/>
Secondary: found in fields	<input type="checkbox"/>	<input type="checkbox"/>
Tertiary: slightly smaller than a starling	<input type="checkbox"/>	<input type="checkbox"/>
Eastern meadowlark (<i>Sturnella magna</i>)		
Primary: bright yellow breast with a black V	<input type="checkbox"/>	<input type="checkbox"/>
Secondary: found in fields	<input type="checkbox"/>	<input type="checkbox"/>
Tertiary: about same size as a starling	<input type="checkbox"/>	<input type="checkbox"/>
Savannah sparrow (<i>Passerculus sandwichensis</i>)		
Primary: song is a slightly buzzy, mechanical 'tsit-tsit-tsit, tseeee-tsaay', the last note being lower	<input type="checkbox"/>	<input type="checkbox"/>
Secondary: found in fields	<input type="checkbox"/>	<input type="checkbox"/>
Tertiary: slightly smaller than house sparrow	<input type="checkbox"/>	<input type="checkbox"/>
Green frog (<i>Lithobates clamitans</i>)		
Primary: call is a 'gunk', sounding like a loose banjo string being plucked	<input type="checkbox"/>	<input type="checkbox"/>
(careful - listen to the recording, some calls similar to bullfrog)		
Secondary: ridges down entire length of back	<input type="checkbox"/>	<input type="checkbox"/>
Bullfrog (<i>Lithobates catesbeiana</i>)		
Primary: call is a deep 'jug-o-rum'	<input type="checkbox"/>	<input type="checkbox"/>
Secondary: ridge on back curves around tympanum (eardrum - the large circle behind the eye)..	<input type="checkbox"/>	<input type="checkbox"/>
Grey treefrog (<i>Hyla versicolor</i>)		
Primary: song is a slow, loose trill every few seconds	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

Summer Data Sheet - Visit #3 and #4

Observer Name: _____ Date: Visit #3 _____

Site Number: _____ Date: Visit #4 _____

Survey Start Time (24 hr clock): #3 _____ #4 _____

Survey End Time (24 hr clock): #3 _____ #4 _____

Temperature (OC): #3 _____ #4 _____

% cloud cover: #3 _____ #4 _____

Precipitation: #3 _____ #4 _____

Michigan lily (*Lilium michiganense*) #3 #4

Primary: large, very showy orange lily with petals curved up..... ☐ ☐

Secondary: leaves in whorls around stem ☐ ☐

Tertiary: tall plant (to 2 m) ☐ ☐

Turtlehead (*Chelone glabra*)

Primary: white bulbous flowers (turtle head shape) ☐ ☐

Secondary: medium tall plant with opposite leaves ☐ ☐

Tertiary: found in moist to wet areas, streamside ☐ ☐

Swamp milkweed (*Asclepias incarnata incarnata*)

Primary: clusters of pink, **rubbery** flowers ☐ ☐

Secondary: slender leaves in pairs (opposite) ☐ ☐

Tertiary: found in marshes & other wet areas ☐ ☐

Spotted Joe Pye weed (*Eupatorium maculatum maculatum*)

Primary: bushy plant with flat-topped clusters of pink, **fluffy** flowers ☐ ☐

Secondary: leaves in whorls, stem green with purple speckles/blotches ☐ ☐

Tertiary: found in marshes, thicket swamps, wet ditches ☐ ☐

Barber-pole bulrush (*Scirpus microcarpus*)

Primary: strong grass-like leaves and loose broom-like flower head ☐ ☐

Secondary: red in bands where each leaf begins (turn rusty/brown with age) ☐ ☐

Tertiary: found in wetlands, wet meadows and streamside ☐ ☐

White oak (*Quercus alba*)

Primary: leaves with rounded lobes are widest around the middle ☐ ☐

Secondary: twigs and buds smooth, with no hairs or bristles ☐ ☐

Tertiary: found in savannahs, upland forests, and as remnants in other areas ☐ ☐

Caution: may be confused with bur oak

Riverbank wild rye (*Elymus riparius*)

Primary: tall grass with arching heads and long (3 cm) straight bristles

☐☐

Secondary: generally found along streams

☐☐

Comments:

Summer Data Sheet - Visit #3 and #4

Observer Name: _____ Date: Visit #3 _____

Site Number: _____ Date: Visit #4 _____

Survey Start Time (24 hr clock): #3 _____ #4 _____

Survey End Time (24 hr clock): #3 _____ #4 _____

Temperature (OC): #3 _____ #4 _____

% cloud cover: #3 _____ #4 _____

Precipitation: #3 _____ #4 _____

Michigan lily (*Lilium michiganense*) #3 #4

Primary: large, very showy orange lily with petals curved up..... ☐ ☐

Secondary: leaves in whorls around stem ☐ ☐

Tertiary: tall plant (to 2 m) ☐ ☐

Turtlehead (*Chelone glabra*)

Primary: white bulbous flowers (turtle head shape) ☐ ☐

Secondary: medium tall plant with opposite leaves ☐ ☐

Tertiary: found in moist to wet areas, streamside ☐ ☐

Swamp milkweed (*Asclepias incarnata incarnata*)

Primary: clusters of pink, **rubbery** flowers ☐ ☐

Secondary: slender leaves in pairs (opposite) ☐ ☐

Tertiary: found in marshes & other wet areas ☐ ☐

Spotted Joe Pye weed (*Eupatorium maculatum maculatum*)

Primary: bushy plant with flat-topped clusters of pink, **fluffy** flowers ☐ ☐

Secondary: leaves in whorls, stem green with purple speckles/blotches ☐ ☐

Tertiary: found in marshes, thicket swamps, wet ditches ☐ ☐

Barber-pole bulrush (*Scirpus microcarpus*)

Primary: strong grass-like leaves and loose broom-like flower head ☐ ☐

Secondary: red in bands where each leaf begins (turn rusty/brown with age) ☐ ☐

Tertiary: found in wetlands, wet meadows and streamside ☐ ☐

White oak (*Quercus alba*)

Primary: leaves with rounded lobes are widest around the middle ☐ ☐

Secondary: twigs and buds smooth, with no hairs or bristles ☐ ☐

Tertiary: found in savannahs, upland forests, and as remnants in other areas ☐ ☐

Caution: may be confused with bur oak

Riverbank wild rye (*Elymus riparius*)

Primary: tall grass with arching heads and long (3 cm) straight bristles

☐ ☐

Secondary: generally found along streams

☐ ☐

Comments:

TRCA Invasive Plant Species Data Sheet

***See reverse of page for a guide to completing this sheet, and additional space for comments**

Complete one sheet for each of the Spring #3 visit, Summer #3 visit and Summer #4 visit

Observer name: _____

Date: _____

Year: _____

Site # : _____

		Complete applicable boxes with a ✓										Manual Count & Comment						
		Distribution on site				Habitat where found				Estimated size of largest patch					Change since last year			
		Count of occurrences on site	Not Found	Few or Scattered	# patches	Forest	Wetland	Riparian	Meadow	<100 m ²	>100 m ²				>1 ha (10,000 m ²)	None	Increase	Decrease
Common name	Scientific name(s)																	
dog-strangling vine (aka swallowwort)	<i>Cynanchum rossicum</i> , <i>C. nigrum</i>																	
garlic mustard	<i>Alliaria petiolata</i>																	
periwinkle	<i>Vinca minor</i>																	
common buckthorn	<i>Rhamnus cathartica</i>																	
glossy buckthorn	<i>Rhamnus frangula</i>																	
Himalayan balsam (ornamental jewelweed)	<i>Impatiens glandulifera</i>																	
Common reed	<i>Phragmites australis</i>																	
European frog-bit	<i>Hydrocharis morsus-ranae</i>																	

If you are able to identify whether it is pale or black swallowwort, please note that here.

Guide for completion of Invasive Plant Species Data Sheet

1. Complete the observer name, date including year, and site # blanks.
2. Review your field guide pictures and identification characteristics for the target species. Take field guide pages with you while conducting the survey.
3. While traversing your site, enter a manual count mark in the "count & comment" box for the appropriate target plant each time a new patch is seen within the site boundary, and check the appropriate box for the habitat in which you found it. If your count reaches 11 for any species, stop counting it and check the "over 10" box for # patches. **manual count eg. ### III. It is possible to find a species in more than one habitat type. Check all that apply.**
4. As you encounter each new patch for a given plant, roughly estimate it's size. If it is over 100 m², but less than 1ha in size check that box; if it is over 1000 m² (= 1 ha or 10% of the total site area), then check that box, and continue. To estimate size, you can use your pace as approximately 1m.
Example: a patch that paces at average 5m by average 10m is estimated as 5 X 10 = 50m²; the "<100m²" box will apply, unless a larger patch is found.
5. If you have checked the "over 100 m²" box, and encounter a patch that meets the 1ha size, merely draw a line through the previous entry and add a check box to the larger size category.
6. For the first survey, do not check any of the "Change since last survey" boxes. If you conducted a previous survey under this protocol for this site, check the appropriate change box. You may need to review the previous data before completing this. You should go by memory only if the change is great enough that it is clearly memorable.
7. In the case of pale or black swallowwort, add a comment if you can tell which of the two species it is. This will be easy to do when the flowers are on the plants and very difficult to do at any other time, so don't worry about this unless it is in flower.
8. Add any comments that you think might be useful.
9. Once you have completed the survey, check the correct count box using the manual count records you made. If none, check the "not found" box.
10. For species found, if neither the >100m² box nor the >1ha box is checked at the end, then check the <100m² box for largest patch size.

What is a patch? The answer will vary somewhat by species. Most of these species will usually be found growing very tightly together, with very few other plants interspersed between them. In this case a "patch" is easy to delineate. In the case of garlic mustard, once well established it will cover large areas, but you may well be able to see other species growing between the garlic mustard plants. We would still call the whole area a patch of garlic mustard. If there is a gap with none of the invasive plant growing, and then another area in which it is distributed, these would be looked upon as separate patches.

Common buckthorn frequently grows at the edges of forests. It may be in a narrow belt that surrounds much or all of a forest block. You could call this a single patch, and estimate it at one of the two larger size categories, as appropriate.

If in doubt, do what makes sense to you, and then add an explanatory comment.

Additional comments:

TRCA Invasive Plant Species Data Sheet

***See reverse of page for a guide to completing this sheet, and additional space for comments**

Complete one sheet for each of the Spring #3 visit, Summer #3 visit and Summer #4 visit

Observer name: _____

Date: _____

Year: _____

Site # : _____

		Complete applicable boxes with a ✓											Manual Count & Comment			
		Distribution on site				Habitat where found				Estimated size of largest patch				Change since last year		
		Count of occurrences on site				Forest	Wetland	Riparian	Meadow	<100 m ²	>100 m ²	>1 ha (10,000 m ²)		None	Increase	Decrease
Common name	Scientific name(s)	Not Found	Few or Scattered	<5	5-10								>10			
dog-strangling vine (aka swallowwort)	<i>Cynanchum rossicum</i> , <i>C. nigrum</i>															
garlic mustard	<i>Alliaria petiolata</i>															
periwinkle	<i>Vinca minor</i>															
common buckthorn	<i>Rhamnus cathartica</i>															
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Himalayan balsam (ornamental jewelweed)	<i>Impatiens glandulifera</i>															
Common reed	<i>Phragmites australis</i>															
European frog-bit	<i>Hydrocharis morsus-ranae</i>															

Guide for completion of Invasive Plant Species Data Sheet

<p>1. Complete the observer name, date including year, and site # blanks.</p> <p>2. Review your field guide pictures and identification characteristics for the target species. Take field guide pages with you while conducting the survey.</p> <p>3. While traversing your site, enter a manual count mark in the "count & comment" box for the appropriate target plant each time a new patch is seen within the site boundary, and check the appropriate box for the habitat in which you found it. If your count reaches 11 for any species, stop counting it and check the "over 10" box for # patches. manual count eg. ### III. It is possible to find a species in more than one habitat type. Check all that apply.</p> <p>4. As you encounter each new patch for a given plant, roughly estimate it's size. If it is over 100 m², but less than 1ha in size check that box; if it is over 1000 m² (= 1 ha or 10% of the total site area), then check that box, and continue. To estimate size, you can use your pace as approximately 1m. Example: a patch that paces at average 5m by average 10m is estimated as 5 X 10 = 50m², the "<100m²" box will apply, unless a larger patch is found.</p> <p>5. If you have checked the "over 100 m²" box, and encounter a patch that meets the 1ha size, merely draw a line through the previous entry and add a check box to the larger size category.</p> <p>6. For the first survey, do not check any of the "Change since last survey" boxes. If you conducted a previous survey under this protocol for this site, check the appropriate change box. You may need to review the previous data before completing this. You should go by memory only if the change is great enough that it is clearly memorable.</p> <p>7. In the case of pale or black swallowwort, add a comment if you can tell which of the two species it is. This will be easy to do when the flowers are on the plants and very difficult to do at any other time, so don't worry about this unless it is in flower.</p> <p>8. Add any comments that you think might be useful.</p> <p>9. Once you have completed the survey, check the correct count box using the manual count records you made. If none, check the "not found" box.</p> <p>10. For species found, if neither the >100m² box nor the >1ha box is checked at the end, then check the <100m² box for largest patch size.</p>	<p>What is a patch? The answer will vary somewhat by species. Most of these species will usually be found growing very tightly together, with very few other plants interspersed between them. In this case a "patch" is easy to delineate. In the case of garlic mustard, once well established it will cover large areas, but you may well be able to see other species growing between the garlic mustard plants. We would still call the whole area a patch of garlic mustard. If there is a gap with none of the invasive plant growing, and then another area in which it is distributed, these would be looked upon as separate patches.</p> <p>Common buckthorn frequently grows at the edges of forests. It may be in a narrow belt that surrounds much or all of a forest block. You could call this a single patch, and estimate it at one of the two larger size categories, as appropriate.</p> <p>If in doubt, do what makes sense to you, and then add an explanatory comment.</p>
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Additional comments:

10. FALL SURVEY

10.1 Fall Protocol

October

One daytime, 3 hours.

The winterberry is a large woody shrub that grows in thicket swamps. The male plants do not have berries but there is usually a female close by if you find a male. The berries are red in colour. In the forest look for Christmas fern and zig-zag goldenrod.

Many sites should support the chipmunk. Ensure that you are not seeing a red squirrel, which is of similar size but without the racing stripes down its back.

Formal and informal trails will be mapped on a copy of the aerial photograph. This survey should be conducted in fair weather as the ink on the maps is very sensitive to rain and fog. Lichens also change colour in such weather so should also be surveyed on dry days for consistency. Look for lichens on trees and dead wood and search in forest openings, forest edges or on isolated trees.

Lichens are a fascinating association of a fungus and alga that unite in a symbiotic relationship. Although, as a group, they are well-adapted to extreme conditions of dryness and temperature variation, species differ in their nutrient and light requirements as well as ability to withstand extended long periods of drought. Most are sensitive to sulphate air pollution (car exhausts is one source), again to varying degrees. The selected lichen species are relatively easy to identify and are being tested as an air-quality indicator gradient based on sulphate-sensitivity. However, it is extremely important that **all three** identifiers on the checklist are used to get a reliable identification, as many similar species exist that differ by one of the characters. You may choose to take a sample and send to the coordinator to confirm your lichen identification. Sampling should only be done if the lichen species in question is common in the immediate vicinity. Remember, our monitoring should not impact the ecosystem significantly.

Collection Equipment (optional):

small knife (e.g. Swiss army)
hand lens

marker/dark pen
paper bags/envelopes

Collection Method (optional):

If you are unsure of a lichen identification, remove a small sample (big enough to ID, small enough not to harm the tree or lichen population) using a knife. Check the bark of fallen trees for lichen samples to minimize damage to living trees. Label a paper (never plastic) with:

- date
- site #
- collector
- tree species (if known)
- habitat type - i.e. forest edge, forest interior

Fall Survey Summary

NOT TO BE USED FOR RECORDING DATA

- digital orthophoto map & copy for trail sketching
- vegetation community map
- binoculars (optional)
- field guide photo pages for fall
- fall species and trail mapping data sheets
- writing utensils
- ruler
- hand lens (for lichen surveys)
- paper bags
- marker
- knife (for lichen collections)
- small notebook
- clipboard - leave binder behind and only bring pages required for visit

Please enter your data online as soon as the visit is done, and return data sheets when you have completed all your surveys for the season.

It is important for data analysis that we receive your survey results promptly. Thank you.

Species Checklists

* please read protocol and conduct survey accordingly

Visit #1

October - 3 hours

chipmunk	Christmas fern	winterberry	zig-zag goldenrod
mealy rosette lichen	candleflame lichen	hooded sunburst lichen	
rough speckled shield lichen	common greenshield lichen	hammered shield lichen	
trail mapping*			

* trail mapping may be completed on a separate visit if needed or desired - enter trail mapping data online on sheet named Fall Visit #2

[illegible]

[illegible]

Fall Data Sheet

Note: Online data entry requires completion of two data sheets. Visit #1 is for species observations and visit #2 is for trail information. You may collect the trail data at the same time as your species visit or on a separate visit. This is your choice, depending on whether your site has few or many trails and whether there are changes from last year.

Observer Name: _____ Date of visit: _____

Site Number: _____

Survey Start Time (24 hr clock): _____

Survey End Time (24 hr clock): _____

Temperature (°C): _____

% cloud cover: _____

Precipitation: _____

Eastern chipmunk

Primary: beige with black and white stripes along body ☐

Christmas fern

Primary: evergreen fern with thick leathery leaflets ☐

Secondary: leaflets have a small lobe at base ☐

Tertiary: stems have scales, giving them a fuzzy appearance (see sketch) ☐

Winterberry

Primary: bush/small tree; female plants have great numbers of red berries that last through winter ... ☐

Secondary: leaves are shiny, dark green, and finely toothed, but deciduous ☐

Tertiary: found in thicket swamps (wet conditions) ☐

Zig-zag-goldenrod

Primary: small yellow flower clusters at every leaf & stem that zigzags ☐

Secondary: leaves rounded and toothed ☐

Mealy rosette (*Physcia millegrana*)

Primary: dull, green/grey with very small lobes (0.3 - 1mm); apothecia under 1mm across ☐

Secondary: edges of lobes finely divided, powdery to granular, (visible with hand lens) ☐

Tertiary: white underneath ☐

Candleflame (*Candelaria concolor*)

Primary: bright yellow-green with very narrow lobes (0.1-0.5 mm) ☐

Secondary: crusty looking above ☐

Tertiary: lobes overlap, hug surface (visible with hand lens) ☐

Hooded sunburst (*Xanthoria fallax*)

Primary: bright orange-yellow with large lobes (0.8-2 mm) ☐

Secondary: white underside with white rhizines (hair-like roots) ☐

Tertiary: wavy, hood-like lobes; found where exposed to direct sunlight ☐

Common greenshield (*Flavoparmelia caperata*)

Primary: pale yellow-green when dry, greener when wet; underside black grading to tan at edges .. ☐

Secondary: lobes very wide (3-8 mm), rounded, lacking white pores ☐

Tertiary: ridges not powdery ☐

Hammered shield (*Parmelia sulcata*)

Primary: mineral blue-grey with big lobes (2 - 5mm) ☐

Secondary: underside black and hairy, often browned at edges ☐

Tertiary: network of depressions and sharp white ridges (hammered look) ☐

Rough speckled shield (*Punctelia rudecta*)

Primary: dark greenish-grey to almost blue grey, underside tan ☐

Secondary: lobes very wide (3-8 mm), white pores prominent & extend to tips of lobes ☐

Tertiary: ridges not powdery; found where not directly exposed to sunlight ☐

Trails (enter online on data sheet titled Fall Visit #2)

Trail characteristics:	boardwalk	<input type="checkbox"/>	paved surface.....	<input type="checkbox"/>
	Bridges	<input type="checkbox"/>	wood chip	<input type="checkbox"/>
	trail markers	<input type="checkbox"/>	gravel/pea gravel	<input type="checkbox"/>
	signs	<input type="checkbox"/>	dirt/unsurfaced	<input type="checkbox"/>
	garbage	<input type="checkbox"/>		
	logging	<input type="checkbox"/>		

Trail usage:	hiking	<input type="checkbox"/>
	biking	<input type="checkbox"/>
	horses	<input type="checkbox"/>
	ATV/trail bike	<input type="checkbox"/>
	dog walking	<input type="checkbox"/>

Comments:

Fall Data Sheet

Note: Online data entry requires completion of two data sheets. Visit #1 is for species observations and visit #2 is for trail information. You may collect the trail data at the same time as your species visit or on a separate visit. This is your choice, depending on whether your site has few or many trails and whether there are changes from last year.

Observer Name: _____ Date of visit: _____

Site Number: _____

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Precipitation: _____

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Primary: beige with black and white stripes along body ☐

Christmas fern

Primary: evergreen fern with thick leathery leaflets ☐

Secondary: leaflets have a small lobe at base ☐

Tertiary: stems have scales, giving them a fuzzy appearance (see sketch) ☐

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Primary: bush/small tree; female plants have great numbers of red berries that last through winter ... ☐

Secondary: leaves are shiny, dark green, and finely toothed, but deciduous ☐

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Zig-zag-goldenrod

Primary: small yellow flower clusters at every leaf & stem that zigzags ☐

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Trail characteristics:	boardwalk	<input type="checkbox"/>	paved surface.....	<input type="checkbox"/>
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	trail markers	<input type="checkbox"/>	gravel/pea gravel	<input type="checkbox"/>
	signs	<input type="checkbox"/>	dirt/unsurfaced	<input type="checkbox"/>
	garbage	<input type="checkbox"/>		
	logging	<input type="checkbox"/>		

Trail usage:	hiking	<input type="checkbox"/>
	biking	<input type="checkbox"/>
	horses	<input type="checkbox"/>
	ATV/trail bike	<input type="checkbox"/>
	dog walking	<input type="checkbox"/>

Comments: