



GUIDING SOLUTIONS IN THE  
NATURAL ENVIRONMENT

# City of Peterborough Official Plan Update Natural Heritage System Background Report

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# 1. Introduction

The City of Peterborough has undertaken an Official Plan review and update as required by the provincial *Planning Act* (1990). The Official Plan is intended to establish the vision and direction for the long-term growth and development of the City of Peterborough. As part of the Official Plan review and update, the province directs municipalities through the Provincial Policy Statement (PPS) (MMAH 2020) to develop a municipal Natural Heritage System (NHS).

In the PPS, the province defines an NHS as:

*A system made up of natural heritage features and areas, and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. These systems can include natural heritage features and areas, federal and provincial parks and conservation reserves, other natural heritage features, lands that have been restored or have the potential to be restored to a natural state, areas that support hydrologic functions, and working landscapes that enable ecological functions to continue.*

The development of an NHS typically relies on the use of well-defined criteria to identify and confirm NHS components for a given jurisdiction. In the case of Provincially Significant Wetlands (PSW), Areas of Natural and Scientific Interest (ANSI), fish habitat and habitat of endangered or threatened species, the criteria for identification and determination of significance are generally already established, and beyond the local planning authority's purview. However, significant woodlands, significant valleylands and significant wildlife habitat as well as ecological linkages are to be identified by the planning authorities based on criteria that they establish. The use of criteria rooted in the current principles of conservation biology and landscape ecology, that also consider the local biophysical and planning context, help ensure that the approach to NHS identification is transparent, defensible and can be updated as required.

At the outset of the Official Plan review and update process, the City of Peterborough identified a vision and guiding principles to set out the policy direction of the Official Plan. The vision and guiding principles were selected to represent the community's priorities and needs and are:

- Environmental stewardship and sustainability;
- Economic strength;
- Complete community;

- Vibrant and unique; and
- Well-connected with options for mobility.

The inclusion of Environmental Stewardship and Sustainability as one of the five guiding principles was in recognition that natural areas are a valued part of the City of Peterborough's history and current landscape. Areas such as watercourses, wetlands and woodlands, are vitally important not only from a functional ecosystem perspective but also from a social and cultural perspective by forming part of the community's identity. The intrinsic value of natural areas and the flora and fauna that inhabit natural areas are highly valued by the community of Peterborough and by Indigenous Communities.

The protection of natural heritage features has tangible benefits that contribute to sustainable and healthy communities. Benefits provided by a functional natural heritage system include, but are not limited to, flood moderation, erosion control, air quality improvements, pollination services, genetic resources, recreation opportunities and human health (OMNRF 2010; Ontario Nature 2014; Kuo 2010). Additionally, protecting an interconnected system can facilitate adaptations that contribute to the resiliency of habitats and organisms when faced with threats associated with a changing climate (Fischlin *et al.* 2007; Lemieux *et al.* 2010).

Developing a system approach is the preferred method to protecting natural heritage features and their associated ecological functions (OMNRF 2010). This approach recognizes the interdependence of features and functions, and seeks to maintain connections among natural heritage features, so that their existing ecological functions are maintained or enhanced. A well-balanced and functional NHS ensures that an appropriate balance is struck between protecting the key elements of the natural environment and the need to accommodate and manage future growth in a sustainable and healthy environment.

The goal of the City of Peterborough's NHS is to provide a comprehensive, functional and resilient system of interconnected natural features that aligns with current conservation principles, supported by strong planning policies to identify and protect the valuable natural heritage resources within the City. The purpose of this report is to provide both context and supplementary information in support of the implementation of the natural heritage policies of the City of Peterborough Official Plan.

The planning policies related to the NHS are described in the Official Plan in Section 4.6 and shown on Schedule F: Natural Heritage System and Environmental Constraints. As with any large-scale mapping projects, the mapping shown on Schedule F will need to be further amended and updated based on site-specific information. However, it is important to note that it is the principles of the NHS and the criteria used to identify the components that is the final determinant of whether or not any particular area is part of the NHS and protected through the policies of the City of Peterborough Official Plan.

## 2. Approach

A multi-phased approach was used for developing the City of Peterborough NHS and supporting policies. The following sections outline the framework.

### 2.1 Phase 1: Background Review

Phase 1 focused on completing background review of applicable natural heritage information. Existing studies such as the Peterborough Natural Areas Strategy, watershed plans, the Peterborough Ecology Strategy as well as many environmental reports were a valuable foundation upon which to build the NHS and were used in conjunction with other sources of background information.

Additional sources of information included: the City of Peterborough, Otonabee Region Conservation Authority (ORCA), Ministry of Natural Resources and Forestry (MNRF), Natural Heritage Information Centre (NHIC), Land Information Ontario (LIO). Base data, including existing NHS mapping, floodplain mapping, topographical mapping, aerial photography, hydrologic mapping, fisheries management plans, and flora and fauna data were integrated where available and useful.

Road-side reconnaissance-level surveys were required to supplement information gathered through the background review. The purpose of these investigations was to confirm background information and focused on areas where there may be some uncertainty as to the existing conditions. These surveys were limited by site access availability and were not intended to be a fulsome inventory or study of natural areas and functions.

### 2.2 Phase 2: Component Definitions and Natural Heritage System Mapping

Phase 2 synthesized the information gathered during Phase 1 in a manner that defined and allowed for identification of the components of the NHS that was consistent with the PPS building-block approach. The science and technical direction in natural heritage planning strongly emphasizes the need for a landscape-scale approach to the identification of significant features, the importance of feature connectivity and the importance of incorporating an understanding of habitat functions (e.g., Donnelly and Marzluff 2006; Ewers and Didham 2006; Gilbert-Norton *et al.* 2010; Hodgson *et al.* 2011; Prugh *et al.* 2008; Spring *et al.* 2010).

As stated in the Natural Heritage Reference Manual (OMNR 2010), a comprehensive NHS can be achieved by starting with the identification of natural features and build-in connectivity among these

features. Using this approach, connectivity can be achieved in two ways. The first is by overlaying the various significant natural features, which often provides some level of existing connectivity (e.g., river or creek corridors often form natural connections between various other natural features in the landscape). The second is by assessing the system that results from the overlay of the various significant features and identifying feasible and functional opportunities for linkage in the landscape.

Criteria-based identification of natural heritage features and/or municipal natural heritage systems is recognized as an effective approach to natural heritage planning (OMNRF 2006; Ontario Nature 2014). Having each significant feature (or subset of features) with a distinct set of criteria for identification and, where possible, mapped in an official plan schedule, as well as linked to a specific set of policies, makes implementing and defending protection of these areas on the ground, on a site-specific basis, more transparent, systematic, and defensible.

Criteria for defining NHS components within the City of Peterborough were developed. These criteria incorporated scientific knowledge, conservation principles, and sound planning principals. A multi-level approach to defining the features of the City of Peterborough NHS was used which considered the sensitivity, significance (including provincial significance), and function of the NHS components. This approach allowed for natural heritage features to be incorporated into the NHS in a way that is reflective of their current form and function, ties into the intent of the Official Plan, and allows a policy framework that considers each of the levels separately.

Finally, when identifying NHS components, consideration for the relationship with surrounding systems was incorporated recognizing the critical importance of the broader landscape and ecological connections with neighbouring jurisdictions in order to implement and maintain a functional natural heritage system.

### **GIS Mapping**

Data availability is an important consideration for NHS planning, but the lack of some types of data should not preclude the inclusion of a criterion category that is considered important to the overall sustainability of the NHS, or necessary for conformity with current policies.

While it is useful and practical to develop mapping for an NHS for planning and implementation purposes, it is not always possible or practical (or for that matter necessary) to map all natural features and areas. Some components of the NHS will always be subject to site-specific review and refinement at the time of planning applications. This is particularly true with habitat for endangered or threatened species and significant wildlife habitat, which can change even from year to year.

Therefore, the approach to developing the City of Peterborough NHS map as shown in Schedule F of the Official Plan was based on the best available data at the time of preparation. It is important to recognize that the mapping is not an exhaustive representation of all NHS components but is a useful tool to use for planning and implementation subject to the following limitations:

- Mapping was developed with information from different sources, collected at different scales, and while every effort has been made to ensure that the mapping is as current and accurate as possible, there will be some inaccuracies that need to be corrected at the site-specific scale;
- Only reconnaissance-level field reviews were conducted in support of this study and the mapping will need to be refined to reflect the applicable NHS criteria more accurately at the site-specific scale based on current and comprehensive field studies;
- Designated Natural Areas as mapped do not include buffers (or vegetation protection zones); these need to be determined as part of the planning/development process (through the appropriate studies). Note that once buffers or vegetation protection zones are established through appropriate studies these areas are added to the Natural Area Designation but not necessarily reflected on the Official Plan mapping;
- Opportunities for ecological linkages, naturalization or restoration that may be identified as part of the planning process or through a Restoration and Enhancement Strategy that have not been identified in the mapping; and
- The acknowledgement that there are development rights provided through the existing zoning by-law. However, upon adoption of the new Official Plan, the zoning by-law must be brought into conformity with the new Official Plan and reflect the NHS mapping accordingly.

## **2.3 Phase 3: Policy Development**

Following consultation with stakeholders and rightsholders and receipt of public input and comments, Official Plan policy was developed to direct the protection of the natural features of the City of Peterborough NHS in a manner that was consistent with the overall goals and objectives of the Official Plan update.

The policy approach focused on a Natural Areas land use designation to capture the NHS components, connections and linkages. Permitted uses were prescribed for the NHS components along with development policies including minimum vegetation protection zones and consultation requirements. Permitted uses, development policies and study scoping requirements were also developed for land adjacent to features defined under the Natural Areas designation, regardless of their inclusion on Schedule F, recognizing the importance of these areas in supporting and facilitating the function of the NHS.

## **2.4 Consultation, Collaboration and Traditional Ecological Knowledge**

A separate consultation phase was purposely not incorporated into the approach outlined above. This was in recognition of the value of obtaining the knowledge and input of stakeholders, community members and rightsholders throughout the process. Consultation and collaboration was on-going and incorporated various opportunities throughout the NHS and policy development phases to share important insight which contributed to the NHS component and policies of the Official Plan.

The work of the Beacon team has also been guided by the Natural Heritage System Taskforce, which was struck at the outset of the undertaking by the City of Peterborough and comprised of key stakeholders and rightsholders, including:

- Ministry of Natural Resources and Forestry;
- Otonabee Region Conservation Authority;
- Peterborough Field Naturalists;
- ReImagine Peterborough;
- Curve Lake First Nation;
- Hiawatha First Nation; and
- Local planning expertise.

The City of Peterborough also solicited feedback and comments from stakeholders, community members and rightsholders through written comment submissions at key points throughout the process. A summary of the various meetings, open houses, information centers are provided as follows:

- Natural Heritage System Taskforce;
- Official Plan Working Group;
- Traditional Ecological Knowledge sharing with Treaty 20 Rightsholders – October 2018, November 2018 and September 2019;
- Traditional Ecological Knowledge sharing with Treaty 20 Elders – January 2019;
- Public open houses to discuss urban design and natural heritage – November and December 2018;
- Drop-in public open houses to review the draft Official Plan – August 2019; and
- Drop-in public open houses to provide a summary of the feedback received from the public

on the draft Official Plan – September 2019.

### **3. Policy Background**

The PPS, section 2.1, promotes a systems approach to natural heritage planning, and provides policy direction for specific natural feature categories. Both aspects of natural heritage planning are laid out in the policies and need to be addressed through local municipal natural heritage planning.

Despite the overall emphasis on a systems approach to natural heritage planning, and on the importance of linkages and connectivity, the fundamental building blocks of the system remain specific features, with specific policies that apply to each, as provided in sections 2.1.4 through 2.1.7. These features, combined, are to form a system of habitat cores and linkages to sustain the full range of local biodiversity (i.e., both common and rare species and habitats) for the long-term.

Municipalities are faced with multiple challenges when identifying and developing policies for NHSs. The challenges include providing protection for significant features, fish habitat and habitat for endangered or threatened species as well as connections between them, and also protecting connections to supporting water resources, while still accommodating changes in adjacent land uses and trying to plan for climate change.

The PPS provides direction to regional and local municipalities regarding planning policies for the protection and management of natural heritage features and resources for applications pursuant to the *Planning Act*. The 2020 PPS took effect on May 1, 2020, superseding the PPS of 2014. The PPS defines natural heritage features and provides planning policies for each natural heritage feature. The key text from the PPS that applies to the natural heritage features is reproduced below. The City of Peterborough is located with Ecoregion 6E of Southern Ontario.

*2.1.4 Development and site alteration shall not be permitted in:*

- a) *Significant wetlands in Ecoregions 5E, 6E and 7E; and*
- b) *Significant coastal wetlands.*

*2.1.5 Development and site alteration shall not be permitted in:*

- a) *Significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E;*
- b) *Significant woodlands in Ecoregions 6E and 7E (excluding islands in*

- Lake Huron and the St. Marys River);*
- c) *Significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);*
  - d) *Significant wildlife habitat;*
  - e) *Significant areas of natural and scientific interest; and*
  - f) *Coastal wetlands in Ecoregions 5E, 6E and 7E that are not subject to policy 2.1.4(b);*

*unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.*

2.1.6 *Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.*

2.1.7 *Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.*

Of these features, PSWs and significant ANSIs are identified directly by the MNR. Woodlands are identified using criteria to be provided by MNR (none have been provided to date), and other significant features may be identified using MNR recommended criteria or municipal criteria that meet the same standard. In Ontario, Fisheries and Oceans Canada (DFO) manages fish habitat and the MNR manages fisheries. Habitat of endangered or threatened species is mainly governed by the provincial *Endangered Species Act* (ESA) (2007) although the federal *Species at Risk Act* may also apply.

Policy 2.1.8 of the PPS further states that development and site alteration shall not be permitted on “adjacent lands” to the natural heritage features/areas (i.e., within 120 m) addressed in policies 2.1.4, 2.1.5, 2.1.6 and 2.1.7 unless:

*...the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.*

Adjacent lands are defined in the PPS as:

*Those lands contiguous to a specific natural heritage feature or area where it is likely that development and site alteration would have a negative impact on the feature or area.*

The other primary pieces of legislation that pertain to natural heritage, and related to the feature categories identified in the PPS are the provincial ESA (2007), the federal *Species at Risk Act* (SARA) (2002), the federal *Fisheries Act* (1985), and the provincial *Conservation Authorities Act* (2006). Each of these also needs to be considered in the development and implementation of municipal NHS policies.

The province has also prepared a series of the technical guidance documents to assist with the development of natural heritage systems and development of criteria to establish significance for features not designated by the province. Two key documents are the *Natural Heritage Reference Manual* (OMNR 2010) and the *Significant Wildlife Habitat Ecoregion Criteria* (OMNR 2015). While both documents are useful tools for natural heritage planning, they do not set criteria that must be followed by municipalities for establishing significance. This allows for municipalities to use these documents as a guidance tool while still having the flexibility to develop policies that are appropriate in the context of the landscape. A balanced approach of using provincial guidance as a tool and applying a “made in Peterborough” lens has been used for the City of Peterborough NHS.

## **4. Existing Natural Environment**

The following sections provide a general overview of natural feature occurrence within the City of Peterborough to provide some context for the natural landscape and is not meant to be an exhaustive summary of all natural features and areas documented with the City.

### **4.1 Physiography**

The composite geology within the City of Peterborough area has a diversity not seen in many other regions, that directly affects the ability of each subwatershed to respond to changing water balance and land use.

Peterborough is the gateway to what Ontario geologists know as ‘the land between’, a geological area that runs from Georgian Bay in the west to Kingston in the east, and is characterized by the complex bedrock transition from the young limestone/shale bedrocks (the Paleozoic Lowlands) of southern Ontario, to the old rolling craton rocks (the Precambrian Shield) of ‘cottage country’. This complex

area directly affects the current fluvio-lacustrine and groundwater regimes, just as it directly influenced the morphology of glacial features deposited during the Laurentide glaciation.

More specifically, the City of Peterborough lies over the shaley Ordovician limestones of the Verulam Formation, which consist of grey to blue to brown fossiliferous limestone interbedded with thin layers of shale (MRD227). Fossiliferous zones contain crinoid grainstones, contemporary to the Ordovician, indicating that the Peterborough area was a shallow sea water environment at that time.

The overburden/physiology beneath the City of Peterborough is equally complex, and generally the result of widespread glacial processes associated with the advance, stagnation, and retreat of the Simcoe Lobe of the Laurentide Ice Sheet (Marich 2016). Recognized features include, but are not limited to, drumlins, eskers, moraines, kames, till planes, glaciolacustrine and glaciofluvial outwash features (Marich 2016; MRD228).

Although generally famous for the Peterborough Drumlin Fields, the greater part of the City of Peterborough is comprised of generally flat glaciolacustrine deposits with few drumlins, and a glaciofluvial outwash deposit extending north along the Otonabee River toward Lakefield. The Peterborough Drumlin Fields bracket this 'paleo-lake and spillway' feature to the east and west (MRD128; MRD228) at the City margins. Overburden thickness beneath the City of Peterborough ranges from 0 metres to 120 metres, with the thickest overburden in the west and southwest toward Cavan.

The glaciolacustrine and glaciofluvial deposits comprising the greater part of Peterborough are characterized by sand to gravel with nearshore, beach, river and deltaic textures (MRD128, MRD228).

The Peterborough Drumlin Field, which is found to the east and west margins of Peterborough, is a singular example of a drumlin field, with more than 3,000 well-developed drumlins of various morphologies and orientations extending south beyond the Oak Ridges Moraine into the Lake Ontario Basin (Marish 2016). The drumlins are composed primarily of Newmarket Till, characterized as sub-glacially-deposited massive silty-sand diamicton, which may have existed in the area as a single basal subglacial deposit, before being eroded as part of four or five flow sets into the familiar drumlin morphologies (Boyce and Eyles 1991). Some drumlins have been identified with fluted bedrock cores (Gravenor 1957; Boyce and Eyles 1991).

## 4.2 Wetlands

Wetlands are lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case, the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic or water tolerant plants. Four main categories of wetland are swamps, marshes, bogs and fens. Periodically soaked or wetlands being used for agricultural purposes which no longer exhibit wetland characteristics are not considered to be wetlands.

Wetlands are recognized as an essential natural resource that help moderate water flow, contribute to groundwater recharge, improve water quality, store carbon, and provide habitat for a broad range of species including: fish, waterfowl, songbirds, shorebirds, raptors, amphibians, reptiles and insects. Wetlands also often have a special significance socially and culturally.

Wetlands have been linked to the culture, traditions, health, and well-being of the Michi Saagiig. The First Nations often consider wetlands to be sacred places containing important medicines and view wetlands as the liver and kidneys of the earth due to their ability to improve water quality.

Wetlands form a valued component of the City of Peterborough's natural areas and often coincide with the larger natural feature areas within the City. Currently eight PSWs are located within the City. These are:

- Jackson Creek Provincially Significant Wetland;
- Jackson Creek East Provincially Significant Wetland;
- Harper Creek Provincially Significant Wetland;
- Loggerhead Marsh Provincially Significant Wetland;
- Peterborough Airport Wetland Complex Provincially Significant Wetland;
- Downer's Corners Provincially Significant Wetland;
- Cold Springs and Yankee Bonnet Provincially Significant Wetland; and
- Nassau Wetland Complex Provincially Significant Wetland.

Mapped wetlands, including PSW, non-PSW and unevaluated wetlands, cover approximately 618 ha within the City of Peterborough, accounting for 9% of the total area of the City. PSWs comprise approximately 261 ha and represent 42% of the total wetland coverage. However, as not all wetlands are mapped, and the boundary of mapped wetlands do not always reflect current conditions, it is likely that these numbers are an underestimate of the total area of wetlands within the City.

### 4.3 Woodlands

Woodlands in this context exclude urban trees and street trees. Woodlands are treed areas, woodlots and forested areas, including treed wetlands, other than a cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees or nursery stock.

The following Ecological Land Classification (ELC) Community Classes and Series are considered woodland (Lee *et al.* 1998):

- Forest – coniferous forest (FOC), mixed forest (FOM) or deciduous forest (FOD);
- Swamp – coniferous swamp (SWC), mixed swamp (SWM) or deciduous swamp (SWD);  
and
- Cultural – cultural woodland (CUW) or cultural plantation (CUP).

Woodlands provide a suite of ecosystem services, contribute to habitat diversity, support connectivity, and supply both social and economic benefits. In a landscape where woodlands are separated into smaller patches (or fragmented), such as the City of Peterborough, the size and composition of remaining woodlands combined with their position in the landscape in relation to other woodlands and natural areas influence their level of ecological functions. Often, in an urbanized landscape, the social (human) values placed on woodlands are extremely high, regardless of their level of ecological function.

Structural diversity of habitat is a key driver of biodiversity and woodlands provide a diverse range of habitats for flora and fauna. Woodlands form important building blocks of the NHS and are present in a wide range of topographic settings, substrates and moisture regimes. The structure of woodlands varies in composition on both a landscape scale and species composition. Woodlands provide a variation of habitat niches, comprised of microhabitats such as the surfaces of fissured trunks, stumps and rotting logs to macrohabitat features such as the horizontal layers within the forest (e.g., ground flora, understory, sub-canopy, and canopy).

Woodlands form a dominant component of the City of Peterborough's natural areas, often coinciding with areas valued from First Nation societal and cultural perspectives. Examples of these areas include Jackson Park, Trent Nature Areas and Harper Park. Jackson Park specifically has the distinction of being "Peterborough's best known and most popular nature area" (Greig *et al.* 1993) and is home to old growth White Pine, Eastern Hemlock and White Cedar (Henry *et al.* 2016). Often these more extensive areas of woodland cover are associated with areas of higher ecological function within the City of Peterborough and provide habitat for diverse wildlife communities.

Woodlands extend over approximately 1,070 ha, accounting for about 15.9% of the total area of the City of Peterborough (Table 1). Based on background information, interpretation of aerial photography and reconnaissance-level investigations the dominant woodland cover is a mixed canopy (FOM/SWM), accounting for an estimated 64% of the total woodland within the City and 10% of the City area.

**Table 1. Estimated Woodland Cover by Type**

Woodland Type	Woodland Cover		
	Area in City (ha)	Cover by Woodland Type (%)	Cover within City (%)
Cultural Plantation (CUP)	5	0.4	< 0.1
Cultural Woodland (CUW)	25	2.4	0.4
Conifer Forest (FOC)	54	5.0	0.8
Deciduous Forest (FOD)	140	13.0	2.1
Mixed Forest (FOM)	340	31.8	5.0
Conifer Swamp (SWC)	7	0.7	0.1
Deciduous Swamp (SWD)	158	14.7	2.3
Mixed Swamp (SWM)	341	31.9	5.1
<b>Total</b>	<b>1,070</b>	<b>--</b>	<b>15.9</b>

Woodland patch size plays an important role in determining the ecological importance of a woodland. It is widely recognized that more expansive woodland patches typically have higher ecological importance and many species require either large patches of woodland or well-connected moderately-sized patches within which to occur. The absence of expansive large patches within the City boundaries indicates that productive habitat is likely not present for some species.

The woodland cover in the surrounding landscape and the matrix within which a woodland occurs are also important factors that are indirectly related to a woodland’s form and function and are independent of patch size.

The total area of woodland cover in the broader landscape is important in functional terms (see summary in *How Much Habitat is Enough* [Environment Canada 2013]). It is known that some species decline in abundance in any given habitat patch as the broader landscape level of woodland cover declines. Clearly, an urbanized landscape, such as is found within the City of Peterborough, with its 16% woodland cover will be unable to support the full suite of species that would occur if the landscape level woodland cover was, for example, above 50%; which is the level at which biodiversity changes are less likely to occur (Environment Canada 2013).

The landscape matrix within which the woodland occurs is also important in terms of species composition. The more similar the matrix is to a woodland, the more likely it may be supportive of the flora and fauna within that woodland. An urban matrix is generally unsupportive and less permeable, while an agricultural landscape may be at least more permeable. Connectivity values (i.e., the actual usage of linkages and connections) likely increase when the matrix is more inhospitable (Gilbert-Norton *et al.* 2010).

A woodland patch is defined as the total area of a contiguous patch of wooded areas. This analysis does not incorporate other parameters of function such as habitat for endangered or threatened species, as this can only be established with detailed investigations. For this analysis, GIS was used to calculate all contiguous wooded areas and determine the distribution of woodland patch sizes within the City (**Table 2**). Consistent with the *Natural Heritage Reference Manual* (OMNRF 2010) wooded areas separated by more than 20 m or a road/railway were considered separate woodlands. This analysis does not incorporate adjacent or nearby natural areas that extend beyond the City limits.

**Table 2. Woodland Cover by Patch Size**

Woodland Patch Size (ha)	Woodland Cover			
	Area in City (ha)	# of Woodland Patches	% of Total Woodland Cover	Cover within City (%)
≥ 0.2 - < 0.5	5	16	0.5	0.1
≥ 0.5 - < 2.0	73	64	6.8	1.1
≥ 2.0 - < 5.0	85	28	7.9	1.3
≥ 5.0 - <10	129	18	12.0	1.9
≥ 10	779	24	72.8	11.6
<b>Total</b>	<b>1,070</b>	<b>150</b>	-----	<b>15.9</b>

There are approximately 779 ha of woodlands in patches of 10 ha or greater, distributed among 24 patch locations. This represents 72.8% of the woodland cover if the City of Peterborough. This analysis indicates the prevalence of larger woodlands within the City of Peterborough. However, in terms of total woodland cover at 15.9% the City is at what could be considered a critical threshold. The City of Peterborough should aim to not lose woodland cover, especially that which is of good quality and provides functions associated with mature woodlands and larger patch sizes (Environment Canada 2013).

#### **4.4 Valleylands**

A valleyland is a natural depression in the landscape that has two sides and has water flowing through it or standing in it, for some period of the year. Valleylands vary in size from headwater features to wide valleys containing substantial rivers and expansive natural features. These features often form the “backbone” of a watershed because of the many important ecological functions they perform. As described in the *Natural Heritage Reference Manual* (OMNR 2010), these functions include channeling water, connecting natural heritage features, acting as movement corridors, transporting sediment and nutrients, maintaining water levels by acting as floodplains and seepage areas, and maintaining water quality through riparian vegetation communities.

Valleylands often also hold a cultural significance. Whether they were the location of indigenous meeting places, travel routes or settlements, or post-settlement development patterns, valleylands can strongly influence human settlement patterns. This is readily apparent in the City of Peterborough with large portions of the urban landscape being situated within valleylands.

Within the City of Peterborough, the presence of valleylands are typically determined through site specific field investigations and technical reports and the limits are identified with the conservation authority. Predominate valleyland features within the City of Peterborough include the Otonabee River valley and Jackson Creek valley, both of which have been identified as significant valleyland systems.

#### **4.5 Area of Natural and Scientific Interest**

Areas of Natural and Scientific Interest (ANSIs) are representative examples of the many natural landscapes, geological features, communities, plants and animals in the province. To encourage the protection of these areas that are rich in biological, geological and ecological value, the MNR leads the ANSI program; identifying ANSI's by surveying regions and evaluating sites to decide which areas have the highest value for conservation, scientific study and education in the province.

Currently, there are neither Life Science ANSIs nor Earth Science ANSIs of any level (local, regional or provincial) within the City of Peterborough.

## **4.6 Fish Habitat, Watercourses and Waterbodies**

Watercourses are featured prominently on the landscape within the City of Peterborough and play an important role in the area both historically and presently. The landscape of Peterborough has been shaped around watercourses and their importance is reflected in many facets of the community. There is high societal value placed on watercourses in addition to the many ecological services they provide. The Michi Saagiig view water as a sacred, living entity and the bloodline of Mother Earth. The waterways form part of the historic travelling routes of the Michi Saagiig and have played a key role in the history of the area.

Watercourses and waterbodies have an integral role in providing and supporting ecological functions, acting not only to convey or contain water but to provide habitat, act as movement corridors or stepping-stones, transport or store nutrients, and provide flood moderation. Watercourses typically provide fish habitat in either a direct or indirect capacity by providing or supporting spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes.

A watercourse is generally defined as an identifiable depression in the ground in which a flow of water regularly or continuously occurs. Watercourses are typically further classified by flow regime into one of three categories:

- Ephemeral - supporting flows for a short in response to localized precipitation (e.g. spring freshet or storm events). Surface water channel is above the local groundwater table;
- Intermittent - water flows for several months during the year because of a connection with seasonally high groundwater table or flow contributions from wetlands. Typically flow ceases during the summer months; or
- Permanent - continuous year-round surface flow occurs in most years. Baseflow conditions are supported by year-round groundwater discharge and/or wetland/surface storage areas.

This definition captures features ranging from ploughed-through headwater drainage features in farm fields, to large riverine systems such as the Otonabee River. Within the City of Peterborough there are portions of eight distinct watersheds that drain to the Otonabee River. These are:

- Bears Creek;
- Byersville Creek;

- Unnamed Tributaries;
- Jackson Creek;
- Curtis Creek;
- Thompson Creek;
- Riverview Creek; and
- Meade Creek.

These systems range from heavily urbanized (e.g. portions of Jackson Creek through downtown) to relatively natural and provide varied aquatic habitats, with some areas supporting critical functions such as spawning, refuge, nursery and foraging for a variety of fish species.

An example of a unique fish habitat function that occurs within the City is one of very few known coldwater urban Brook Trout systems in Ontario. This fish community is found in Harper Creek and recent studies (Harper Park Stewardship Committee 2017) have documented the fish utilizing reaches of the system that flow adjacent to a roadway as spawning habitat.

#### **4.7 Habitat for Endangered or Threatened Species**

Protection of habitat for species that are facing threat and experiencing population decline is a key tool for limiting the loss of biodiversity. In the *Natural Heritage Reference Manual* (OMNR 2010), it is noted that the protection of endangered or threatened species is necessary in order to slow or prevent the loss of species from the province, and in some cases, their extinction on a global basis.

Threatened or endangered species are designated by both the provincial and the federal governments. At the provincial level, species listed as endangered or threatened by the Committee on the Status of Species at Risk in Ontario are protected through the *Endangered Species Act* wherever they occur. In general terms, species listed as endangered or threatened on Schedule 1 of the federal *Species at Risk Act* are protected on federal lands (i.e. the Trent Severn Waterway). These lists are amended on a regular basis (i.e., at least once a year) to accurately reflect new information. For example, some species previously not considered at risk (NAR), or of special concern (SC) can become threatened or endangered, or conversely the status of species currently listed as endangered or threatened can be down-listed.

Mapping of records (including historical records) for endangered and threatened species is maintained by Ontario's NHIC. Due to the sensitivity of these data, the information is accessible as 1

km squares that capture the approximate locations for the species occurrence, and in some cases even then the name of the species is withheld. Other sources of information gathered through detailed studies, Indigenous knowledge or citizen science initiatives have been useful to develop a list of species with known occurrences within the City of Peterborough. **Table 3** provides an overview of endangered or threatened species that are known to have been recorded within the City of Peterborough that have likely bred in the area (i.e., excluding migrant birds).

**Table 3. Endangered or Threatened Species Records in City of Peterborough**

Group	Common Name	Scientific Name	SARO Status	SARA Schedule	SARA Status
Birds	Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	THR	Schedule 1	THR
	Chimney Swift	<i>Chaetura pelagica</i>	THR	Schedule 1	THR
	Least Bittern	<i>Ixobrychus exilis</i>	THR	Schedule 1	THR
	Loggerhead Shrike	<i>Lanius ludovicianus</i>	END	No Schedule	
	Bank Swallow	<i>Riparia riparia</i>	THR	Schedule 1	THR
	Barn Swallow	<i>Hirundo rustica</i>	THR	Schedule 1	THR
	Bobolink	<i>Dolichonyx oryzivorus</i>	THR	Schedule 1	THR
	Eastern Meadowlark	<i>Sturnella magna</i>	THR	Schedule 1	THR
	Cerulean Warbler	<i>Setophaga cerulea</i>	THR	Schedule 1	END
Mammals	Northern Myotis	<i>Myotis septentrionalis</i>	END	Schedule 1	END
	Eastern Small-footed Myotis	<i>Myotis leibii</i>	END	No Schedule	
	Little Brown Myotis	<i>Myotis lucifugus</i>	END	Schedule 1	END
	Tri-colored Bat	<i>Perimyotis subflavus</i>	END	Schedule 1	END
Trees	Butternut	<i>Juglans cinerea</i>	END	Schedule 1	END
Reptiles	Eastern Hog-nosed Snake	<i>Heterodon platirhinos</i>	THR	Schedule 1	THR
	Spotted Turtle	<i>Clemmys guttata</i>	END	Schedule 1	END
	Blanding's Turtle	<i>Emydoidea blandingii</i>	THR	Schedule 1	THR

## 4.8 Wildlife Habitat

Wildlife habitat is a broad category that includes a wide range of unique and specialized habitats. It is a complex category because it encompasses such a diversity of natural and semi-natural areas both in terms of type and scale. As defined through the PPS (2020) wildlife habitat means:

*...areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or non-migratory species.*

At the time of developing the NHS for the City of Peterborough, wildlife habitat had not been designated within the City.

## 4.9 Linkages and Connections

The term “linkages and connections” can be applied in the context of land use planning to apply to pathways of connectivity along which wildlife could be expected to move, particularly in the context of anticipated land use changes (e.g., urbanization).

These connections are especially important for species that move between different habitats for survival (like some amphibians) or species that migrate in response to seasonal changes. This function is also captured by the significant wildlife habitat category for the subcategory “*animal movement corridors*”, although these are generally interpreted as being specific locations where use by specific wildlife species has been documented.

There continues to be debate about the value of maintaining and/or creating ecological connectivity in highly fragmented landscapes, as occur in southern Ontario, and some scientists have pointed out that such connections can, and do, provide pathways for stressors that degrade natural areas (e.g., invasive species, pests and pathogens) (e.g., Proche et al. 2005; Bailey 2007). While others (e.g., Hannah 2008; Falcy and Estades 2007; Quinby 2006) have argued that in the context of climate change and ever limited resources more ecological benefits can be reaped by increasing the area of existing protected natural areas, rather than trying to connect them. However, there remains strong support for the principle that maintaining connections between otherwise isolated patches of remnant habitats is a sound conservation strategy. Research on this topic continues to demonstrate that well-connected habitats tend to support higher levels of biodiversity and facilitate important longer-term ecological functions such as: the re-population of areas subject to local extinctions of particular species of flora or fauna; the dispersal of animals and/or of plant seeds/propagules that are carried by

animals to new habitats in the post-breeding season; and the provision of habitat critical to fulfill life cycle requirements (e.g., ELI 2003; Damschen *et al.* 2006; Damschen *et al.* 2014; Gilbert-Norton *et al.* 2010; Rudnick *et al.* 2012).

The City of Peterborough is dominated by the corridor that is created by the Otonabee River and its tributaries. These were important pathways in the past when the Michi Saagiig used them extensively and remain important to the current day.

There are relatively few opportunities within the more urbanized portions of the City to expand and create pathways of natural connectivity, and most of those pathways might only be used by urban-tolerant species. More opportunities exist at the margins of the built areas and where natural areas are already connected to, and part of, systems that extend beyond the City.

## **5. City of Peterborough Natural Heritage System Components and Levels**

An NHS includes primary components that act as building blocks to construct a functional system. These components comprise different types of natural areas, ecological functions and linkages. When combined, they form an interconnected system of natural areas. This interconnected system strengthens the potential of individual components to provide ecological benefits and supports the resiliency of the natural environment. This “building block” approach has been utilized as a foundation for the City of Peterborough NHS and a “made in Peterborough” lens has been applied to ensure that the NHS reflects the natural areas of the City as well as the values of the community.

Within the City of Peterborough, there are seven component types that, together with linkages and connections, comprise the NHS. These are:

- Wetlands;
- Woodlands;
- Valleylands;
- Areas of Natural and Scientific Interest;
- Fish Habitat, Watercourses and Waterbodies;
- Habitat for Endangered or Threatened Species; and

- Significant Wildlife Habitat.

These seven components are also consistent with the requirements of the PPS.

In recognition of the wide spectrum of natural features that comprise the NHS, a level designation is applied to reflect the function and significance of the different system components. The NHS comprises of natural features and areas that are categorized into one of three levels: Level A, Level B and Level C.

- Level A is the highest level of protection afforded to NHS features and the intent is to protect the form and function of these areas *in situ*. Development or site alteration will not be permitted unless in accordance with the federal *Fisheries Act*, the provincial *Endangered Species Act* or the federal *Species at Risk Act*.
- Level B is comprised of features that are important to the overall function of the Natural Heritage System. The intent is to preserve the function that these areas provide to the NHS while allowing some flexibility to the form of the features in cases where it can be demonstrated that a net gain in function can be achieved through mitigation or a compensation strategy.
- Level C features are recognized for the supporting role they provide to the Natural Heritage System. Development or site alteration will be considered where there is an opportunity to replicate the function on site or elsewhere in the City, in conformity with provincial and/or federal requirements.

The following sections summarize how features within the components of the NHS are protected through the Official Plan.

## 5.1 Wetlands

Provincially Significant Wetlands are afforded a high level of protection under provincial policies while all wetlands and their adjacent areas are regulated by the local conservation authority. Under the *Planning Act* Section 2.1 of the PPS states that no development or site alteration is permitted within Provincially Significant Wetlands, and development and site alteration within adjacent lands are only permitted where an environmental study demonstrates no negative impact to the feature or its ecological function.

In Ontario wetland significance under the *Planning Act* is determined by application of the Ontario Wetland Evaluation System (OWES). The OWES was developed by the MNRF primarily to address the Province's planning requirements and to provide a standardized method of assessing wetlands relative to each other. The evaluation system often serves as a preliminary inventory of a wetland (or wetland complex, which is several associated wetland units), and is based on a consideration of the following four components: biology, hydrology, social and economic values, and special features. Site-specific field studies to confirm the boundaries of evaluated, or to evaluate unevaluated wetlands, must be undertaken by persons certified by the MNRF in the application of OWES and the designation of PSWs remains under the purview of MNRF.

When describing the type of wetlands other than PSWs there are two terms that are commonly used and a third category that exists. The distinctions between the three are important to understand. These are:

1. A non-PSW is a wetland that has been evaluated following the OWES, however the MNRF has determined that the wetland does not meet the requirements for a PSW designation;
2. Unevaluated wetlands are those that have not yet been evaluated using the OWES; and
3. Some wetlands have been considered for evaluation but were purposefully not included in an evaluation on account of various complexing or evaluation rules; these wetlands have never been scored under the evaluation system as they have been considered not eligible for evaluation in the first place.

Wetland designations are not static and wetland evaluations are considered to be open files by MNRF. Non-PSWs are sometimes re-evaluated when new, verifiable and qualifying information is provided. In recent years there have been several instances (e.g. Harper Creek PSW and Loggerhead Marsh PSW) in the City of Peterborough where a non-PSW has been re-designated as a PSW.

All wetlands, regardless of their current evaluation status, are included within the City of Peterborough NHS and afforded protection through the applicable levels as detailed in **Table 4**. Consistent with the policies of the PPS, PSWs are afforded the highest level of protection within the NHS.

**Table 4. Natural Heritage System Level Criteria - Wetlands**

Component	Natural Heritage System Level Criteria		
	NHS Level A	NHS Level B	NHS Level C
<b>Wetlands</b>	Provincially Significant Wetlands (PSW) as designated by the	Non-PSW or unevaluated wetlands that meet the following criteria: i. Wetlands $\geq$ 0.5 ha; or	All wetlands that do not otherwise qualify under

Component	Natural Heritage System Level Criteria		
	NHS Level A	NHS Level B	NHS Level C
Ministry of Natural Resources and Forestry.		ii. Wetlands 0.2 to 0.5 ha that meet one or more of the following: <ul style="list-style-type: none"> <li>• Located within floodplain;</li> <li>• Contiguous with a permanent or intermittent watercourse, a Significant Valleyland or NHS Level A or B woodland;</li> <li>• Identified as a bog or fen; or</li> <li>• Identified as part of an ecologically functional corridor or linkage between natural heritage features.</li> </ul>	Wetland NHS Level A or B.

There are many wetlands that have not been evaluated for significance within the City of Peterborough. This poses difficulties when an unevaluated wetland is present on a property that is subject to a development application. The City of Peterborough, in coordination with appropriate parties, intends to evaluate all wetlands within the City following the OWES for Southern Ontario to determine significance. It should be recognized that the evaluation process will result in three possible outcomes. These are: wetlands that are PSW, wetlands that are evaluated and determined to be non-PSW and wetlands that were determined not to be eligible for inclusion in an evaluation.

## 5.2 Woodlands

The PPS does not permit development or site alteration in significant woodlands or its adjacent lands unless it has been demonstrated that there will be no negative impacts on the feature or its ecological function. However, unlike PSWs and ANSIs, the province has not yet provided specific criteria for determining woodland significance.

As part of developing the NHS, the City of Peterborough has identified criteria by which the woodlands within the City must be evaluated to determine significance. The criterion for significance considers woodland area, and for woodlands between 0.5 ha and 2.0 ha metrics to represent quality, diversity, age and representation. As well functions that woodlands provide in the landscape such as water quality contributions, and linkages between other habitats has been incorporated. Area thresholds have been incorporated that reflect existing woodland cover within the City of Peterborough (**Table 5**). Under the City-identified criteria for the evaluation of woodland significance, 92.7% of woodlands would be considered significant based on area alone and another 6.8% of woodlands are candidates to be considered significant if they met the criteria detailed in **Table 5**.

**Table 5. Natural Heritage System Level Criteria - Woodlands**

Components	Natural Heritage System Level Criteria		
	NHS Level A	NHS Level B	NHS Level C
<b>Woodlands</b>	<p>Significant Woodlands are woodlands that are:</p> <ul style="list-style-type: none"> <li>i. Woodlands 2 ha or greater in extent; and</li> <li>ii. Woodlands 0.5 ha or greater in extent and that: <ul style="list-style-type: none"> <li>• Directly supports threatened or endangered species, with the exception of specimens deemed not requiring protection by the Province (e.g. as is sometimes the case with Butternut); or,</li> <li>• Are within 30 m of a provincially significant wetland or permanent stream or intermittent stream; or</li> <li>• Are identified as part of an ecologically functional corridor or linkage between natural heritage features; or</li> <li>• Are dominated by native trees older than 100 years and having late successional characteristics.</li> </ul> </li> </ul>	<p>Woodlands <math>\geq</math> 0.2 ha that do not meet the test to be identified as Significant.</p>	<p>Not applicable.</p>

The City of Peterborough is committed to increase woodland cover overtime, and at a minimum the maintenance of woodland cover. Accordingly, the protection of significant woodlands has been elevated above the requirements of the PPS. Through the policies of the Official Plan, significant woodlands are included within Level A, which prohibits development or site alteration within these features.

### 5.3 Valleylands

As with significant woodlands, the province does not identify significant valleylands at the provincial level and leaves the determination of significance to the municipality. The use of criteria recommended in the *Natural Heritage Reference Manual* (OMNR 2010) or developed independently that achieve or exceed the same objectives as the provincial criteria, is recommended but not required. For the purposes of the City of Peterborough NHS significant valleylands and non-significant valleylands have been incorporated as identified in **Table 6**.

**Table 6. Natural Heritage System Level Criteria - Valleylands**

Component	Natural Heritage System Level Criteria		
	NHS Level A	NHS Level B	NHS Level C
<b>Valleylands</b>	Significant Valleylands as identified/regulated by Otonabee Region Conservation Authority.	All Non-significant valleylands as identified/regulated by ORCA.	Not applicable.

In the City of Peterborough, large portions of the urban landscape are situated within valleylands. Recognizing this reality, for the purposes of the NHS, significant valleylands and non-significant valleylands exclude built-up valleyland areas within the City of Peterborough. However, these areas may still be subject to conservation authority regulations.

The presence and limits of all valleylands will be determined through site-specific field investigations and technical reports in association with conservation authority criteria. These limits will be established and confirmed to the satisfaction of the conservation authority and the City, as appropriate. Additionally, the flooding hazard, erosion hazard and stable or physical slope policies of the conservation authority should also be considered for applicability and may necessitate technical erosion hazard studies to establish the limits of a valleyland feature. Given these complex requirements for identification, valleylands have not been shown on the NHS mapping.

## 5.4 Areas of Natural and Scientific Interest

While MNRF ranks ANSIs as being provincially, regionally or locally significant, only those ranked as provincially significant meet the PPS definition for “significance”. The PPS requires planning authorities to protect ANSIs that have been identified as provincially significant by not permitting development and site alteration and to only permit development and site alteration within its adjacent lands, if it has been demonstrated that there will be no negative impacts on the feature or its ecological function.

Despite the application of PPS level protection only to provincially significant ANSIs, the City of Peterborough recognizes that regionally significant ANSI’s often support the function of natural heritage systems and have included them as a Level A feature of the NHS (**Table 7**).

**Table 7. Natural Heritage System Level Criteria – ANSI’s**

Component	Natural Heritage System Level Criteria		
	NHS Level A	NHS Level B	NHS Level C
<b>Area of Natural Scientific Interest (ANSI’s)</b>	Provincially or Regionally Significant ANSI’s as designated by the Ministry of Natural Resources and Forestry.	Locally Significant ANSI’s.	Not applicable.

No provincially, regionally or locally significant ANSI’s have been designated by MNRF within the City of Peterborough. Therefore, the policies contained within the Official Plan related to ANSI’s will only be relevant at such time that an ANSI is designated by MNRF within the boundaries of the City.

### 5.5 Fish Habitat, Watercourses and Waterbodies

Section 2.1.6 of the PPS requires that municipalities not permit development and site alteration in fish habitat except in accordance with provincial and federal requirements. The City of Peterborough has taken the direction provided by the province and extended protection to all watercourses and naturally occurring waterbodies through inclusion in the NHS. This is in recognition of the important role that watercourses and waterbodies have in contributing to a functional NHS beyond fish habitat. **Table 8** summarizes how fish habitat, watercourses, and waterbodies are incorporated into the City of Peterborough NHS.

**Table 8. Natural Heritage System Level Criteria – Fish Habitat, Watercourses and Waterbodies**

Component	Natural Heritage System Level Criteria		
	NHS Level A	NHS Level B	NHS Level C
<b>Fish Habitat, Watercourses and Waterbodies</b>	Permanent and Intermittent Watercourses (includes Little Lake).	Permanent Waterbodies.  <i>*does not include anthropogenic waterbodies that are created by excavating basins with no inlet or outlet channels in which surface and/or groundwater collect or</i>	Ephemeral Watercourses.

Component	Natural Heritage System Level Criteria		
	NHS Level A	NHS Level B	NHS Level C
		<i>facilities constructed for the treatment/storage of stormwater.</i>	

Fish habitat is regulated by the federal government through the *Fisheries Act* as administered by DFO. The *Fisheries Act* is a permissive regulation and authorization can be obtained to alter or destroy fish habitat. Fish habitat under the *Fisheries Act* can include both direct and indirect fish habitat functions. The City of Peterborough can allow development and site alteration in fish habitat, including Level A features, if the undertaking is compliant with the federal *Fisheries Act*, conservation authority regulations and policies and any other applicable regulations. In the instance of fish habitat associated with a Level A feature this applies only to the Level A fish habitat component of the NHS and does not extend to NHS components that may occur in conjunction. For example, a PSW that is also Level A fish habitat is still a Level A wetland under the City of Peterborough NHS and is still subject to the wetland policies of the Official Plan.

Where no detailed fish habitat and/or watercourse mapping has been completed, all waterbodies, including permanent or intermittent streams, headwaters, seasonally flooded areas, municipal or agricultural surface drains, lakes and ponds (except facilities constructed for the treatment/storage of stormwater) should be considered fish habitat, watercourse and/or waterbody for the purposes of the NHS unless it can be demonstrated to the satisfaction of the City, conservation authority and DFO, as applicable, that the feature does not constitute fish habitat and/or a watercourse and/or waterbody as defined by the *Fisheries Act* and the *Conservation Authorities Act*.

## 5.6 Habitat for Endangered or Threatened Species

The PPS requires that municipalities prohibit development and site alteration in the habitat of endangered species and threatened species, except in accordance with provincial and federal requirements. The federal SARA and the provincial ESA are the mechanism by which species at risk are regulated in Ontario.

The City of Peterborough recognizes habitat for endangered or threatened species as a Level A feature (**Table 9**). However, this component is subject to the permissive regulations of the ESA and/or SARA (i.e. the province can issue a permit to destroy habitat of a species listed as endangered provincially). Therefore, habitat for endangered or threatened species within the City of Peterborough may be altered/removed in accordance with applicable federal and/or provincial regulations. Where

this is permitted, the habitat will not be considered part of the City of Peterborough NHS under this component. This applies only to the habitat for endangered or threatened species component of the NHS and does not extend to any NHS components that may occur in conjunction. For example, a significant woodland that is also habitat for an endangered species is still a woodland under the City of Peterborough NHS and is still subject to the woodland policies of the plan.

**Table 9. Natural Heritage System Level Criteria – Habitat for Endangered or Threatened Species**

Component	Natural Heritage System Level Criteria		
	NHS Level A	NHS Level B	NHS Level C
<b>Habitat for Endangered or Threatened Species</b>	<p>A) Habitat for species listed as endangered or threatened on the Species at Risk in Ontario Regulation 230/08 (under the Endangered Species Act, 2007)</p> <p>and/or</p> <p>B) Habitat for aquatic species or migratory birds species listed as threatened or endangered on Schedule 1 of the <i>Species at Risk Act</i> on non-federal lands.</p> <p><i>Note: Where a permit is obtained under either the ESA or SARA to remove/destroy habitat for endangered or threatened species the habitat will not be considered part of the City of Peterborough NHS under this component.</i></p>	Not applicable.	Not applicable.

Threatened or endangered species occurrence or extent of habitat is typically confirmed through detailed field studies in conjunction with either the provincial or federal authority, as appropriate. The list of the threatened or endangered species is amended on a regular basis and the occurrence of endangered or threatened species is not constant and can be ephemeral.

While the City of Peterborough must confirm the species presence through the planning process, it is ultimately the responsibility of the Ministry of Environment Conservation and Parks at the provincial

level or either Environment Climate Change Canada or DFO at the federal level to administer their legislation. It is necessary for all persons and entities to be in conformity with the applicable law.

## 5.7 Significant Wildlife Habitat

Policies 2.1.5 and 2.1.7 of the PPS do not permit development and site alteration in significant wildlife habitat, or their adjacent lands, unless it has been demonstrated that there will be no negative impacts on the feature or its ecological functions. As with significant woodlands and significant valleylands, the province does not identify significant wildlife habitat at the provincial level and leaves the determination of significance to the municipality.

The definitions of wildlife habitat is a broad category and the application of a test of significance adds further complexity. The province has suggested *Significant Wildlife Habitat Ecoregion Criteria* (OMNR 2015) to assist in the identification of significant wildlife habitat. While the Ecoregion Criteria are useful, the suggested thresholds for confirming significant wildlife habitat occurrence are in some instances overly prescriptive and are not always appropriate in the context of an urban landscape, as they have been developed for the entire ecoregion or have not considered site specific factors (i.e., artificial habitat, poor quality occupied habitat, patch size etc.).

The manner in which significant wildlife habitat has been incorporated in the City of Peterborough NHS has relied on the guidance of the *Significant Wildlife Habitat Ecoregion 6E Criteria* (OMNR 2015) developed by the Province but viewed through a “made in Peterborough” lens. Within the City of Peterborough significant wildlife habitat is classified as occurring in either natural or semi-natural features and further categorized into one or more of the follow groups, which are consistent with the *Significant Wildlife Habitat Ecoregion 6E Criteria* (OMNR 2015).

- Habitats of seasonal concentrations of animals;
- Rare vegetation communities or specialized habitat for wildlife;
- Habitat of species of conservation concern; and
- Animal movement corridors.

Semi-natural features are natural features that require human management to persist in the current form. A cultural meadow community is an example of this, as this feature requires management to persist and not succeed to a thicket or forested community.

Consistent with the provincial *Significant Wildlife Habitat Ecoregion 6E Criteria* (OMNR 2015) artificial features are not included as significant wildlife habitat. Examples of artificial features include but are not limited to golf course ponds, irrigation ponds, sand traps, stormwater management facilities, sewage treatment and storage facilities, licensed/permitted aggregate areas, orchards, buildings, bridges, roadsides or constructed features.

**Table 10** indicates how significant wildlife habitat has been incorporated into the NHS.

**Table 10. Natural Heritage System Level Criteria – Significant Wildlife Habitat**

Component	Natural Heritage System Element Criteria		
	NHS Level A	NHS Level B	NHS Level C
<b>Wildlife Habitat</b>	Significant Wildlife Habitat within natural features.	Significant Wildlife Habitat within or associated with semi-natural features.	Not applicable

Typically, all other natural features in the given landscape will be identified and mapped first (i.e., wetlands, woodlands, valleylands), and in most cases these will also capture most significant wildlife habitats. Significant wildlife habitat is then, generally, a supplementary step whereby a given area is screened to make sure no unique or specialized habitats have been overlooked. Although the MNRF does have mapping for a few significant wildlife habitat categories (i.e. deer winter congregation areas), usually no such mapping will exist prior to a proponent submitting a development application for most categories, and therefore evaluation will need to take place on a site-specific level.

A comprehensive evaluation will include consideration of all the categories listed in **Appendix A Significant Wildlife Habitat Criteria – City of Peterborough**. Identification will require determining the applicable significant wildlife habitat designation by first verifying the occurrence of candidate significant wildlife habitat using Ecological Land Classification ecosite codes and habitat criteria/habitat definitions and then establishing if confirmed significant wildlife habitat occurs based on the presence of wildlife species/indicator species as per the defining criteria. Using this process for identification of significant wildlife habitat therefore requires that both the candidate and confirmed criteria identified in **Appendix A** be met for a significant wildlife habitat designation to occur in the City of Peterborough.

If significant wildlife habitat is confirmed based on the preceding steps it will be protected through the policies of the Official Plan that correspond with NHS element level based on feature type (i.e. natural or semi-natural).

## 5.8 Linkages and Connections

The concept of ecological linkages is firmly supported in the PPS policy 2.1.2 even though it is not isolated as a distinct feature category. For the City of Peterborough NHS, many of the existing pathways of connectivity are being incorporated through the designation of components, such as watercourses, habitat for fish and significant valleylands.

In recognition of opportunities that may exist to reconnect features at the local level, a criterion has been incorporated in the Official Plan to identify Proximity Linkages. Proximity linkages are present where Level A or Level B NHS elements occur within 60 m of each other, and the interconnecting area is free of barriers to movement for flora and fauna. Connections that extend beyond the boundaries of the City have been incorporated through the inclusion of a Regional Connections classification in the NHS. These connections provide general pathways of connectivity between the City of Peterborough NHS, the County of Peterborough NHS and more broadly the Regional NHS for the Growth Plan for the Greater Golden Horseshoe (MMAH 2018).

Regional Connections and Proximity Linkages have been identified with a symbol on Schedule F of the Official Plan to indicate the general pathway of connectivity. These symbols are not intended to represent the precise location of linkage/corridors. The exact location of corridors should be established through site-specific investigations to determine the location and dimensions best suited to the function.

In instances where Regional Connections are identified it is intended that the connectivity function be maintained and, where possible, enhanced in the vicinity of these areas. For Proximity Linkages these are to be treated in a manner similar to Level B NHS features. In the instance of land development, the function may be addressed through various solutions established through site-specific investigation to determine the location and dimensions best suited to the NHS function.

In terms of ideal dimensions for ecological linkages there are no fixed standards. This is in part because optimal dimensions, which have been examined for a number of wildlife species and groups, vary so much between and within taxonomic groups, and are unknown for many other species (OMNR 2010; Environment Canada 2004). Minimum widths and lengths of corridors also depend on habitat structure and quality within individual corridors, nature of the surrounding habitat, and human use patterns. Key linkage or corridor attributes listed in the *Natural Heritage Reference Manual* (OMNR 2010) include the habitat needs of species expected to use it, shape, length, and width. The

manual also points out that linkage can also be achieved through multiple pathways, and for some groups of species *via* smaller, relatively close patches that serve as steppingstones. In the City of Peterborough, natural heritage components are often fragmented by highways, roads, and a variety of other linear infrastructure (e.g., railways, hydro lines, pipeline easements, etc.), alternate land uses or even inhospitable habitats (for some species) such as the Otonabee River itself.

As such, in instances of development applications in the vicinity of Proximity Linkages and Regional Connection connectivity solutions should be determined based on the following:

- Knowledge of the species present and likely to use a connection in a given landscape;
- Review of the most current data of habitat needs and mobility of those species in the context of the landscape matrix (i.e., agricultural *versus* urban landscapes which have significantly different opportunities and constraints in their ability to support biota);
- Analysis of the most suitable linkage options available in a given landscape; and
- Consideration for the minimum requirements of the selected species and/or those with the broadest needs.

## 5.9 Natural Heritage System Component and Level Summary

Within the City of Peterborough, the NHS incorporates seven component types, linkages, and connections. **Table 11** provides a summary of the City of Peterborough NHS components and corresponding levels of protection.

**Table 11. Natural Heritage System Component and Level Summary**

Component	Level A	Level B	Level C
<b>Wetlands</b>	Provincially Significant Wetlands	Non-PSW or unevaluated wetlands that meet the NHS criteria for Level B	All wetlands that do not otherwise qualify under NHS Level A or B
<b>Woodlands</b>	Significant Woodlands	Non-Significant Woodlands $\geq 0.2$ ha	Not applicable

Component	Level A	Level B	Level C
<b>Valleylands</b>	Significant Valleylands	All Non-significant valleylands	Not applicable
<b>Life Science Area of Natural Scientific Interest (ANSI's)</b>	Provincially or Regionally Significant Life Science ANSI's	Locally Significant Life Science ANSI's	Not applicable
<b>Fish Habitat, Watercourses and Waterbodies</b>	Permanent and Intermittent Watercourses (includes Little Lake)	Permanent Waterbodies	Ephemeral Watercourses
<b>Habitat for Endangered or Threatened Species</b>	<p>A) Habitat for species listed as endangered or threatened on the Species at Risk in Ontario Regulation 230/08 (under the <i>Endangered Species Act</i>, 2007);</p> <p>and/or</p> <p>B) Habitat for aquatic species or migratory birds species listed as threatened or endangered on Schedule 1 of the <i>Species at Risk Act</i> on non-federal lands</p>	Not applicable	Not applicable
<b>Wildlife Habitat</b>	Significant Wildlife Habitat within natural features.	Significant Wildlife Habitat within or associated with semi-natural features.	Not applicable
<b>Proximity Linkages</b>	These are to be treated in a manner similar to Level B NHS features. In the instance of land development, the function may be addressed through various solutions established through site specific investigation to determine the location and dimensions best suited to the NHS function.		
<b>Regional Connections</b>	It is intended that the connectivity function be maintained and where possible enhanced in the vicinity of these areas.		

## 6. Vegetation Protection Zones

Vegetation Protection Zones (VPZs) (also known as buffers) can be a useful planning tool for municipalities to implement to protect natural heritage features and functions from the impacts of adjacent land uses. The *Natural Heritage Reference Manual* (OMNR 2010) provides guidance on VPZs. This guidance specifies that VPZs should:

- Be between a natural feature and lands subject to development or site alteration;
- Be permanently vegetated, preferably with native species; and
- Protect the natural feature against the impacts of the adjacent land use, rather than provide the functions of the feature itself.

If implemented correctly, VPZs play an important role protecting natural heritage features and functions in changing landscapes by providing a suite of benefits that include but are not limited to:

- Attenuate sediments and pollutants;
- Screen against human disturbances;
- Serve as a habitat transition zones;
- Maintain microclimate conditions; and
- Limit the spread of invasive species.

The concept of VPZ's is not explicitly identified as a requirement of the PPS however the need to have no negative impact on natural heritage features is clearly identified in Section 2.1 of the PPS. The PPS does reference Adjacent Lands which is a term that often gets incorrectly confounded with the concept of VPZs. Regarding the natural heritage policies of the PPS the term Adjacent Lands refers to:

*Those lands contiguous to a specific natural heritage feature or area where it is likely that development or site alteration would have a negative impact on the feature or area. The extent of the adjacent lands may be recommended by the Province or based on municipal approaches which achieve the same objectives.*

The function of Adjacent Lands is to ensure that the study area is appropriate to determine the natural feature boundaries, and assess impacts associated with the proposed activities. Typically, the VPZ is not equivalent to the Adjacent Lands area.

Recognizing the critical importance of establishing VPZ that are appropriate to ensure no negative impact to natural features and functions, the City of Peterborough has taken a Minimum Vegetation Protection Zone (MVPZ) approach. This approach sets out the minimum width allowed for a VPZ based on feature type, meaning that the VPZ can exceed but not be less than the MVPZ. MVPZ's are included in Section 4.6.2 (m) of the Official Plan and in **Table 12** below.

**Table 12. Natural Heritage Feature Minimum Vegetation Protection Zones**

Feature	Minimum Vegetation Protection Zone Width
Provincially Significant Wetlands or Unevaluated Wetlands	30 metres
Non-Provincially Significant or Unevaluated Wetlands that are not included in a wetland evaluation as per the Ontario Wetland Evaluation System for Southern Ontario	15 metres
Woodlands	10 metres from dripline
Valleylands	10 m in conjunction with Conservation Authority requirements
Permanent and Intermittent Watercourses (Cool/Cold Water)	30 metres
Permanent and Intermittent Watercourses (Warm Water)	15 metres
Naturally Occurring Waterbodies	15 metres
Significant Wildlife Habitat	To be determined through an Environmental Impact Study
Provincially or Regionally Significant Life Science or Earth Science Areas of Natural and Scientific Interest	To be determined through an Environmental Impact Study
Habitat for Threatened or Endangered Species	To be determined through an Environmental Impact Study

MVPZs established in the policies of the Official Plan will not be sufficient to protect all natural heritage features and functions. There will be instances where VPZ's that exceed the minimum will be necessary. Furthermore, for some features the range of appropriate VPZ's is so variable that

setting a MVPZ is not possible without detailed studies and site specific considerations (i.e. Significant Wildlife Habitat or ANSI's). Through the *Planning Act* application process there is requirement for environmental study (See Section 7 below for further details on environmental study requirements). One purpose of the environmental study is to make recommendations related to an appropriate VPZ based on the feature and function as determined through detailed study. The MVPZ should not be implemented without appropriate study and rationale as MVPZ are not intended to replace the need to complete an environmental study.

When establishing appropriate VPZ's many factors need to be considered including the type of feature, local biophysical conditions, change to adjacent land use and intended function of the VPZ. These factors will vary and require site specific assessment to determine. Additionally, the knowledge and science around establishing effective VPZs is still evolving, particularly for already fragmented landscapes such as the City of Peterborough. The MVPZ approach allows for site specific information to be assessed using proven and emerging information when establishing VPZ's that are suited to protect natural features and functions from negative impacts.

## 7. Environmental Impact Study

An Environmental Impact Study (EIS) is required when development is proposed within the adjacent lands (i.e., 120 m) of a natural heritage system component, regardless of the features inclusion in the Natural Areas Designation on Schedule F of the Official Plan. This requirement is in recognition that not all NHS components have been mapped within the City of Peterborough and there will be instances where previously un-identified natural heritage features or functions will exist in the vicinity of an application.

To determine the need for an EIS, the City will require a screening level assessment of all *Planning Act* applications. This screening level assessment is to be completed by a qualified professional (i.e. biologist, ecologist, environmental consultant etc.) retained by the applicant to determine the occurrence of features defined by the natural areas designation in Section 4.6 of the Official Plan. A screening level assessment may consider relevant background information and/or reconnaissance level site investigations. If a feature(s) is present within 120 m of the activity, the requirement for an EIS will be triggered.

The need for and scope of the EIS must be established in consultation with the City of Peterborough, and as appropriate the Conservation Authority, and any other agency having jurisdiction, to ensure the appropriate level of study is undertaken. The agreed upon scope will serve as the Terms of Reference for the EIS. The type of assessment and surveys to be included in the scope of an EIS will vary depending on the application and features present. The scope could range from primarily

desktop/reconnaissance review to multi-season targeted studies. Regardless of the extent of the scope, an EIS must fulfill the requirements of the Official Plan policies and address the following:

- Clearly identify and map all natural heritage features on site, including Natural Heritage System Level A, B or C features and other features;
- Provide a thorough field inventory, mapping of species and features on site including identification of vegetation communities using the Ecological Land Classification (ELC) system, and complete lists of flora and fauna species and features that were observed on site;
- Describe the survey methods and level of effort undertaken including the dates, weather conditions and number of field visits/surveys and demonstrate that assessments were conducted using appropriate methodologies at the appropriate time of year;
- Provide an analysis of the ecological features and functions provided by each natural heritage feature;
- Identify the type and extent of the proposed development, re-development, site alteration or boundary adjustment;
- Outline potential impacts from the proposed development and any mitigation measures or monitoring to address these impacts;
- Identify planning, design and construction practices that will maintain or restore and, where feasible, improve the health, diversity and size of the NHS;
- Establish an appropriate VPZs based on the function of natural heritage features;
  - If the minimum vegetation protection zones identified in Section 4.6.2 (m) of the Official Plan are recommended in the EIS then rationale to support the minimum vegetation protection zone must be provided;
- Demonstrate how connectivity within the NHS will be maintained or restored and, where possible, improved during and after construction; and
- Determine residual impacts to the natural heritage features from the proposed development, site alteration or boundary adjustment and demonstrate that there will be no adverse effects or negative impact on the NHS.

If the need for an EIS is identified through the screening level assessment, the EIS must be submitted as part of the Complete Application Requirements in accordance with the policies of the Official Plan. The submission of an EIS does not guarantee that the proposed development, site alteration or boundary adjustment will be approved.

## 8. Conclusion

The City of Peterborough NHS builds on the components required through the PPS supported by the application of scientific principles and the application of practical natural heritage planning realities. The NHS has been developed in close consultation with the Natural Heritage System Taskforce and has benefited from knowledge shared by Treaty 20 rightsholders and input from various stakeholders, which has resulted in a system that is truly reflective of the natural features of the City of Peterborough. Through the inclusion of all wetlands in the NHS designations and elevation of protection levels for components such as significant woodlands beyond what is required by the province, the City of Peterborough has demonstrated dedication to the protection of valued natural features. The NHS is supported through strong policies in the Official Plan that establish protections and permitted uses. Through the policies of the Official Plan, the City has also committed to evaluate wetlands within the City and to develop a restoration and enhancement strategy, indicating commitment to implement the NHS framework.

Overall, the NHS positions the City of Peterborough for future growth while acknowledging that a functional, resilient and sustainable NHS will require a long-term commitment to the protection of substantial areas of natural heritage features.

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# Appendix A

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## Significant Wildlife Habitat Criteria – City of Peterborough

## Appendix A

### Significant Wildlife Habitat Criteria – City of Peterborough

The following tables provide the criteria for identifying Significant Wildlife Habitat in the City of Peterborough. The tables are by large consistent with the recommended *Criteria for Significant Wildlife Habitat in Ecoregion 6E* produced by the Ontario Ministry of Natural Resources and Forestry (OMNRF 2015) with minor alterations to reflect the natural heritage conditions within the City of Peterborough. These criteria will be reviewed and updated periodically by the City of Peterborough. Consistent with the provincial criteria, guidance for the SWH designation is classified into the four categories of SWH identified in the *Significant Wildlife Habitat Technical Guide* and its Appendices (OMNR 2000). Citations indicated in the table (indicated by a roman numeric symbol or ©) are directly from the provincial criteria and have not been adapted by the City of Peterborough. A list of these reference documents can be found following the schedules of the *Criteria for Significant Wildlife Habitat in Ecoregion 6E* (OMNRF 2015).

Identification of SWH in the City of Peterborough should utilize the following tables to determine the applicable SWH designation by first verifying the occurrence of Candidate SWH using Ecological Land Classification (ELC) codes and Habitat Criteria/Habitat Definitions provided then establishing Confirmed SWH on occurrence of specified Wildlife Species/Indicator Species as per the Defining Criteria. Using this process for identification of SWH therefore requires that both the Candidate SWH and Confirmed SWH criteria to be met for a SWH designation to occur.

**Table 1-1. Seasonal Concentrations Areas of Animals**

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria
<p><b>Waterfowl Stopover and Staging Areas (Terrestrial)</b></p> <p><u>Rationale:</u> Habitat important to migrating waterfowl.</p>	<p>American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Northern Pintail Northern Shoveler American Wigeon Gadwall</p>	<p>CUM1 CUT1 Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.</p>	<p>Fields with sheet water during Spring (mid-March to May).</p> <ul style="list-style-type: none"> <li>Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl.</li> <li>Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available cxlviii.</li> </ul>	<p>Studies carried out and verified presence of an annual concentration of any listed species.</p> <ul style="list-style-type: none"> <li>Any mixed species aggregations of 100<sup>©</sup> or more individuals required.</li> <li>The flooded field ecosite habitat plus a 100-300m radius area, dependant on local site conditions and adjacent land use is the significant wildlife habitat cxlviii</li> <li>Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates).</li> <li>Significant Wildlife Habitat Mitigation Support Tool (SWH MiST) cxlix Index #7 provides development effects and mitigation measures.</li> </ul>
<p><b>Waterfowl Stopover and Staging Areas (Aquatic)</b></p> <p><u>Rationale:</u> Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.</p>	<p>Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter</p>	<p>MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7</p>	<ul style="list-style-type: none"> <li>Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify.</li> </ul>	<p>Studies carried out and verified presence of:</p> <ul style="list-style-type: none"> <li>Aggregations of 100<sup>©</sup> or more of listed species for 7 days<sup>©</sup>, results in &gt; 700 waterfowl use days.</li> <li>Areas with annual staging of Ruddy Ducks, Canvasbacks, and Redheads are SWH cxlix.</li> <li>The combined area of the ELC ecosites and a 100m radius area is the SWH cxlviii.</li> <li>Wetland area and shorelines associated with sites identified within the Significant Wildlife Habitat Technical Guide (SWHTG) cxlviii Appendix K cxlix are significant wildlife habitat.</li> <li>Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded).</li> <li>SWHMiST cxlix Index #7 provides development effects and mitigation measures.</li> </ul>

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria
	Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback Ruddy Duck			
<b>Shorebird Migratory Stopover Area</b>  <u>Rationale:</u> High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	<ul style="list-style-type: none"> <li>Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats in May to mid-June and early July to October.</li> <li>Sewage treatment ponds and stormwater ponds do not qualify as a SWH.</li> </ul>	Studies confirming: <ul style="list-style-type: none"> <li>Presence of three or more of listed species and &gt; 1000© shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period).</li> <li>Whimbrel stop briefly (&lt;24hrs) during spring migration, any site with &gt;100 © Whimbrel used for three years or more qualifies.</li> <li>The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100 m radius area cxlviii.</li> <li>SWHMIST cxlix Index #8 provides development effects and mitigation measures.</li> </ul>

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria
	Sanderling Dunlin			
<b>Raptor Wintering Area</b>  <u>Rationale:</u> Sites used by multiple species, a high number of individuals and used annually are most significant	Rough-legged Hawk Northern Harrier American Kestrel Snowy Owl Short-eared Owl Bald Eagle	<u>Bald Eagle</u>  Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).  <b>Other Listed Species</b>  Combination of ELC Community Series; need to have present one Community Series from each land class;  Forest: FOD, FOM, FOC.  Upland: CUM; CUT; CUS; CUW.	<ul style="list-style-type: none"> <li>The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors.</li> <li>Raptor wintering sites (hawk/owl) need to be &gt; 20 ha, cxlviii, cxlix with a combination of forest and upland. Xvi, xvii, xviii, xix, xx, xxi.</li> <li>Least disturbed sites, idle/fallow or lightly grazed field/meadow (&gt;15ha) with adjacent woodlands cxlix.</li> <li>Field area of the habitat is to be wind swept with limited snow depth or accumulation.</li> <li>Eagle sites have open water, large trees and snags available for roosting cxlix.</li> </ul>	Studies confirm the use of these habitats by: <ul style="list-style-type: none"> <li>One or more Short-eared Owls or; one or more Bald Eagles or; At least 10 individuals and two of the listed hawk/owl species ☉.</li> <li>To be significant a site must be used regularly (three in five years) cxlix for a minimum of 20 days by the above number of birds ☉.</li> <li>The habitat area for a Bald Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area☉</li> <li>SWHMIST cxlix Index #10 and #11 provides development effects and mitigation measures.</li> </ul>
<b>Bat Hibernacula</b>  <u>Rationale:</u> Bat hibernacula are rare habitats in all Ontario landscapes.	Big Brown Bat	Bat Hibernacula may be found in these ecosites:  CCR1 CCR2 CCA1 CCA2	<ul style="list-style-type: none"> <li>Hibernacula may be found in caves, mine shafts, underground foundations and Karsts.</li> <li>Active mine sites should not be considered a SWH.</li> <li>The locations of bat hibernacula are relatively poorly known.</li> <li>Buildings are not considered to be SWH.</li> </ul>	<ul style="list-style-type: none"> <li>All CCR/A sites with confirmed hibernating bats are SWH☉.</li> <li>The habitat area includes a 200 m radius around the entrance of the hibernaculum cxlviii, ccvii, ☉ for most development types and 1,000 m for wind farm sccv.</li> <li>Studies are to be conducted during the peak swarming period (Aug. – Sept.).</li> <li>SWHMIST cxlix Index #1 provides development effects and mitigation measures.</li> </ul>
<b>Bat Maternity Colonies</b>  <u>Rationale:</u> Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites.  All ELC Ecosites in ELC Community Series:	<ul style="list-style-type: none"> <li>Maternity colonies can be found in tree cavities, vegetation and often in buildings xxii, xxv, xxvi, xxvii, xxxi (buildings are not considered to be SWH).</li> <li>Maternity roosts are not found in caves and mines in Ontario xxii.</li> </ul>	Maternity Colonies with confirmed use by; <ul style="list-style-type: none"> <li>&gt;20 Big Brown Bats☉ or Silver-haired Bats with occurrence at nightly roost emergence period. The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecosystem containing the maternity colonies☉.</li> </ul>

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria
		FOD FOM SWD SWM	<ul style="list-style-type: none"> <li>• Maternity colonies located in mature deciduous or mixed forest stands ccix, ccx, ccv, with &gt;10/ha large diameter (&gt;25cm dbh) wildlife trees ccvii.</li> <li>• Female bats prefer wildlife tree (snags) in early stages of decay, class 1-3 ccxiv or class 1 or 2 ccxii.</li> <li>• Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred ccx, lxiv.</li> </ul>	<ul style="list-style-type: none"> <li>• SWHMIST cxlix Index #12 provides development effects and mitigation measures.</li> </ul>
<p><b>Turtle Wintering Areas</b></p> <p><b>Rationale:</b> Sites with the highest number of individuals are most significant.</p>	<p>Midland Painted Turtle</p> <p>Northern Map Turtle</p> <p>Snapping Turtle</p>	<p><u>Snapping and Midland Painted Turtles</u></p> <p>ELC Community</p> <p>Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO</p> <p><u>Northern Map Turtle</u></p> <p>Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.</p>	<ul style="list-style-type: none"> <li>• For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates.</li> <li>• Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen cix, cx, cxi, cxii.</li> <li>• Man-made ponds such as sewage lagoons or stormwater ponds should not be considered SWH.</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of five or more over-wintering Midland Painted Turtles, Any Northern Map Turtle or Snapping Turtle over wintering within a wetland®.</li> <li>• The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH.</li> <li>• Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May) cvii.</li> <li>• Congregation of turtles is more common where wintering areas are limited and therefore significant cix, cx, cxi, cxii.</li> <li>• SWHMIST cxlix Index #28 provides development effects and mitigation measures for turtle wintering habitat.</li> </ul>
<p><b>Reptile Hibernaculum</b></p> <p><b>Rationale:</b> Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.</p>	<p>Eastern Gartersnake</p> <p>Northern Watersnake</p> <p>Northern Red-bellied Snake</p> <p>Northern Brownsnake</p> <p>Smooth Greensnake</p> <p>Northern Ring-necked Snake</p> <p>Eastern Milksnake</p> <p>Eastern Ribbonsnake</p> <p>Five-lined Skink</p>	<p><u>All Snakes</u></p> <p>Habitat may be found in any ecosite other than very wet ones.</p> <p>Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats.</p> <p><u>Five-lined Skink</u></p>	<ul style="list-style-type: none"> <li>• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area.</li> <li>• Does not include human-made structures (e.g., roadsides, bridges, foundations or buildings) or recently (two years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles.</li> <li>• Does not include a licensed/permitted Mineral Aggregate Operations.</li> <li>• Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator.</li> </ul>	<p>Studies confirming:</p> <ul style="list-style-type: none"> <li>• Presence of snake hibernacula used by a minimum of ten individuals of a Eastern Gartersnake or five of any other species. Or; individuals of two or more snake spp.</li> <li>• Congregations of a minimum of ten Eastern Gartersnake or five individuals of any other snake sp. Or; multiple individuals of two or more snake spp. Near potential hibernacula (e.g. rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct) ®</li> <li>• Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e. strong hibernation site fidelity). Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30 m radius area is the SWH®.</li> </ul>

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria
		ELC Community Series of FOD and FOM and Ecosites: FOC1 FOC3		<ul style="list-style-type: none"> <li>• SWHMiST cxlix Index #13 provides development effects and mitigation measures for snake hibernacula.</li> <li>• Presence of any active hibernaculum for skink is significant.</li> <li>• SWHMiST cxlix Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat.</li> </ul>
<p><b>Colonially – Nesting Bird Breeding Habitat – Cliff Swallow</b></p> <p><u>Rationale:</u> Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations.</p>	Cliff Swallow	<p>Cliff faces</p> <p>Habitat found in the following ecosites:</p> <p>CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1</p>	<ul style="list-style-type: none"> <li>• Does not include human-made structures (e.g., bridges or buildings or barns)</li> <li>• Does not include a licensed/permitted Mineral Aggregate Operation.</li> </ul>	<p>Studies confirming:</p> <ul style="list-style-type: none"> <li>• Presence of one or more nesting sites with 8 cxlix or more Cliff Swallow during the breeding season.</li> <li>• A colony identified as SWH will include a 50 m radius habitat area from the peripheral nests ccvii.</li> <li>• Field surveys to observe and count swallow nests are to be completed during the breeding season.</li> <li>• SWHMiST cxlix Index #4 provides development effects and mitigation measures.</li> </ul>
<p><b>Colonially – Nesting Bird Breeding Habitat (Tree/Shrubs)</b></p> <p><u>Rationale:</u> Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.</p>	<p>Great Blue Heron</p> <p>Black-crowned Night-Heron</p> <p>Great Egret</p> <p>Green Heron</p>	<p>SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1</p>	<ul style="list-style-type: none"> <li>• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used.</li> <li>• Most nests in trees are 11 to 15 m from ground, near the top of the tree.</li> </ul>	<p>Studies confirming:</p> <ul style="list-style-type: none"> <li>• Presence of five<sup>©</sup> or more active nests.</li> <li>• The habitat extends from the edge of the colony and a minimum 300 m radius or extent of the Forest Ecosite containing the colony or any island &lt;15.0ha with a colony is the SWH cc, ccvii.</li> <li>• Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells.</li> <li>• SWHMiST cxlix Index #5 provides development effects and mitigation measures.</li> </ul>

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria
<p><b>Colonially -Nesting Bird Breeding Habitat (Ground)</b></p> <p><u>Rationale:</u> Colonies are important to local bird population, typically sites are only known colony in area and are used annually.</p>	<p>Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird</p>	<p>Any rocky island or peninsula (natural) within a lake or large river (two-lined on a 1:50,000 NTS map).</p> <p>Close Proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird)</p> <p>MAM1-6; MAS1-3; CUM CUT CUS</p>	<ul style="list-style-type: none"> <li>Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas.</li> <li>Brewer's Blackbird colonies are found loosely on the ground in low bushes in close proximity to streams and irrigation ditches within farmlands.</li> </ul>	<p>Studies confirming:</p> <ul style="list-style-type: none"> <li>Presence of &gt; 25 active nests for Herring Gulls or Ring-billed Gulls, &gt;5 active nests for Common Tern or &gt;2 active nests for Caspian Tern.</li> <li>Presence of 5 or more pairs of Brewer's Blackbird.</li> <li>Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant.</li> <li>The edge of the colony and a minimum 150m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island &lt;3.0ha with a colony is the SWH cc, ccvii.</li> <li>Studies would be done during May/June when actively nesting.</li> <li>SWHMiST cxlix Index #6 provides development effects and mitigation measures.</li> </ul>
<p><b>Deer Yarding Areas</b></p> <p><u>Rationale:</u> Winter habitat for deer is considered to be the main limiting factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer range.</p>	<p>White-tailed Deer</p>	<p>Note: OMNRF to determine this habitat.</p> <p>ELC Community Series providing a thermal cover component for a deer yard would include; FOM, FOC, SWM and SWC.</p> <p>Or these ELC Ecosites; CUP2 CUP3 FOD3 CUT</p>	<ul style="list-style-type: none"> <li>Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20 cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30 cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter.</li> <li>The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60% cxciv.</li> <li>OMNRF determines deer yards following methods outlined in "Selected Wildlife and Habitat Features: Inventory Manual" cxcv.</li> <li>Woodlots with high densities of deer due to artificial feeding are not significant.</li> </ul>	<p>No Studies Required:</p> <ul style="list-style-type: none"> <li>Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO).</li> <li>If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4 of this Schedule.</li> <li>SWHMiST cxlix Index #2 provides development effects and mitigation measures.</li> <li>Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF cxlviii.</li> <li>Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF.</li> <li>If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4 of this Schedule.</li> </ul>

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria
				<ul style="list-style-type: none"> <li>SWHMiST cxlix Index #2 provides development effects and mitigation measures.</li> </ul>
<p><b>Deer Yarding Areas</b></p> <p><u>Rationale:</u> Winter habitat for deer is considered to be the main limiting factor for northern deer populations. In winter, deer congregate in “yards” to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer range.</p>	White-tailed Deer	<p>Note: OMNRF to determine this habitat.</p> <p>ELC Community Series providing a thermal cover component for a deer yard would include; FOM, FOC, SWM and SWC.</p> <p>Or these ELC Ecosites; CUP2 CUP3 FOD3 CUT</p>	<ul style="list-style-type: none"> <li>Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20 cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30 cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter.</li> <li>The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60% cxciv.</li> <li>OMNRF determines deer yards following methods outlined in “Selected Wildlife and Habitat Features: Inventory Manual” cxcv.</li> <li>Woodlots with high densities of deer due to artificial feeding are not significant<sup>©</sup>.</li> </ul>	<p>No Studies Required:</p> <ul style="list-style-type: none"> <li>Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO);</li> <li>If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4 of this Schedule;</li> <li>SWHMiST cxlix Index #2 provides development effects and mitigation measures;</li> <li>Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF cxlviii;</li> <li>Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF<sup>©</sup>;</li> <li>If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4 of this Schedule; and</li> <li>SWHMiST cxlix Index #2 provides development effects and mitigation measures.</li> </ul>
<p><b>Deer Winter Congregation Areas</b></p> <p><u>Rationale:</u> Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions cxlviii</p>	White-tailed Deer	<p>All Forested Ecosites with these ELC Community Series;</p> <p>FOC FOM FOD SWC SWM SWD</p>	<ul style="list-style-type: none"> <li>Woodlots will typically be &gt;100 ha in size <sup>©</sup>. Woodlots &lt;100ha may be considered as significant based on MNRF studies or assessment.</li> <li>Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands cxlviii.</li> <li>If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule.</li> <li>Large woodlots &gt; 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha ccxiv.</li> </ul>	<p>If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4 of this Schedule.</p> <ul style="list-style-type: none"> <li>SWHMiST cxlix Index #2 provides development effects and mitigation measures.</li> </ul>

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria
		Conifer plantations much smaller than 50 ha may also be used.	<ul style="list-style-type: none"> <li>Woodlots with high densities of deer due to artificial feeding are not significant©</li> </ul>	

**1-2 Rare Vegetation Communities or Specialized Habitats for Wildlife**

**Table 1-2-1. Rare Vegetation Communities**

Rare Vegetation Community	Candidate SWH		Confirmed SWH
	ELC Ecosite Code	Habitat Description	Defining Criteria
<p><b>Cliffs and Talus Slopes</b></p> <p><u>Rationale:</u> Cliffs and Talus Slopes are extremely rare habitats in Ontario.</p>	<p>Any ELC Ecosite within Community Series:</p> <p>TAO TAS TAT CLO CLS CLT</p>	<p>A Cliff is vertical to near vertical bedrock &gt;3m in height.</p> <p>A talus slope is rock rubble at the base of a cliff made up of coarse rocky debris.</p> <p>Most cliff and talus slopes occur along the Niagara Escarpment.</p>	<ul style="list-style-type: none"> <li>Confirm any ELC Vegetation Type for Cliffs or Talus Slopes lxxviii.</li> <li>SWHMIST cxlix Index #21 provides development effects and mitigation measures.</li> </ul>
<p><b>Sand Barren</b></p> <p><u>Rationale:</u> Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry</p>	<p>ELC Ecosites:</p> <p>SBO1 SBS1 SBT1</p> <p>Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always ≤ 60%.</p>	<p>Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered, but less than 60%.</p> <p>A sand barren area &gt;0.5ha in area©.</p>	<p>Confirm any ELC Vegetation Type for Sand Barrens lxxviii</p> <ul style="list-style-type: none"> <li>Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover are exotic sp.) ©.</li> <li>SWHMIST cxlix Index #20 provides development effects and mitigation measures.</li> </ul>
<p><b>Alvar</b></p>	<p>ALO1 ALS1</p>	<p>An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and</p>	<ul style="list-style-type: none"> <li>Field studies that identify four of the five© <b>Alvar Indicator Species</b> lxxv, cxlix, at a Candidate Alvar site is significant.</li> </ul>

Rare Vegetation Community	Candidate SWH		Confirmed SWH
	ELC Ecosite Code	Habitat Description	Defining Criteria
<p><b>Rationale:</b></p> <p>Alvars are extremely rare habitats in Ecoregion 6E.</p> <p>Most alvars in Ontario are in Ecoregions 6E and 7E. Alvars in 6E are small and highly localized just north of the Palaeozoic-Precambrian contact.</p>	<p>ALT1</p> <p>FOC1</p> <p>FOC2</p> <p>CUM2</p> <p>CUS2</p> <p>CUT2-1</p> <p>CUW2</p> <p><u>Five Alvar Indicator Species:</u></p> <p>1) <i>Carex crawei</i></p> <p>2) <i>Panicum philadelphicum</i></p> <p>3) <i>Eleocharis compressa</i></p> <p>4) <i>Scutellaria parvula</i></p> <p>5) <i>Trichostema brachiatum</i></p> <p>These indicator species are very specific to Alvars within Ecoregion 6E©cxlix</p>	<p>shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals' species. Vegetation cover varies from patchy to barren with a less than 60% tree cover lxxviii.</p> <p>An Alvar site &gt; 0.5 ha in area lxxv.</p>	<ul style="list-style-type: none"> <li>• Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover are exotic sp.).</li> <li>• The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses lxxv.</li> <li>• SWHMiST cxlix Index #17 provides development effects and mitigation measures.</li> </ul>
<p><b>Old Growth Forest</b></p> <p><b>Rationale:</b></p> <p>Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species.</p>	<p>Forest Community Series:</p> <p>FOD</p> <p>FOC</p> <p>FOM</p> <p>SWD</p> <p>SWC</p> <p>SWM</p>	<p>Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.</p> <p>Woodland areas 30 ha or greater in area or with at least 10 ha interior habitat assuming 100 m buffer at edge of forest©.</p>	<p>Field Studies will determine:</p> <ul style="list-style-type: none"> <li>• If dominant trees species of the area &gt;140 years old, then the area containing these trees is Significant Wildlife Habitat cxlviii;</li> <li>• The forested area containing the old growth characteristics will have experienced no recognizable forestry activities cxlviii (cut stumps will not be present);</li> <li>• The area of forest ecosites combined or an eco-element within an ecosite that contains the old growth characteristics is the SWH;</li> <li>• Determine ELC vegetation types for the forest area containing the old growth characteristics; and</li> <li>• SWHMiST cxlix Index #23 provides development effects and mitigation measures.</li> </ul>

Rare Vegetation Community	Candidate SWH		Confirmed SWH
	ELC Ecosite Code	Habitat Description	Defining Criteria
<p><b>Savannah</b></p> <p><b>Rationale:</b> Savannahs are extremely rare habitats in Ontario.</p>	<p>TPS1</p> <p>TPS2</p> <p>TPW1</p> <p>TPW2</p> <p>CUS2</p>	<p>A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60% lxxix, lxxx, lxxxi, lxxxii, lxxxiii</p> <p>No minimum size to site ©. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.</p>	<p>Field studies confirm one or more of the Savannah indicator species listed in cxlix Appendix N of the SWHTG should be present ©. Note: Savannah plant spp. list from Ecoregion 6E should be used cxlviii.</p> <ul style="list-style-type: none"> <li>• Area of the ELC Ecosite is the SWH.</li> <li>• Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover are exotic sp.).</li> <li>• SWHMIST Index cxlix #18 provides development effects and mitigation measures.</li> </ul>
<p><b>Tallgrass Prairie</b></p> <p><b>Rationale:</b> Tallgrass Prairies are extremely rare habitats in Ontario.</p>	<p>TPO1</p> <p>TPO2</p>	<p>A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has &lt; 25% tree cover. lxxix, lxxx, lxxxi, lxxxii, lxxxiii.</p> <p>No minimum size to site© Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.</p>	<p>Field studies confirm one or more of the Prairie indicator species listed in Appendix N of the SWHTG should be present©. Note: Prairie plant spp. list from Ecoregion 6E should be used cxlviii.</p> <ul style="list-style-type: none"> <li>• Area of the ELC Ecosite is the SWH.</li> <li>• Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover are exotic sp.).</li> <li>• SWHMIST cxlix Index #19 provides development effects and mitigation measures.</li> </ul>
<p><b>Other Rare Vegetation Communities</b></p> <p><b>Rationale:</b> Plant communities that often contain rare species which depend on the habitat for survival.</p>	<p>Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG cxlviii. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.</p>	<p>Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.</p> <p>ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M cxlviii</p>	<p>Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG cxlviii.</p> <ul style="list-style-type: none"> <li>• Area of the ELC Vegetation Type polygon is the SWH.</li> <li>• SWHMIST cxlix Index #37 provides development effects and mitigation measures.</li> </ul>

**Table1-2-2. Specialized Habitats of Wildlife**

Specialized Wildlife Habitats	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Code	Habitat Criteria	Defining Criteria
<p><b>Waterfowl Nesting Area</b></p> <p><b>Rationale:</b> Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.</p>	<p>American Black Duck</p> <p>Northern Pintail</p> <p>Northern Shoveler</p> <p>Gadwall</p> <p>Blue-winged Teal</p>	<p>All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH:</p> <p>MAS1</p> <p>MAS2</p>	<ul style="list-style-type: none"> <li>• A waterfowl nesting area extends 120 m cxlix from a wetland (&gt; 0.5 ha) or a wetland (&gt;0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of three or more small (&lt;0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur cxlix.</li> </ul>	<p>Studies confirmed:</p> <ul style="list-style-type: none"> <li>• Presence of three or more nesting pairs for listed species©;</li> <li>• Any active nesting site of an American Black Duck is considered significant;</li> </ul>

Specialized Wildlife Habitats	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Code	Habitat Criteria	Defining Criteria
	Green-winged Teal Wood Duck Hooded Merganser	MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4  <b>Note: includes adjacency to Provincially Significant Wetlands</b>	<ul style="list-style-type: none"> <li>Upland areas should be at least 120 m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests.</li> <li>Wood Ducks and Hooded Mergansers utilize large diameter trees (&gt;40cm dbh) in woodlands for cavity nest sites.</li> </ul>	<ul style="list-style-type: none"> <li>Nesting studies should be completed during the spring breeding season (April - June);</li> <li>A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m cxlvi from the wetland and will provide enough habitat for waterfowl to successfully nest; and</li> <li>SWHMiST cxlix Index #25 provides development effects and mitigation measures.</li> </ul>
<b>Bald Eagle Nesting, Foraging and Perching Habitat</b>  <b>Rationale:</b> Nest sites are fairly uncommon in Eco-region 6E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.	Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	<ul style="list-style-type: none"> <li>Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.</li> <li>Nests are typically in super canopy trees in a notch within the tree's canopy.</li> <li>Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms).</li> </ul>	Studies confirm the use of these nests by: <ul style="list-style-type: none"> <li>One or more active Bald Eagle nests in an area cxlviii.</li> <li>Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH.</li> <li>For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH cvi, ccvii. Area of the habitat from 400-800m is dependant on site lines from the nest to the development and inclusion of perching and foraging habitat cvi</li> <li>To be significant a site must be used annually. When found inactive, the site must be known to be inactive for &gt; 3 years</li> </ul>

Specialized Wildlife Habitats	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Code	Habitat Criteria	Defining Criteria
				<p>or suspected of not being used for &gt;5 years before being considered not significant ccvii.</p> <ul style="list-style-type: none"> <li>Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August.</li> <li>SWHMiST cxlix Index #26 provides development effects and mitigation measures.</li> </ul>
<p><b>Woodland Raptor Nesting Habitat</b></p> <p><u>Rationale:</u> Nests sites for these species are rarely identified; these area sensitive habitats and are often used annually by these species.</p>	<p>Northern Goshawk Cooper's Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk</p>	<p>May be found in all forested ELC Ecosites.</p> <p>May also be found in SWC, SWM, SWD and CUP3</p>	<p>All natural or conifer plantation woodland/forest stands &gt;30 ha with &gt;10 ha of interior habitat lxxxviii, lxxxix, xc, xci, xcii, xciv, xcv,xcvi, cxxxiii. Interior habitat determined with a 200m buffer. cxlviii</p> <ul style="list-style-type: none"> <li>Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small offshore islands.</li> <li>In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>Presence of any active nests from species list is considered significant cxlviii;</li> <li>Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha area of habitat is the SWH. ccvii (the 28-ha habitat area would be applied where optimal habitat is irregularly shaped around the nest);</li> <li>Barred Owl – A 200 m radius around the nest is the SWH ccvii;</li> <li>Broad-winged Hawk and Coopers Hawk, – A 100m radius around the nest is the SWH ccvii;</li> <li>Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area; and</li> <li>SWHMiST cxlix Index #27 provides development effects and mitigation measures.</li> </ul>
<p><b>Turtle Nesting Areas</b></p> <p><u>Rationale:</u> These habitats are rare and when identified will often be the only breeding site for local populations of turtles.</p>	<p>Midland Painted Turtle Northern Map Turtle Snapping Turtle</p>	<p>Exposed mineral soil (sand or gravel) areas adjacent (&lt;100m) cxlviii or within the following ELC Ecosites:</p> <p>MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1</p>	<ul style="list-style-type: none"> <li>Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals.</li> <li>For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas.</li> <li>Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH.</li> <li>Nesting areas located on human-made structures or objects are not to be included as SWH (e.g. sand, sand traps, roadside verges, active parks etc.).</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>Presence of five or more nesting Midland Painted Turtles®;</li> <li>One or more Northern Map Turtle or Snapping Turtle nesting is a SWH®;</li> <li>The area or collection of sites within an area of exposed mineral soils where the turtle's nest, plus a radius of 30-100m around the nesting area dependant on slope, riparian vegetation and adjacent land use is the SWH cxlviii;</li> <li>Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30-100 m area of habitat cxlix;</li> </ul>

Specialized Wildlife Habitats	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Code	Habitat Criteria	Defining Criteria
		FEO1	<ul style="list-style-type: none"> <li>Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.</li> </ul>	<ul style="list-style-type: none"> <li>Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method; and</li> <li>SWHMiST cxlix Index #28 provides development effects and mitigation measures for turtle nesting habitat.</li> </ul>
<p><b>Seeps and Springs</b></p> <p><u>Rationale:</u> Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.</p>	<p>Wild Turkey</p> <p>Ruffed Grouse</p> <p>Spruce Grouse</p> <p>White-tailed Deer</p> <p>Salamander spp.</p>	<p>Seeps/Springs are areas where ground water comes to the surface. Often, they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.</p>	<p>Any forested area (with &lt;25% meadow/field/pasture) within the headwaters of a stream or river system cxvii, cxlix</p> <ul style="list-style-type: none"> <li>Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species</li> </ul> <p>cxix, cxx, cxxi, cxxii, cxiii, cxiv</p>	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> <li>Presence of a site with 2 or more seeps/springs that demonstrably support ecological functions and/or species listed should be considered SWH;</li> <li>The area of an ELC forest ecosite or an ecoelement within ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation of the habitat cxlviii; and</li> <li>SWHMiST cxlix Index #30 provides development effects and mitigation measures.</li> </ul>
<p><b>Amphibian Breeding Habitat (Woodland).</b></p> <p><u>Rationale:</u> These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.</p>	<p>Eastern Newt</p> <p>Blue-spotted Salamander</p> <p>Spotted Salamander</p> <p>Gray Treefrog</p> <p>Spring Peeper</p> <p>Western Chorus Frog</p> <p>Wood Frog</p>	<p>All Ecosites associated with these ELC Community Series;</p> <p>FOC</p> <p>FOM</p> <p>FOD</p> <p>SWC</p> <p>SWM</p> <p>SWD</p> <p>Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians</p>	<ul style="list-style-type: none"> <li>Presence of a wetland, pond or woodland pool (including vernal pools) &gt;500m<sup>2</sup> (about 25 m diameter) ccvii within or adjacent (within 120m) to a woodland (no minimum size). clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx. Some small wetlands may not be mapped and may be important breeding pools for amphibians.</li> <li>Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat cxlviii</li> </ul>	<p>Studies confirm;</p> <ul style="list-style-type: none"> <li>Presence of breeding population of 2 or more of the listed newt/salamander species or 3 or more of the listed frog species with at least 20 individuals (adults or eggs masses) lxx or 3 or more of the listed frog species with Call Level Codes of 3;</li> <li>A combination of observational study and call count surveys cviii will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands;</li> <li>The habitat is the wetland area plus a 230m radius of woodland area lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi;</li> <li>If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat; and</li> <li>SWHMiST cxlix Index #14 provides development effects and mitigation measures.</li> </ul>
<p><b>Amphibian Breeding Habitat (Wetlands)</b></p>	<p>Eastern Newt</p> <p>American Toad</p>	<p>ELC Community</p>	<p>Wetlands&gt;500m<sup>2</sup> (about 25m diameter) ccvii, supporting high species diversity are significant; some small or ephemeral habitats may not be identified on</p>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>Presence of breeding population of 2 or more of the listed newt/salamander species or 3 or more of the listed</li> </ul>

Specialized Wildlife Habitats	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Code	Habitat Criteria	Defining Criteria
<p><b>Rationale:</b></p> <p>Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario landscapes.</p>	<p>Spotted Salamander</p> <p>Four-toed Salamander</p> <p>Blue-spotted Salamander</p> <p>Gray Treefrog</p> <p>Western Chorus Frog</p> <p>Northern Leopard Frog</p> <p>Pickerel Frog</p> <p>Green Frog</p> <p>Mink Frog</p>	<p>Classes SW, MA, FE, BO, OA and SA.</p> <p>Typically, these wetland ecosites will be isolated (&gt;120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species may be adjacent to woodlands.</p>	<p>MNRF mapping and could be important amphibian breeding habitats clxxxii.</p> <ul style="list-style-type: none"> <li>Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators.</li> </ul>	<p>frog/toad species with at least 20 individuals (adults or eggs masses) lxxi or 3 or more of the listed frog/toad species with Call Level Codes of 3Ⓢ;</p> <ul style="list-style-type: none"> <li>The ELC ecosite wetland area and the shoreline are the SWH.</li> <li>A combination of observational study and call count surveys cviii will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands;</li> <li>If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4 of this Schedule; and</li> <li>SWHMiST cxlix Index #15 provides development effects and mitigation measures.</li> </ul>
<p><b>Woodland Area-Sensitive Bird Breeding Habitat</b></p> <p><b>Rationale:</b></p> <p>Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest songbirds.</p>	<p>Yellow-bellied Sapsucker</p> <p>Veery</p> <p>Blue-headed Vireo</p> <p>Northern Parula</p> <p>Black-throated Green Warbler</p> <p>Blackburnian Warbler</p> <p>Black-throated Blue Warbler</p> <p>Ovenbird</p> <p>Scarlet Tanager</p> <p>Winter Wren</p> <p>Cerulean Warbler</p> <p>Canada Warbler</p>	<p>All Ecosites associated with these ELC Community Series;</p> <p>FOC</p> <p>FOM</p> <p>FOD</p> <p>SWC</p> <p>SWM</p> <p>SWD</p>	<p>Habitats where interior forest breeding birds are breeding, typically large mature (&gt;60 yrs old) forest stands or woodlots &gt;30 ha. cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxxv, cxxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvi, clvii, clviii, clix,</p> <ul style="list-style-type: none"> <li>Interior forest habitat is at least 200 m from forest edge habitat. clxiv</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>Presence of multiple nesting or breeding pairs of 3 or more of the listed wildlife species. Ⓢ;</li> <li>Conduct field investigations in spring and early summer when birds are singing and defending their territories; and</li> <li>SWHMiST cxlix Index #34 provides development effects and mitigation measures.</li> </ul>

**Table 1-3. Habitats of Species of Conservation Concern**

Wildlife	Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Code	Habitat Criteria	Defining Criteria
<p><b>Marsh Breeding Bird Habitat</b></p> <p><u>Rationale:</u> Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.</p>	American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1  <u>For Green Heron:</u> All SW, MA and CUM1 sites.	<ul style="list-style-type: none"> <li>Nesting occurs in wetlands</li> <li>All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present cxxiv</li> <li>For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water.</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>Presence of five or more nesting pairs of Sedge Wren or Marsh Wren or one pair of Sandhill Cranes; <b>or</b> breeding by any combination of five or more of the listed species ©;</li> <li>Area of the ELC ecosite is the SWH;</li> <li>Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats; and</li> <li>SWHMiST cxlix Index #35 provides development effects and mitigation measures</li> </ul>
<p><b>Open Country Bird Breeding Habitat</b></p> <p><u>Rationale:</u> This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records</p>	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow  Short-eared Owl	CUM1 CUM2	<ul style="list-style-type: none"> <li>Large grassland areas (includes natural and cultural fields and meadows) &gt;30 ha clx, clxi, clxii, clxiii clxiv, clxv, clxvi, clxvii, clxviii, clxix.</li> <li>Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last five years) ©.</li> <li>Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least five years or older.</li> <li>The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>Presence of multiple pairs 5 or more nesting or breeding pairs of two or more of the listed species. ©;</li> <li>A field with one or more breeding Short-eared Owls is to be considered SWH;</li> <li>The area of SWH is the contiguous ELC ecosite field areas;</li> <li>Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories; and</li> <li>SWHMiST cxlix Index #32 provides development effects and mitigation measures.</li> </ul>
<p><b>Shrub/Early Successional Bird Breeding Habitat</b></p>	<u>Indicator Spp:</u> Brown Thrasher Clay-coloured	CUT1 CUT2 CUS1	Large field areas succeeding to shrub and thicket habitats >10ha clxiv in size. <ul style="list-style-type: none"> <li>Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for</li> </ul>	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> <li>Presence of nesting or breeding of multiple pairs of 2 of the indicator species and at least 3 of the common species©;</li> </ul>

Wildlife	Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Code	Habitat Criteria	Defining Criteria
<p><b>Rationale:</b></p> <p>This wildlife habitat is declining throughout Ontario and North America.</p> <p>The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records.</p>	<p>Sparrow</p> <p>Golden-winged Warbler</p> <p><u>Common Spp.</u></p> <p>Field Sparrow</p> <p>Black-billed Cuckoo</p> <p>Eastern Towhee</p> <p>Willow Flycatcher</p>	<p>CUS2</p> <p>CUW1</p> <p>CUW2</p> <p>Patches of shrub ecosites can be complexed into a larger habitat for some bird species</p>	<p>farming (i.e. no row-cropping, haying or live-stock pasturing in the last five years) ☺.</p> <ul style="list-style-type: none"> <li>Shrub thicket habitats (&gt;10 ha) are most likely to support and sustain a diversity of these species clxxiii.</li> <li>Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands.</li> </ul>	<ul style="list-style-type: none"> <li>The area of the SWH is the contiguous ELC ecosite field/thicket area;</li> <li>Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories; and</li> <li>SWHMiST cxlix Index #33 provides development effects and mitigation measures.</li> </ul>
<p><b>Terrestrial Crayfish</b></p> <p><b>Rationale:</b></p> <p>Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. Ccii</p>	<p>Chimney or Digger Crayfish; (<i>Fallicambarus fodiens</i>)</p> <p>Devil Crayfish or Meadow Crayfish; (<i>Cambarus Diogenes</i>)</p>	<p>MAM1</p> <p>MAM2</p> <p>MAM3</p> <p>MAM4</p> <p>MAM5</p> <p>MAM6</p> <p>MAS1</p> <p>MAS2</p> <p>MAS3</p> <p>SWD</p> <p>SWT</p> <p>SWM</p> <p>CUM1 with inclusions of above meadow marsh or swamp ecosites can be used by terrestrial crayfish.</p>	<p>Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish.</p> <ul style="list-style-type: none"> <li>Constructs burrows in marshes, mudflats, meadows.</li> </ul>	<p>Studies Confirm:</p> <ul style="list-style-type: none"> <li>Presence of 10 or more individuals of species listed or active (closed) chimneys (burrows) in contiguous suitable meadow marsh, swamp or moist terrestrial sites cci;</li> <li>Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH;</li> <li>Surveys should be done April to August in temporary or permanent water. Note the presence of closed burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult cci; and</li> <li>SWHMiST cxlix Index #36 provides development effects and mitigation measures.</li> </ul>
<p><b>Special Concern and Provincially Rare Wildlife Species</b></p> <p><b>Rationale:</b></p>	<p>All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre.</p>	<p>All plant and animal element occurrences (EO) within a 1 or 10km grid.</p>	<p>When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites lxxviii.</p>	<p>Studies Confirm:</p> <ul style="list-style-type: none"> <li>Assessment/inventory of the site for the identified special concern or provincially rare species needs to be completed during the time of year when the species is present or easily identifiable;</li> </ul>

Wildlife	Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Code	Habitat Criteria	Defining Criteria
These species are quite rare or have experienced significant population declines in Ontario.			<ul style="list-style-type: none"> <li>Cultural ecosites and constructed features are not included as SWH.</li> </ul>	<ul style="list-style-type: none"> <li>For wildlife species multiple breeding pairs must be present for confirmed SWH;</li> <li>The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs to be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat;</li> <li>SWHMiST cxlix Index #37 provides development effects and mitigation measures.</li> </ul>

**Table 1-4. Animal Movement Corridors**

Habitat	Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Code	Habitat Criteria	Defining Criteria
<p><b>Amphibian Movement Corridors</b></p> <p><u>Rationale:</u> Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.</p>	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	Corridors may be found in all ecosites associated with water.  <ul style="list-style-type: none"> <li>Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1</li> </ul>	Movement corridors between breeding habitat and summer habitat clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, clxxx, clxxxi.  Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 ( <b>Amphibian Breeding Habitat –Wetland</b> ) of this Schedule ©.	<ul style="list-style-type: none"> <li>Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites;</li> <li>Corridors should consist of native vegetation, with several layers of vegetation;</li> <li>Corridors should be unbroken by roads, waterways or bodies, cxlix;</li> <li>Corridors should have at least 15 m of vegetation on both sides of waterway cxlix or be up to 200 m wide cxlix of woodland habitat and with gaps &lt;20m cxlix;</li> <li>Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat cxlix; and</li> <li>SWHMiST cxlix Index #40 provides development effects and mitigation measures.</li> </ul>

Habitat	Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Code	Habitat Criteria	Defining Criteria
<p><b>Deer Movement Corridors</b></p> <p><u>Rationale:</u> Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling.</p>	White-tailed Deer	<p>Corridors may be found in all forested ecosites.</p> <p>A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.</p>	<p>Movement corridor must be determined when <b>Deer Wintering Habitat</b> is confirmed as SWH from Table 1.1 of this schedule.</p> <ul style="list-style-type: none"> <li>A deer wintering habitat identified by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion.</li> <li>Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges)</li> </ul>	<ul style="list-style-type: none"> <li>Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas.</li> <li>Corridors that lead to a deer wintering habitat should be unbroken by roads and residential areas</li> <li>Corridors should be at least 200 m wide c/lx with gaps &lt;20m c/lx and if following riparian area with at least 15m of vegetation on both sides of waterway c/lx.</li> <li>Shorter corridors are more significant than longer corridors c/lx.</li> <li>SWHMiST c/lx Index #39 provides development effects and mitigation measures</li> </ul>