



# **Significant Wildlife Habitat Technical Guide**

**Ontario Ministry of Natural Resources  
October 2000**

 **Ontario**

# **Significant Wildlife Habitat Technical Guide**

---

**2000**

---

**Fish and Wildlife Branch  
Wildlife Section**

**Science Development and Transfer Branch  
Southcentral Sciences Section**

© 2000, Queen's printer for Ontario

Printed in Ontario, Canada

MNR #51438  
(.5k P.R. 00 10 16)  
ISBN# 0-7794-0262-6-6 (Internet)

This publication should be cited as:  
OMNR. 2000. Significant wildlife habitat technical guide. 151p.

Copies of this publication are available from:

Ontario Ministry of Natural Resources  
Fish and Wildlife Branch - Wildlife Section  
300 Water Street  
P.O. Box 7000  
Peterborough,  
K9J 8M5

Cette publication scientifique n'est disponible qu'en anglais.

## **Acknowledgements**

This document has undergone numerous reviews. We would like to thank all those who reviewed this document and contributed comments.

Main contributors to the technical guide include:

Kerry Coleman – Ontario Ministry of Natural Resources  
Al Sandilands – Biological Consultant  
Tim Haxton – Ontario Ministry of Natural Resources  
Dave Bland – Biological Consultant  
Vivian Brownell – Biological Consultant  
Richard Rowe – Ontario Ministry of Natural Resources

Main contributors to the appendices include:

Ruth Grant – Biological Consultant  
Don Cuddy – Ontario Ministry of Natural Resources  
Mike Oldham – Natural Heritage Information Centre



## Table of Contents

<b>Acknowledgements .....</b>	<b>i</b>
<b>List of Tables.....</b>	<b>vi</b>
<b>List of Figures .....</b>	<b>vii</b>
<b>List of Appendices .....</b>	<b>viii</b>
<b>1 Introduction .....</b>	<b>1</b>
<b>2 A Landscape Approach to Conserving Significant Wildlife Habitat.....</b>	<b>3</b>
2.1 Gap analysis – A critical tool in landscape analysis.....	6
<b>3 Preparing to Identify Significant Wildlife Habitat .....</b>	<b>8</b>
3.1 Significant wildlife habitat.....	8
3.2 Available information .....	8
3.3 Other information.....	12
3.4 The conservation advisory committee .....	13
3.5 Finding potentially significant wildlife habitat .....	14
3.5.1 Wetlands .....	16
3.5.2 Woodlands .....	17
3.6 Mapping significant wildlife habitat.....	19
<b>4 Identifying Habitats of Seasonal Concentrations of Animals.....</b>	<b>20</b>
4.1 Definition .....	20
4.2 Ecological functions/effects of loss .....	20
4.3 Identification of potentially significant seasonal concentration areas .....	20
4.3.1 Mapping and verifying known seasonal concentration areas .....	20
4.3.2 Finding animal Concentration areas that have not been previously identified.....	21
4.4 How to find some specific seasonal concentration areas .....	22
4.4.1 Winter deer yards .....	22
4.4.2 Moose late winter habitat.....	23
4.4.3 Colonial bird nesting sites .....	23
4.4.4 Waterfowl stopover and staging areas.....	25
4.4.5 Waterfowl nesting.....	25
4.4.6 Shorebird migratory stopover areas.....	26
4.4.7 Landbird migratory stopover areas.....	27
4.4.8 Raptor winter feeding and roosting areas .....	27
4.4.9 Wild turkey winter range .....	28
4.4.10 Turkey vulture summer roosting areas .....	29

4.4.11	Reptile hibernacula .....	29
4.4.12	Bat hibernacula.....	30
4.4.13	Bullfrog concentration areas .....	31
4.4.14	Migratory butterfly stopover areas .....	32
<b>5</b>	<b>Identifying Rare Vegetation Communities or Specialised Habitats for Wildlife.....</b>	<b>33</b>
5.1	Definitions.....	33
5.2	Ecological function/effects of loss.....	33
5.2.1	Rare vegetation communities .....	33
5.2.2	Specialised habitats for wildlife .....	33
5.3	Identification of potentially rare vegetation communities or specialised habitat for wildlife.....	34
5.3.1	Potentially rare vegetation communities .....	35
5.3.2	Specialised habitats for wildlife .....	36
5.4	How to find some rare vegetation communities or specialised habitats for wildlife.....	37
5.4.1	Rare vegetation communities .....	37
5.4.1.1	Alvars.....	37
5.4.1.2	Tall-grass prairies .....	38
5.4.1.3	Savannahs.....	39
5.4.1.4	Rare forest types.....	40
5.4.1.5	Talus slopes.....	41
5.4.1.6	Rock barrens .....	41
5.4.1.7	Sand barrens.....	42
5.4.1.8	Great Lakes dunes .....	42
5.4.2	How to find specialised habitats for wildlife .....	43
5.4.2.1	Habitat for area-sensitive species .....	43
5.4.2.2	Forests providing a high diversity of habitats.....	45
5.4.2.3	Old-growth or mature forest stands.....	45
5.4.2.4	Foraging areas with abundant mast .....	46
5.4.2.5	Amphibian woodland breeding ponds.....	47
5.4.2.6	Turtle nesting habitat .....	47
5.4.2.7	Specialised raptor nesting habitat .....	48
5.4.2.8	Moose calving areas .....	49
5.4.2.9	Moose aquatic feeding areas .....	50
5.4.2.10	Mineral licks .....	50
5.4.2.11	Mink, otter, marten, and fisher denning sites .....	50
5.4.3	Highly diverse areas.....	51
5.4.4	Cliffs.....	52
5.4.5	Seeps and springs .....	53
<b>6</b>	<b>Identifying Habitats of Species of Conservation Concern.....</b>	<b>54</b>
6.1	Definition .....	54

6.2	Ecological function/effects of loss.....	54
6.3	Identification of habitat of species of conservation concern.....	54
6.3.1	A suggested approach to habitat identification .....	55
6.3.2	Summary .....	56
<b>7</b>	<b>Identifying Animal Movement Corridors .....</b>	<b>58</b>
7.1	Definition .....	58
7.2	Ecological function/effects of loss.....	58
7.3	Identification of animal movement corridors .....	59
7.3.1	Recommendations.....	60
<b>8</b>	<b>Evaluation of Significant Wildlife Habitat.....</b>	<b>62</b>
8.1	Evaluation criteria and guidelines.....	62
8.2	Field investigations .....	65
8.3	Evaluation of habitat of seasonal concentrations of animals.....	66
8.3.1	Winter deer yards .....	67
8.3.2	Moose late winter habitat.....	67
8.3.3	Colonial bird nesting sites .....	68
8.3.4	Waterfowl stopover and staging areas.....	69
8.3.5	Waterfowl nesting habitat .....	69
8.3.6	Shorebird migratory stopover sites.....	70
8.3.7	Landbird migratory stopover areas.....	71
8.3.8	Raptor wintering areas.....	72
8.3.9	Wild turkey wintering areas .....	72
8.3.10	Turkey vulture summer roosting areas .....	73
8.3.11	Reptile hibernacula .....	73
8.3.12	Bat hibernacula.....	73
8.3.13	Bullfrog concentration areas .....	74
8.3.14	Migratory butterfly stopover areas .....	74
8.4	Evaluation of rare vegetation communities.....	75
8.5	Evaluation of specialised habitats for wildlife .....	76
8.5.1	Sites supporting area-sensitive species .....	77
8.5.2	Forest stands providing a diversity of habitats .....	78
8.5.3	Old growth or mature forest stands.....	78
8.5.4	Seeps and springs .....	79
8.5.5	Woodlands supporting amphibian breeding ponds .....	79
8.5.6	Special woodland feeding habitat .....	80
8.5.7	Osprey nesting habitat.....	80
8.5.8	Turtle nesting habitat .....	80
8.5.9	Special moose habitats–aquatic feeding areas, calving sites and mineral licks.....	81
8.5.10	Mink and otter feeding/denning sites; marten and fisher denning sites.....	81
8.5.11	Areas of high diversity .....	82



8.5.12 Cliffs and caves.....	82
8.6 Evaluation of habitat of species of conservation concern.....	82
8.7 Evaluation of animal movement corridors .....	83
<b>9 Ranking Significant Wildlife Habitat.....</b>	<b>85</b>
9.1 An evaluation of three ranking methods.....	85
9.2 Recommended method for ranking similar habitats .....	88
9.2.1 Importance of representation of habitats .....	88
9.2.2 Establishing minimum standards for representation.....	88
9.2.3 Minimum standards of other selected evaluation criteria.....	89
9.2.4 Avoiding numerical values for some minimum standards .....	90
9.2.5 Explanation of the tables in Appendix Q.....	90
<b>10 How Much Habitat to Protect .....</b>	<b>92</b>
10.1 Difficulties in determining how much habitat to protect.....	92
10.2 Some considerations for determining how much habitat to protect .....	93
10.3 What to protect?- summary of guidelines .....	96
10.4 How much to protect?- summary of factors to consider .....	99
10.5 How much to protect?- suggested Amounts.....	100
10.6 Some hypothetical examples .....	105
10.7 General habitat requirements of species of conservation concern.....	120
10.7.1 Seasonal concentration areas.....	120
10.7.2 Rare or specialised habitats .....	122
10.7.3 Habitat of species of conservation concern.....	124
<b>11 Assessment of the Natural Heritage System.....</b>	<b>127</b>
11.1 Gap analysis .....	128
11.1.1 Gap analysis of vegetation communities .....	129
11.1.2 Gap analysis of species.....	130
11.2 Restoration and rehabilitation opportunities .....	131
<b>12 References.....</b>	<b>134</b>
12.1 Literature Cited .....	134
12.2 Glossary .....	137

## List of Tables

Table 3-1. Information sources that will assist in the identification of significant wildlife habitat. ....	9
Table 8-1. General evaluation criteria for wildlife habitats. ....	63
Table 9-1. Minimum standards evaluation method example. ....	85
Table 9-2. Additive weighting evaluation method example. ....	86
Table 9-3. Ranking evaluation method example. ....	87
Table 10-1. Suggested values for protection of selected wildlife habitats. ....	101
Table 10-2. Minimum standards for nesting waterfowl for six hypothetical sites. ....	109
Table 10-3. Minimum standards for three hypothetical off-shield amphibian breeding ponds. ....	115
Table 10-4. Minimum standards of three hypothetical woodlots for southern flying squirrels. ....	119
Table 10-5. Primary locations of seasonal concentrations of wildlife. ....	120
Table 10-6. Primary locations of rare or specialised habitats. ....	122
Table 10-7. General habitat requirements of selected species of conservation concern. ....	124

## List of Figures

Figure 2-1. Hill's site Regions in Ontario. ....	4
Figure 4-1. Colonial nesting species such as gulls, will seek islands to nest and return to the same location annually.....	24
Figure 5-1. Bogbean buckmoth, specific to eastern Ontario fen habitat, are known in only in two locations in Ontario.....	34
Figure 5-2. Monarch caterpillars feed strictly on milkweed. ....	86
Figure 5-3. Alvar, Misery Bay, Manitoulin Island. ....	38

## **List of Appendices**

- Appendix A. A description of Ramsar sites, biosphere reserves, Carolinian Canada sites and Western Hemisphere Shorebird Reserve Network and their application in landuse planning.
- Appendix B. Ecological considerations underlying Natural Heritage System planning.
- Appendix C. A list of area sensitive species and key references.
- Appendix D. Guidelines for conducting field investigations.
- Appendix E. Natural heritage gap analysis methodologies used by the Ontario Ministry of Natural Resources.
- Appendix F. List of agencies and organisations and information that may be obtained.
- Appendix G. Wildlife habitat matrices and habitat descriptions for rare vascular plants.
- Appendix H. Suggested terms of reference for the formation and operation of a Conservation Advisory Committee (CAC).
- Appendix I. Information sources for the identification of specific significant wildlife habitats.
- Appendix J. Natural heritage resources of Ontario: Vegetation communities of Southern Ontario.
- Appendix K. Significant waterfowl habitat.
- Appendix L. Practical approaches for identifying rare vegetation communities using the southern Ontario Ecological Land classification approach.
- Appendix M. Locations of known rare vegetation communities in Ontario.
- Appendix N. List of indicator species of Alvar, Tall Grass Prairie, Savannah and Carolinian forest habitats in southern Ontario.
- Appendix O. Finding and identifying raptor nests.
- Appendix P. List of endangered, threatened and vulnerable plant and animal species in Ontario.
- Appendix Q. Evaluation criteria for significant wildlife habitat.
- Appendix R. Summary of Forest Management guidelines for various wildlife species.

## 1 Introduction

In May 1996, the *Provincial Policy Statement* (PPS) was issued under the Planning Act. This document identified matters of provincial interest to be considered as part of the land use planning process in the province of Ontario. Section 3 of the Planning Act requires that planning authorities shall “have regard to” the PPS when exercising any authority that affects municipal planning matters.

Among other things, Section 2.3 of the PPS requires that “natural heritage features and areas will be protected from incompatible development” and that development and site alteration will be permitted on or adjacent to these areas “if it can be demonstrated that there will be no negative impact on the natural features or ecological functions for which the area is identified.”

*Significant Wildlife Habitat* has been identified as a natural heritage area for the purposes of Section 2.3 of the PPS. *Wildlife* is described as:

*“all wild mammals, birds, reptiles, amphibians, fishes, invertebrates, plants, fungi, algae, bacteria and other wild organisms”* (Ontario Wildlife Working Group 1991)

The PPS specifically identifies *wildlife habitat* as:

*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.*

Wildlife habitat is considered *significant* where it is:

*ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System. Criteria for determining significance may be recommended by the Province, but municipal approaches that achieve the same objective may also be used.*

The *Natural Heritage Reference Manual–June 1999* (OMNR 1999) and this document the *Significant Wildlife Habitat Technical Guide* were prepared by the Ministry of Natural Resources to assist planning authorities and other participants in the land use planning system. Both documents represent the most up to date information available at the date of publication on specific technical issues.

The *Natural Heritage Reference Manual* is a general reference manual that applies additional information on technical issues relative to Section 2.3 of the PPS. The manual is intended for use by those who have a basic understanding of the Planning Act process and the intent of the PPS. It will be of most interest to those involved in the development and review of policy documents and the review and approval of development applications.

The *Significant Wildlife Habitat Technical Guide* is a more detailed technical manual that provides information on the identification, description, and prioritisation of significant wildlife habitat. This manual is intended for use by ecologists, biologists, environmental planners, and others involved in the development of strategies to identify and protect significant wildlife habitat in the municipal planning process. More specifically it:

- describes in more detail some of the techniques, issues, and processes identified in the *Natural Heritage Reference Manual*
- provides recommended approaches to describe, identify and prioritise significant wildlife habitat
- provides a compilation of relevant technical support materials and references

Neither of these documents should be read in isolation of the PPS. They are advisory only and may be updated as technology or techniques improve. They provide information to assist in understanding the policy. They do not add to or detract from policy. Except as otherwise specified (e.g. where requirements are established by legislation or regulation), they do not represent the only acceptable approaches. There may be other ways to achieve the results established in the PPS. However, in all cases planning authorities must have regard to the PPS.

This technical guide is intended for use in the municipal policy and development process under the Planning Act. However, this document may also be useful in considering applications that must fulfil other approval processes (e.g. Class Environmental Assessments). In cases where matters are subject to other legislation (e.g. Endangered Species Act), appropriate references are noted in the text.

The *Significant Wildlife Habitat Technical Guide* consists of three sections:

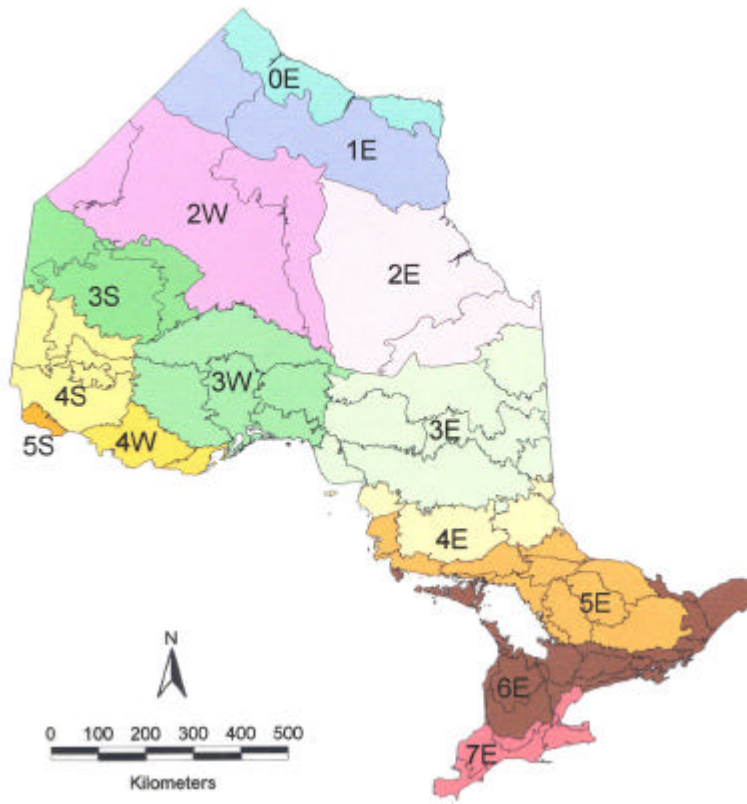
- Background and approach to significant wildlife habitat (Chapters 1–2)
- Identifying significant wildlife habitat (Chapters 3–7)
- Evaluating and ranking significant wildlife habitat (Chapters 8–11)

Technical information has been included in the appendices to this document. The appendices are voluminous and presented in a separate document. The intent is to make updates of these appendices permissible as new science and information becomes available.

## 2 A Landscape Approach to Conserving Significant Wildlife Habitat

The *Natural Heritage Reference Manual* (OMNR 1999) outlines a Natural Heritage System approach. This approach is a useful method for the protection of specific natural heritage features and areas because it reinforces an understanding that individual areas and features have strong ecological ties to other physical features and areas in the overall landscape. When addressing the significant wildlife habitat feature of this system, it is important to consider significant wildlife habitat at more than one scale. Some habitats may be of national or provincial importance, such as an important migration stopover site for migrating birds (e.g. RAMSAR sites—Appendix A). Other habitats may be locally significant, such as a winter concentration area for a local population of deer. Generally, those habitats that are significant at larger scales are considered to be of greater significance than those at the local scale. That does not imply that significance at the local level is not important, as it can be very important. However, scale is a very important criterion when ranking significance between two or more potential sites.

Landscapes are relatively large geographic areas. From an ecological perspective, landscape boundaries are most appropriately defined based on climatic considerations and physiography. These are the two main ecological features used to identify ecological units known as site regions. At a finer scale, vegetation responses to climate and physiography are the primary factors used to define site districts. Hills (1959) divided the province into 14 site regions and 67 site districts (Figure 2-1). The ecosystems that occur in a given site district are distinct from those in other site districts with respect to climate, landform, and patterns of vegetation. For more information on site regions and site districts of Ontario (Figure 2-1), refer to a *Framework for the Conservation of Ontario's Biological Heritage* (Beechey 1980). The Ontario Ministry of Natural Resources (OMNR) has used these ecological units as the basis for determining representation of potential Areas of Natural and Scientific Interest (ANSIs), wetland rarity in the provincial wetland evaluation system, and for determining the rarity of species and vegetation communities across the province. Planning authorities can also use these units as a basis for making landscape level decisions with respect to significance. Other criteria can be used to define landscape boundaries, such as watersheds, sub-watersheds, regional municipalities, and counties. Landscapes that only consider the smaller scales are not as ecologically sound as large-scale landscapes in natural heritage planning. Many significant features extend beyond administrative boundaries and certainly, wildlife is not confined by these boundaries. Planning authorities have to make planning policies for land within their jurisdiction. Ideally, a Natural Heritage System for a planning area would incorporate a variety of scales from global to local and these would be taken into account during the planning process.



**Figure 2-1. Hill's Site Regions (modified) in Ontario.**

By definition, a landscape approach to Natural Heritage System planning involves assessing the relative ecological value of individual features in a particular area in relation to other similar features in a larger area (i.e. a landscape). Such an approach, particularly when it considers natural heritage features at a variety of scales results in a comprehensive, sound Natural Heritage System. The concept of assessing ecological importance to similar features in a larger landscape can and should be applied even at the site-specific scale. A particular habitat for a species may be considered as significant

wildlife habitat because it is under-represented at some scale in the landscape. This could be at the provincial scale, site region or even at the planning area level. Generally, greater priority is given to representation at larger scales.

The concept of representation at a variety of scales in the landscape can assist planning authorities to determine what habitats should be considered significant. For example, the black tern is a colonial nesting bird species that is under-represented (rare) at the provincial scale. Because these colonies are critical to local populations and the species is rare provincially, it is reasonable to assume that all colonies of this species should be considered significant. The great blue heron is also a colonial nesting bird. It is not under-represented (rare) at the provincial scale. Great blue herons can nest in colonies ranging from 5 or 6 nests to well over 100 nests. In smaller landscapes where great blue herons are common, the planning authority may decide that only those colonies with greater than a specific number of nests (e.g. >25), should be considered significant. However, in other small landscapes where great blue heron populations have declined from historical levels and are not common, the planning authority may decide that all colonies that are found in the planning area should be considered significant.



Natural heritage planning at the landscape scale has a number of advantages. These include:

1. Enabling resource planners to identify the most important natural heritage features based on ecosystem representation and linkages between ecosystems. This is more effectively accomplished when examining the entire landscape and later focusing on the site-specific scale, than starting at the site-specific scale and working up to larger scales.
2. Allowing planning authorities to reduce their time and costs early in the planning process. The identification of large natural areas and linkages by using ecologically sound, landscape level criteria such as representation, size, shape, distribution, connectivity and community and species diversity (Appendix B) often does not require extensive field studies. Many of the criteria can be applied using existing information on potential sites as well as remote technologies such as satellite imagery and air photo interpretation.
3. Allowing subsequent finer scale, site-specific planning for significant wildlife habitat to be more focused. After a system of large, well-connected core natural areas has been identified, subsequent efforts to identify site-specific significant wildlife habitat can be concentrated on those portions of the planning area outside of the preliminary Natural Heritage System that have already been identified using landscape criteria.
4. Providing the best protection for significant wildlife habitats that are difficult to identify and quantify. This would include such habitats as waterfowl breeding habitat, amphibian breeding ponds, snake hibernacula, bat hibernacula, marten and fisher denning habitat, habitats for area-sensitive species and a number of other specialised, highly diverse habitats. These habitats are critical to the survival of many species, but are extremely difficult to locate and, when they are located, the significant portions (i.e. critical habitat) of the habitat are often difficult to quantify. The identification and protection of a system of large, well-connected natural areas with good representation of the ecosystems and natural communities in the planning area will often include many of these features. The large size of these areas can provide better protection than if habitats are individually identified and protected as isolated features on the landscape. Isolated habitats, even with protective buffers, are less effective in protecting the ecological functions of a feature than when that feature is part of a larger natural area.
5. Providing a greater probability that the habitat size thresholds of some species are met. The habitat size threshold for many area-sensitive species is much larger than the actual territory of an individual breeding pair (Villard et al. 1992). For example, the loggerhead shrike uses open scrubland habitat. The home range for a nesting pair is generally considered to be a radius of approximately 400 metres around the nest (approx. 0.5 km<sup>2</sup>). However, habitats that appear to be suitable may not be used unless

there is a minimum amount of suitable habitat available within a defined landscape. A general guideline is that 10% of the landscape must be suitable habitat. Therefore within a 100 km<sup>2</sup> landscape, 10 km<sup>2</sup> would have to be suitable shrike habitat before any of the habitat would be used. The same concept applies to many area-sensitive species. Appendix C lists a number of area-sensitive species and key references for these species.

6. Allowing better integration of all of the natural heritage features and areas covered by the policy, than when they are identified and evaluated on their own. Ideally, a planning authority's Natural Heritage System should be comprised of a fully represented system of well-connected natural heritage features and areas broadly distributed across the planning area.

The landscape approach to planning for significant wildlife habitat can be considered a first step in the planning process. It does not eliminate the need for finer scale site-specific identification and evaluation of significant wildlife habitat. Chapters 4 to 7 in this guide provide detailed discussion on the identification of site-specific significant wildlife habitat. Some potentially significant wildlife habitat will be missed when identifying a system of core natural areas at the landscape level. Many of these fine-scale sites can be very important habitats.

Examining significant wildlife habitats at a fine scale after a system of large, well-connected natural areas have been identified at the landscape level, provides the opportunity to gain a better understanding of the ecological functions and species interactions within these areas. This can be very beneficial to a planning authority, particularly during consultation regarding potential development in and adjacent to significant wildlife habitat.

Some field studies may be required to verify existing information or to collect information about potentially significant core natural areas. When conducting field studies it should be kept in mind that additional information may be required at a later date for site-specific evaluation (Appendix D).

## **2.1 Gap analysis – A critical tool in landscape analysis**

Gap analysis is the most commonly accepted landscape-scale methodology for identifying high priority natural areas in need of protection. Gap analysis is an approach to identifying and fulfilling natural heritage targets. It facilitates the identification of natural features that are not represented or are under-represented within natural areas systems and is the basis of the OMNR's program for selecting ANSI's. The areas identified form *core* natural areas around which the rest of the Natural Heritage System can be completed. The key assumptions underlying natural area gap analysis are:

- that enduring features on the landscape (i.e. landforms) are more stable in their distribution than vegetation or other biotic elements (Noss 1995)
- that the ecological diversity of an area is largely a result of interactions between climate and enduring features (Noss 1995); and
- that, by representing all landform-vegetation associations in a protected area system, a significant portion of the biodiversity will be maintained (Crins and Kor 1999)

Collectively, these assumptions recognise that the best way to ensure the survival of the greatest diversity of species is to ensure that the widest possible range of habitat types is protected. OMNR's current gap analysis procedures are described in Crins and Kor (1999) and are summarised in Appendix E. Other important references include NCASI (1996) and Riley and Mohr (1994).

As described above, a gap analysis is a very useful method for determining which natural areas should be considered for protection. A gap analysis can also be used to determine what natural heritage features may be missing from the landscape. These can also include vegetative or biotic communities that were historically found in the planning area, but are no longer present or have been degraded.

## **3 Preparing to Identify Significant Wildlife Habitat**

### **3.1 Significant wildlife habitat**

To ensure a comprehensive approach to identifying and evaluating significant wildlife habitat, wildlife habitat has been divided into four broad categories:

- seasonal concentration areas
- rare vegetation communities or specialised habitats for wildlife
- habitats of species of conservation concern, excluding the habitats of endangered and threatened species
- animal movement corridors

The task of identifying significant wildlife habitat will be facilitated if other natural heritage features listed in the Natural Heritage Policy are mapped first as outlined by the *Natural Heritage Reference Manual* (OMNR 1999) and the appropriate technical manuals. Many known, as well as unknown, wildlife habitats exist in these other reference areas.

Significant wildlife habitat that is found in other natural heritage features is very important and should be identified. However, as a priority, surveys should concentrate on areas outside identified features. It will save time and be more efficient to concentrate on areas not included in other natural heritage features and areas. This approach can also enhance natural heritage conservation if the planning authority concentrates its efforts to find and protect significant wildlife habitats outside the boundaries of the other identified natural heritage features and areas.

However, significant wildlife habitat in other natural heritage areas should not be ignored. These areas may receive development pressure, and it is essential that proponents conducting impact assessments understand their functions and identify potential impacts on significant wildlife habitat.

### **3.2 Available information**

There are several sources of information that will help planning authorities identify significant wildlife habitats. Table 3-1 summarises the most useful information and its specific application to identifying wildlife habitat. Most of the listed information can be obtained from local OMNR offices. A list of agencies and their respective areas of expertise has been comprised in Appendix F.

The most recent aerial photographs used with topographical maps and Ontario base maps (OBMs) will enable the planning authority to determine the precise location of previously mapped significant natural heritage features such as provincially significant wetlands and ANSIs, as well as identify some potential habitats. Interpretation of Forest Resource Inventory (FRI) maps, used with aerial photographs, may help locate potentially rare or

specialised communities. Most OMNR district offices have land tenure maps showing lots and concessions; crown land, agreement forests, and provincial wildlife areas; private property; and property owned by conservation authorities and other agencies.

OMNR wetland evaluations are located at OMNR offices. Although class 4 to 7 wetlands are not provincially significant, their evaluations should still be examined for information about significant wildlife habitats, including rare or specialised habitat such as bogs and fens; important seasonal concentration areas for white-tailed deer and waterfowl; and colonial bird sites such as heronries and black tern colonies.

**Table 3-1. Information sources that will assist in identification of significant wildlife habitat.**

Sources	Information that source can provide
Aerial photographs (scale may be 1:10,000 or 1:15,840) Available from: MNR Natural Resources Information Centre <sup>1</sup>	<ul style="list-style-type: none"> <li>• show relative sizes and precise location of woodlands, grasslands, wetlands, other natural areas</li> <li>• indicate presence and location of human activities (e.g. roads, drainage ditches, pits, quarries, agriculture); settlements and other land uses</li> <li>• reveal location of potential corridors and linkages</li> <li>• indicate presence and nature of buffers</li> <li>• help to verify information from older FRI and topographic maps</li> <li>• photo interpretation can identify some species and discern some types of woodlands (e.g. those dominated by large trees); wetland types (e.g. marsh, swamp); rock outcroppings; dunes</li> <li>• essential for field investigations – navigation, identification, mapping communities and other natural heritage features and areas</li> <li>• help to estimate size of communities</li> </ul>
Topographic maps (scale 1:50,000) Available from: Canada Map Office, Natural Resources Canada, 130 Bentley Ave. Nepean, ON K2E 6T9 (1-800-465-6277); local bookstores	<ul style="list-style-type: none"> <li>• indicate approximate location and size of natural areas and features</li> <li>• show relief of land using incremental contours (e.g. cliffs, lowlands, depressions)</li> <li>• indicate location and type of roads</li> <li>• indicate location of railway tracks, pipelines, hydro corridors, telephone lines</li> <li>• useful in field investigations when used in conjunction with aerial photographs</li> <li>• can provide overview of planning area for larger landscape perspective</li> <li>• can help to identify potential corridors and linkages</li> </ul>
Ontario Base Maps (OBM) (scale may be 1:10,000 or 1:15,840) Available from MNR Natural Resources Information Centre <sup>1</sup>	<ul style="list-style-type: none"> <li>• are same scale as aerial photographs and therefore valuable for identifying precise locations of specific features</li> <li>• useful for mapping areas and features (particularly those that can be identified on aerial photographs)</li> <li>• used for mapping wetlands</li> <li>• some have topographic relief</li> <li>• valuable for locating lot and concession lines</li> </ul>
Forest Resource Inventory (FRI) Maps	<ul style="list-style-type: none"> <li>• provide information about tree composition, age, height, stocking of forest stands (be sure to take into account the date of FRIs)</li> </ul>

Sources	Information that source can provide
<p>(scale may be 1:10,000 or 1:15,840) Available from: Natural Resources Information Centre<sup>1</sup></p>	<ul style="list-style-type: none"> <li>• can be used to help map existing forest cover</li> <li>• can be used to locate older forests which are likely to contain high concentrations of cavity trees, snags and downed logs</li> <li>• have potential to locate uncommon forest associations, sensitive species or species of conservation concern such as forest interior birds</li> </ul> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• not all geographic areas have FRI mapping</li> <li>• composition is not recorded unless it makes up at least 10% of the stand</li> </ul>
<p>MNR Land Tenure maps (scales vary 1:125,000, 1:150,000) Available from: Natural Resources Information Centre<sup>1</sup></p>	<ul style="list-style-type: none"> <li>• indicate private land, Crown Land, Agreement Forests, Provincial Wildlife Areas, Conservation Authority properties, pits and quarries, evaluated wetlands</li> </ul>
<p>County Soil Survey Reports and Maps (Southern Ontario) Available from Ontario Ministry of Agriculture and Food and Rural Affairs (OMAFRA – <i>ibid.</i> Appendix F) or MNR Geology Maps available from Canadian Geological Surveys or Ontario Geological Surveys</p>	<ul style="list-style-type: none"> <li>• provide description of local soils, relief, drainage, forest types</li> <li>• can help to locate potentially rare or specialised communities associated with certain soil, soil depths, landforms</li> <li>• used in wetland evaluations</li> </ul>
<p>MNR Wetland Evaluations (scale 1:10,000; some with scale of 1:15,840) Available from MNR area offices</p>	<ul style="list-style-type: none"> <li>• indicate location, size and type of wetland</li> <li>• identify some rare species, species of conservation concern such as bullfrogs and other amphibians and reptiles</li> <li>• describe types of wetland communities by dominant plant species</li> <li>• indicate presence of uncommon wetland communities (e.g. fens, bogs)</li> <li>• indicate presence of seasonal concentrations of wildlife (e.g. heron colonies, black tern colonies, nesting waterfowl)</li> <li>• indicate wetland's importance to waterfowl</li> <li>• indicate presence of fish habitat</li> <li>• include lists of species observed (not all evaluations)</li> <li>• indicate level of disturbance of the wetland</li> <li>• cite other studies, information sources</li> <li>• maps indicate vegetation communities, wetland types and species</li> </ul>

Sources	Information that source can provide
Areas of Natural and Scientific Interest (ANSI) Site District and inventory reports Available from MNR area offices	<ul style="list-style-type: none"> <li>• provide excellent ecological overview of significant biological areas assessed at the landscape scale</li> <li>• explain basis for selection of sites based on vegetation/landscape features</li> <li>• describe size, location and ecological significance of sites</li> <li>• include list of rare – uncommon flora and fauna observed</li> <li>• list rare species, communities, habitats</li> <li>• identify older forests, diverse communities</li> <li>• include lists of other sites of potential biological significance</li> <li>• include maps (scale 1:250,000), list of references</li> </ul>
Ecological Land Classification (ELC) Available from the Federation of Ontario Naturalists, 355 Lesmill Road, Don Mills ON M3B 2W8	<ul style="list-style-type: none"> <li>• provides lists of natural vegetation communities by site type</li> <li>• can assist with the identification of rare vegetation communities</li> </ul> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• forest and wetland classifications completed for northern Ontario and are available from MNR offices in Thunder Bay and Timmins</li> <li>• forest classification completed for central Ontario and is available through the MNR office in North Bay</li> <li>• preliminary classification available for southern Ontario is available in <b>Bakowsky, W. D.</b> 1996. <i>Natural Heritage Resources of Ontario: Vegetation Communities of Southern Ontario</i>. Ontario Ministry of Natural Resources, Natural Heritage Information Centre, Peterborough Ontario (Appendix J)</li> </ul>
Wildlife habitat matrices ( <i>ibid.</i> Appendix G)	<ul style="list-style-type: none"> <li>• provides comprehensive list of wildlife species, their provincial range and specific habitat description</li> <li>• can help identify and evaluate habitats for species of conservation concern but can be applied to species found in other habitats as well</li> </ul>
Other	<ul style="list-style-type: none"> <li>• Ontario Geological Survey Peat and Peatland Evaluations provide maps and detailed descriptions of all observed wetland communities (Ministry of Northern Development and Mines)</li> <li>• naturalist reports often include results of inventories conducted on specific areas; some studies have been reported in journals such as the <i>Canadian Field Naturalist</i></li> <li>• Canada Land Inventory provides maps of land capability for agriculture, forestry, recreation, and wildlife (ungulates and waterfowl) (<i>ibid.</i> Appendix A)</li> <li>• Conservation Authority Watershed Plans describe natural resource features on a watershed level (local conservation authorities)</li> <li>• Natural Areas Inventory conducted by municipalities</li> <li>• Landsat, Natural Heritage Information Centre, consultant reports, local experts, Parks Canada, Ontario Parks</li> </ul>

<sup>1</sup> Ministry of Natural Resources, Natural Resources Information Centre, 1<sup>st</sup> Floor N, 300 Water St, PO Box 7000, Peterborough ON K9J 8M5 or Rm M1-70 Macdonald Block, 900 Bay St, Toronto ON M7A 2C1

ANSI site district and inventory reports provide excellent summaries of ecologically significant sites. They identify sites that support rare species, species of conservation concern, and areas with high species and community diversity. Frequently a list of other potentially significant sites (in addition to those identified as ANSIs) is listed at the back of the document. They also identify the best known remaining examples of the full range

of landform-vegetation associations. These reports were created with the objective of assuring full representation of the biodiversity and natural landscapes for the site district and province. ANSI Site District and inventory reports provide readers with a general understanding of the full spectrum of biological communities that have been identified in the district and why they are important. Of particular interest are candidate ANSIs and ANSIs considered provincially or regionally significant.

Descriptions of the habitats of species of conservation concern are listed in the habitat matrices found in Appendix G. This list can help the planning authority identify species that are likely to occur in its jurisdiction and to identify potentially significant habitats for them. The planning authority may wish to compile/establish its own list of species of conservation concern, based on more specific knowledge of wildlife and wildlife habitat within its jurisdiction and on criteria that better meet the planning authority's needs.

### 3.3 Other information

Interest in conservation biology has grown rapidly during the past 10 years. A result of this has been an increase in the number of publications about developing Natural Heritage Systems, and how to protect regional biodiversity and important natural areas. The following reports provide information about how to protect biodiversity, and identify and evaluate natural areas and features, including wildlife habitat.

***The natural heritage of southern Ontario's settled landscapes*** (Riley and Mohr 1994)

- focus is on the southern Ontario landscape
- provides a good summary of the ecological concepts of conservation biology and reviews some of the most cited conservation biology literature
- discusses core natural areas, corridors, woodland ecosystems etc.
- discusses the formation of Natural Heritage Systems.

***Saving nature's legacy*** (Noss and Cooperrider 1994)

- one of the best and most comprehensive books about protecting and restoring native biodiversity
- provides numerous case studies of application of concepts of conservation biology
- many suggestions and recommendations for evaluation of natural areas, and building a Natural Heritage System

***Natural Heritage Reference Manual*** (OMNR 1999)

- provides a summary of some of the most commonly discussed concepts of conservation biology
- based on an extensive review of the literature and written for the layman
- outlines the key concepts of Natural Heritage System planning
- provides recommendations about how to identify and evaluate natural heritage features and areas



Reports produced by consultants and government and non-government agencies can often provide useful information concerning areas with important wildlife habitat. Most of these studies and reports apply to the more densely populated areas of southern Ontario. Some reports have been done for conservation authorities, such as sub-watershed plans, and numerous inventories have been done as part of impact studies for development or utilities right-of-way studies. Contact the ecologist at the local OMNR office to help to locate existing reports and studies that have been conducted in the municipality. Reports may also be found at the offices of Ontario Power Generation, Ontario Hydro Services Company, the Ontario Ministry of Transportation and local municipalities.

### **3.4 The conservation advisory committee**

Local residents and experts can be a tremendous asset to planning authorities. Many of these people have a good knowledge of wildlife, natural heritage features, and ecologically important areas in their municipality. The planning authority can form a Conservation Advisory Committee (CAC) consisting of a voluntary panel of these people, and then involve them in environmental land-use planning. The involvement of such a group in natural heritage planning and decision-making processes can minimise and even eliminate the need for expensive inventories and still provide excellent results. It can assist in establishing lists of significant species and habitats. The use of a CAC may also lend credibility to the planning authority's decisions by involving local residents in the planning decisions and fostering greater acceptance of the need for wildlife habitat protection through education and participation. Please refer to Appendix H for suggestions regarding the formation and operation of a CAC.

One of the most important roles of the CAC is to provide accurate information about specific wildlife habitats within the municipality. These may include animal movement corridors, seasonal concentration areas, rare vegetation communities or specialised habitats, and habitats of species of conservation concern. A CAC may be especially helpful in the development of criteria for determining species of conservation concern and the initial production of these lists for birds, reptiles, amphibians, mammals, vascular plants, and butterflies. Eventually lists for fish and certain other groups of invertebrates might be developed. Finally, if site investigations and habitat assessments are required, the CAC may provide input to the terms of reference for fieldwork. This could potentially save the municipality money by avoiding unnecessary work. In some cases, the CAC, in cooperation with the municipality, may organise field days to collect data on wildlife in specific habitats for which there is little information.

Listed below are some objectives that a CAC might adopt.

- develop criteria for determining local species of conservation concern
- develop criteria for determining the respective quality of wildlife habitats
- determine how much locally significant wildlife habitat should be protected

- determine how to best protect all identified significant wildlife habitat in the municipality
- collect, organise, and file information about flora, fauna, and natural heritage features and areas
- map all identified significant wildlife habitats
- organise and conduct field investigations to gather more site-specific information, update old wildlife habitat information, or find previously unknown habitats and rare species
- develop terms of reference for consultants to collect needed data
- maintain a list of important contacts e.g., experts, government personnel, local landowners and naturalists
- provide input toward decisions regarding conservation priorities for the municipality
- provide guidance for public education programs in the municipality
- assist with the review of development proposals to determine their potential impacts on significant wildlife habitats.

Perhaps the easiest way to find individuals who would like to become involved with such a committee is to speak with local naturalist club and/or fish and game club members. The OMNR may also know knowledgeable people who would be interested in working with the planning authority. Members of the local CAC need not necessarily live in the area, but they must be familiar with the flora and fauna in the municipality.

### **3.5 Finding potentially significant wildlife habitat**

Some wildlife habitat has already been identified and its function is well known. Other potential wildlife habitats and their location may not be known. Some significant wildlife habitats are described in this guide even though very few of these sites have been identified and mapped. Often, this is because they are hard to find (turtle nesting sites, snake, and bat hibernacula). These habitats, however, have been included because they are often critical to the survival of local and even regional populations. When they are located, they should be protected. The information sources discussed in Sections 3.2 and 3.3 and Appendix I provide a starting point for identifying potentially significant wildlife habitats that have not previously been described. They may also be used to determine which sites should be verified because of outdated information. The planning authority should be prepared to maintain an open file for new natural heritage information and revise this information periodically.

Some potential wildlife habitats can be identified by using information such as maps and aerial photographs. Examples of such habitats include animal movement corridors; rare or specialised habitats such as fens, bogs and old growth forests; deer yards; and rare

communities such as alvars and savannah and prairie remnants. However, field surveys may be required to confirm their habitat type.

Other wildlife habitats such as bat and reptile hibernacula, habitats of some rare species, and rare vegetation communities; and highly diverse sites are unlikely to be found using these sources alone. However, sometimes potential areas may be identified based on species habitat requirements. This can focus further investigations. In some cases, protection can be provided to sites with the most suitable habitat. For some of these habitats, the planning authority will have to rely more on people such as local experts and OMNR personnel. The CAC may also help to find these hard-to-find habitats.

This guide does not advocate that planning authorities conduct exhaustive searches within their jurisdiction to find “everything.” The methods suggested in this guide are intended to focus searches in the most likely sites at the right time of year. By including potentially significant habitats that have not been previously identified and mapped, future work may be conducted on the most likely sites. For example, there may be regular sightings of rare species in the planning area, but the location of critical components of their habitat may be unknown. Until these sites are found and protected either as significant wildlife habitat or part of a larger protected area, the long-term sustainability of these species is not assured.

Significant wildlife habitats do not occupy discrete, isolated parts of the landscape. Often different wildlife habitats, each with different boundaries, are found in the same natural area. Each provides important ecological functions that together give the area high value. For example, a large forest stand may provide forest-interior habitat for breeding birds. It may also provide denning habitat for martens, a woodland breeding pond for amphibians, and enough undisturbed area for wide-ranging carnivores such as fishers and wolves. Identifying the various significant wildlife habitats found at one site may determine the size and shape of the area to be protected. It would also assist in understanding the ecological functions of the site and implications of proposed activities in the area.

Sub-sections 3.5.1 and 3.5.2 describe a general process for finding potentially significant wildlife habitat in wetlands and woodlands. It involves compilation of background information, determination of essential information needed to find specific habitats, steps to take to find the habitat, and suggestions concerning related field work. This process is used in this guide to find previously unidentified wildlife habitat and to verify old information on existing sites.

### 3.5.1 Wetlands

For all habitats found in wetlands, the first step should be to check the OMNR wetland evaluations and ANSI site district report(s) that cover the municipality, as well as the habitat matrices (Appendix G). Potential significant wildlife habitat might include seasonal concentration areas of colonial birds, waterfowl nesting, or staging areas, or shorebird stopover areas; rare wetland communities such as fens; highly diverse sites; and areas supporting species of conservation concern.

The OMNR wetland evaluations and ANSI site district and inventory reports will document the presence of these habitats if they were observed during the inventory. There are usually more detailed site descriptions for OMNR evaluated wetlands that are also ANSIs. Often several significant wildlife habitats are described for these sites. Information contained in these reports may need to be verified depending on the date of the wetland evaluation or site district report.

The following example describes one way to use the above information to find potentially rare wetland vegetation communities, fens and bogs.

#### Background information

Bogs are nutrient-poor, acidic wetlands comprised mostly of peat-covered areas with a high water table. The vegetation consists predominantly of a surface carpet of mosses, chiefly *Sphagnum* species, ericaceous shrubs, and sedges. Black spruce is commonly found in many bogs. Tamarack may be present at a lower density and is usually confined to bog edges.

Fens are peatlands characterised by surface layers of poorly to moderately decomposed peat, often with well-decomposed peat near the base. Sedge species form the dominant vegetation of fens; mosses may be present or absent. Often there are many small and mid-sized shrubs and sometimes a sparse layer of trees, typically white cedar and tamarack. The water and peat are less acidic than in bogs and often relatively nutrient rich since they receive water through groundwater discharge.

Fens and bogs may be uncommon to very rare wetland communities in many parts of southern Ontario. Numerous fens are found on the Bruce Peninsula.

#### Information needed

- The OMNR wetland evaluations, note presence of fens and bogs and wetland maps that accompany the evaluations show the precise location of these communities.
- Ontario geological survey peat and peatland evaluation reports also describe and map these communities and are available from OMNR.

- ANSI site district and inventory reports often mention and discuss in some detail many important fens and bogs found in southern Ontario. Other fens may be found listed in the back of the reports.
- ANSI inventory reports note the presence of individual vegetation communities such as fens and bogs. The vegetation community map that accompanies the inventory shows the precise location of these communities and significant features.

#### **How to find**

- Ask the OMNR ecologist for locations of fens and bogs in the municipality. Local naturalists and residents may also know where some of these communities are. Many botanists are familiar with these wetlands because of the rare plant species often found in them.
- Locate previously identified fens and bogs by examining all OMNR wetland evaluations, checking the “type of wetland” section for a mark beside fen and bog types.
- Appendix J details a list of rare vegetation communities in southern Ontario.
- For all wetlands with identified fens and bogs, obtain the wetland maps to pinpoint precise location of these communities.
- Ask the OMNR ecologist to determine whether a peat and peatland evaluation was conducted by the Ontario geological survey, and if so, obtain reports and maps from the local OMNR office.
- Check the ANSI site district report(s) that cover the planning area and relevant ANSI inventory reports. Check the descriptions of every wetland, looking for references to fens and bogs. Also, check the list of sites that are not considered provincially or regionally significant ANSIs for mention of fens and bogs.

#### **Field work**

Sometimes fens and bogs have not been identified but are known to exist. Local naturalists may volunteer to help the planning authority find these communities. The OMNR ecologist can help confirm whether newly identified wetland communities are truly fens and bogs. Sometimes potential sites can be discovered on aerial photographs.

### **3.5.2 Woodlands**

For significant wildlife habitats in wooded environments, the first step should be to contact the OMNR for advice. Use the FRI maps, ANSI site district report(s), Information sources (Appendix F) and habitat matrices (Appendix G) to develop a list of potentially significant wildlife habitats. Check the *Significant Wildlife Habitat Decision Support System*<sup>1</sup> to determine which significant wildlife habitats may occur in woodlands.

---

<sup>1</sup> Supporting document that is intended to assist in understanding the functions of significant wildlife habitat, potential impacts and possibilities for mitigation.

The following example describes one way to use the above information to find a specialised wildlife habitat: forested areas containing numerous cavity trees.

### **Information needed**

- OMNR FRI maps provide information about size, composition and age of forest stands. Consider the date of the FRI. For example, if the FRI was based on 1978 aerial photography, a mapped forest stand of 60 years of age would be 82 years old in 2000.
- Interpretation of aerial photographs will indicate the largest, most contiguous forest stands of mature trees. For most of southern Ontario, aerial photographs are more recent than FRI maps (1991 vs. 1978) and consequently should be used to verify FRI map information.
- Habitat matrices (Appendix G) provide specific habitat descriptions for species that rely heavily on tree cavities. More detailed information on habitat requirements is provided in the *Significant Wildlife Habitat Decision Support System*.

### **How to find**

- Ask OMNR foresters for locations of mature and overmature forests comprised of species such as basswood, beech, maple, and poplar. They may know of stands with a high concentration of cavities or sites containing concentrations of diseased and/or damaged trees that are likely to have more cavities.
- Examine the FRI maps and note the oldest forest stands and stands with composition consisting primarily of poplar, beech, basswood, and conifers; cavities are commonly found in these tree species.
- Use aerial photographs to locate largest, contiguous forests. Also, note the oldest, most mature forest cover because this can increase the likelihood of finding numerous cavity trees.

### **Field work**

Both known and potentially significant forest stands should be checked for the presence of trees with suitable cavities of a wide range of sizes. In addition, forests with large amounts of fallen logs on the forest floor can have numerous cavity trees. The presence of pileated woodpeckers in a forest indicates cavity trees that may be used by wildlife.

Forests containing a large number of trembling aspen, largetooth aspen, and downed logs often attract woodpeckers that can excavate cavities.

Birds such as chickadee and nuthatch use small cavities. Barred owl and porcupine use larger cavities. In general, cavities in living trees are particularly valuable because they usually last longer than those in dead trees. Larger cavities may also be more valuable because they can be used by a greater variety of wildlife.

### **3.6 Mapping significant wildlife habitat**

It is suggested that planning authorities first identify and map the other six component natural heritage features and areas described in Policy 2.3 of the *Provincial Policy Statement* and outlined in the *Natural Heritage Reference Manual* (OMNR 1999). This mapped information is an important component of a natural heritage conservation strategy because it provides a visual overview of the potential Natural Heritage System, and gaps in protection and information.

Mapping existing sites helps to identify unrepresented or under-represented features and habitats within the municipality. Potential links among local natural areas and other important sites, and animal movement corridors in the greater region are easier to see. It also facilitates initial evaluations of potentially significant sites by showing the relative size, location, shape, and degree of fragmentation of existing sites in the planning area.

## **4 Identifying Habitats of Seasonal Concentrations of Animals**

### **4.1 Definition**

At certain times of the year, some species of wildlife are highly concentrated within relatively small areas. In spring and autumn, migratory species of birds and butterflies concentrate in critical stopover areas where they can rest and feed. Other examples of such habitat include winter deer yards, bird breeding colonies, and hibernation sites for bats or snakes. See the *Significant Wildlife Habitat Decision Support System* for a detailed description of significant seasonal concentration habitats.

### **4.2 Ecological functions/effects of loss**

Areas of seasonal concentrations of animals provide important cover and protection from inclement weather conditions and predators. They may also provide access to abundant food sources or nesting and breeding sites. This habitat may be limited and directly influence populations numbers of a species. Loss of these seasonal concentration habitats results in a disproportionate loss of associated wildlife. To maintain the biodiversity of the planning area and Ontario, these critical wildlife habitats should be identified and protected.

### **4.3 Identification of potentially significant seasonal concentration areas**

One approach to the identification of potentially significant seasonal concentration areas is outlined below. Emphasis is on first identifying known important sites and then looking for additional habitats. Appendix C provides sources of information about seasonal concentration of animals. The habitat matrices in Appendix G describe the habitat requirements of species that concentrate seasonally.

#### **4.3.1 Mapping and verifying known seasonal concentration areas**

- First, narrow the search for species that may concentrate seasonally. Use the habitat matrices in Appendix G plus the various atlases for the province (butterflies, amphibians and reptiles, breeding birds, mammals [see Appendix I]) to determine which species are likely to occur in the planning area. There is no point in looking for late winter moose habitat or tern breeding colonies if these species are known not to occur in the study area.
- Ask the OMNR ecologist and biologist, and staff at the Canadian Wildlife Service, Ontario Region Office in Ottawa (for birds) to identify known significant seasonal concentrations of animals within the planning area. Appendix C provides information



sources for identifying seasonal concentration areas and Appendix G identified habitat requirement for these species. Several provincially and regionally significant seasonal concentration areas have already been recognised and mapped by the OMNR (winter deer yards, some waterfowl stopover areas, and some heronries) and by the Canadian Wildlife Service (some colonial bird nesting sites, some waterfowl breeding and staging habitat, and some shorebird and landbird migratory stopover areas). Sometimes a specific concentration habitat may not be mapped, but knowledgeable staff may be able to identify potential sites (wild turkey and raptor winter roosting areas, amphibian breeding ponds, and migration stopover sites).

- Map (preferably at 1:10,000 scale) all of the important concentration areas that are known to occur in the municipality.

#### **4.3.2 Finding animal Concentration areas that have not been previously identified**

- Begin to identify seasonal concentration habitats most likely to exist within the planning area that have not been identified and described. Examples may include potentially significant waterfowl breeding and staging habitats, heronries, and migratory bird stopover areas; winter feeding and roosting areas for hawks, owls, and wild turkeys; turkey vulture summer roosting areas; reptile and bat hibernacula; and butterfly migratory stopover areas. Some of these habitats may not exist in the planning area or the species may not occur even if there appears to be suitable habitat. It must be realised that seasonal concentration areas are difficult to find. For example, snakes often overwinter underground. In spring, a large number of snakes may emerge from a small opening within a few days and unless someone is present at the right time and place, these sites can easily be overlooked.
- Appendix C provides a list of information sources for the identification of seasonal concentrations of animals. OMNR site district and inventory reports, wetland evaluations, sensitive area reports, ANSI inventory reports, and consultant reports are the most easily obtained materials and contain the most site-specific information.
- A Conservation Advisory Committee (CAC) might be very helpful in finding seasonal concentration habitats. They are also an excellent liaison with other groups within the planning area. Landowners with potentially significant wildlife habitats on their property might be able to provide more information. Hunters, anglers, trappers, members of cottage associations, fish and game, and naturalist clubs, as well as people working in the outdoor recreation sector (outfitters and resort operators) are often aware of seasonal wildlife concentrations.

- Encourage knowledgeable people to help the planning authority to identify potentially significant habitats, particularly those habitats that are hard to find.

#### **4.4 How to find some specific seasonal concentration areas**

A number of habitats of species that concentrate seasonally are described below and steps to find them are presented. Emphasis is on use of existing information sources to find potentially significant sites. The information sources outlined in Table 3-1 and discussed in Section 3.2 will be very useful to find potentially significant wildlife habitats. Key elements of the habitat are listed. Field investigations may be necessary to confirm the use of the habitat by the species. Specific information about how to conduct field investigations is discussed in Appendix D.

Planning authorities are advised to rely on OMNR advice for locations and significance of deer and moose seasonal concentration areas. However, if they wish to examine these habitats in more detail, a suggested approach is outlined below.

##### **4.4.1 Winter deer yards**

White-tailed deer do not move well in deep snow. As snow begins to accumulate, deer start to move to sheltered areas and remain in the general vicinity until early April. In areas with little snow accumulation, such as in much of southwestern Ontario, deer may not yard in the traditional sense, but often still congregate in large numbers in suitable forested areas.

Deer yards consist of a core area of mainly coniferous trees (pines, hemlock, cedar, spruce) with a canopy cover of more than 60%. In severe winters, deer are confined to the core part of the yard. In mild winters, they may be found in loose aggregations in and around the core of the yard. This core area provides primarily shelter, ease of movement, and protection from predators. The land surrounding the core area is usually mixed or deciduous forest. Understorey shrubs and small trees, especially white cedar, provide winter food. When snow accumulation is light, deer move to nearby agricultural land if it provides food such as leftover corn and grains. Deer tend to use the same yards year after year and are not highly adaptable in moving to a new yard. Animals will often move long distances to some deer yards. Generally, deer yards make up about 10% of the summer deer range.

##### **How to find**

- OMNR biologists, foresters, conservation officers, and local hunters know the location of some deer yards.
- Use FRI maps in conjunction with aerial photographs to help to find other potential areas. Locate areas consisting of preferred tree species such as hemlock, white cedar,

pinus, and white spruce. Use aerial photographs to verify existence of potential sites and to assess the apparent canopy closure and features of the surrounding landscape.

- Conduct field investigations during mid to late winter to confirm use (can be done from a vehicle or aircraft).

#### **4.4.2 Moose late winter habitat**

As snow accumulates, moose move to dense stands of coniferous trees that permit easier movement and provide protection from cold winds and predators. This usually occurs in mid to late winter. Canopy closure within the conifer stand should be at least 60% and most trees should be at least 6 metres tall. Moose are not as dependent on late winter habitat in the southern part of their range as they are in the north because snow is generally not as deep and temperatures not as cold as in northern areas. When moose congregate farther south, they generally use the association of hemlock, balsam fir, and white spruce because of its superior snow interception qualities.

##### **How to find**

- OMNR biologists, foresters, conservation officers, and some local hunters and trappers may know the location of some late-winter habitat.
- Use FRI maps in conjunction with aerial photographs to help to locate potential habitats. Identify contiguous forest stands consisting of mainly older (> 40 years) conifer trees. FRI maps indicate species composition and age of forest stands.
- Use aerial photographs to verify existence of potential habitats, assess the apparent canopy closure and features of the surrounding landscape, and determine the approximate size of these habitats. Suitable habitat should be greater than 4 ha.
- Conduct field investigation in late winter to confirm use by moose. Since many areas are difficult to reach, flying over potential areas is recommended.

#### **4.4.3 Colonial bird nesting sites**

Colonial birds are a diverse group including several species of herons, gulls, terns, and swallows. Sometimes an entire local population can depend on the survival of just one or two colonies. Under favourable conditions, some species are capable of rapid population growth. In some planning areas, species with expanding populations such as ring-billed gulls and double-crested cormorants may be unpopular and considered pests. Planning authorities will have to decide on the level of protection offered to these species.

However, these birds are protected by the *Convention of Migratory Birds* and these laws must be abided. The habitat matrices in Appendix G provide a list of all of the colonial nesting birds and describe their habitats.

Generally, herons nest in trees in swamps and along large bodies of water. Gulls and terns prefer to nest on the ground, and colonies are frequently found on islands in the Great Lakes and large rivers such as the St. Lawrence River and Ottawa River. Birds often

show considerable nesting site fidelity, returning year after year. Different species of swallows congregate on specific habitat types such as cliffs, banks, and artificial structures. Certain grassland birds are also colonial.

### How to find

- Colonial bird nesting sites are often found by speaking with knowledgeable landowners whose property provides suitable habitat. Local naturalists may be especially helpful in finding these sites.
- Check Appendix G to see which of the colonial bird species was documented in the relevant site district(s). Also, check the *Atlas of the Breeding Birds of Ontario* to determine which atlas squares they were sighted in. This will greatly narrow the search. In addition, the habitat information provided in this appendix and the



**Figure 4-1. Colonial nesting species such as gulls, will seek islands to nest and return to the same location annually.**

*Significant Wildlife Habitat Decision Support System* will help planning authorities to key in on areas that may support colonial-nesting birds.

- OMNR offices have some information about local heronries but it may be out-dated and require verification. Bird Studies Canada has information on the Ontario Heronry Inventory, which was completed in the early 1990s.
- Check all OMNR Wetland Evaluations because these indicate the presence of colonial nesting species.
- Bird Studies Canada coordinates the Ontario Birds at Risk program and several colonial-nesting birds are on the list of Ontario Birds at Risk. Volunteers report nesting sites.
- Local conservation authorities may also have wetland or watershed studies that identify these areas.
- Sometimes aerial photographs can help to identify large heronries. They are most easily seen by using a stereoscope or magnifying glass to search lightly wooded swamps consisting of mostly dead trees. Great blue herons tend to use wooded swamps. Aerial photographs can also be used to identify specific habitat types. For example, black terns generally use sedge or cattail marshes that are about 50% water and 50% vegetation. Many of these can be identified on aerial photographs.
- Sometimes black tern and heron colonies can be identified from the air. The flight should cover potential areas identified from aerial photographs and care should be taken not to disturb nesting birds.

- Check potential sites and verify reports of colonies by field investigation.

#### **4.4.4 Waterfowl stopover and staging areas**

During spring and fall migration, waterfowl require habitat that supplies adequate food to replenish energy reserves, resting areas, and cover from predators and adverse weather conditions. Migrating waterfowl usually prefer larger wetlands, especially those adjacent to large bodies of water, and relatively undisturbed shorelines with vegetation.

Many waterfowl congregate in relatively large flocks before fall migration. They raise broods in small areas (ponds, marshes, drainage ditches, and creeks). Then they set up a pattern of pre-migration staging, whereby 30 to a few hundred ducks move between feeding ponds and a large night roosting pond. Often these roosting ponds are used until they freeze over and many of them are used year after year. These ponds may be considered locally significant. Appendix K outlines an approach on how to determine significant waterfowl habitat.

##### **How to find**

- OMNR staff such as local conservation officers may be aware of important fall staging areas within the planning area, such as areas that traditionally receive heavy hunting pressure. Often local duck hunters and fish and game club members know the most important areas.
- CWS staff know the larger, most significant sites. They also commonly fly to find “baited” ponds and often observe local staging areas.
- Check OMNR wetland evaluations and ANSI inventory reports because these indicate presence of locally and regionally significant waterfowl staging habitat. Conservation authorities may also have wetland or watershed studies that identify locally significant sites.
- Use aerial photographs to find large beaver ponds and small lakes. In early September, observations of flights of ducks in the evening can also help to locate these ponds.
- Conduct field investigation of the most likely areas identified from aerial photographs, preferably in the early evening just before dark.

#### **4.4.5 Waterfowl nesting**

The most significant waterfowl nesting sites are usually relatively large, undisturbed upland areas with abundant ponds and wetlands. The upland areas provide nesting cover. Most species nest in grassy or shrubby fields adjacent to wetlands and most nests occur in relatively dense vegetation that is about 50 cm tall. Wood duck, bufflehead, common goldeneye, and hooded merganser nest in cavities in trees located in swamps or on the shorelines of water bodies, and sometimes in adjacent upland woods. Species such as mallard and teal commonly nest near small ponds surrounded by grassy cover. Sites with

an aggregation of several small ponds may be significant for waterfowl nesting. Upland areas should be at least 100 m wide so that predators such as racoons, skunk, and fox have difficulty finding nests. The area should also provide plenty of food and cover for young and adult birds.

One of the best approaches for the conservation of waterfowl is to protect relatively large areas with a high density of small and medium-sized ponds. If single wetlands are being examined, large, diverse wetlands are most likely to contain the best nesting habitat for waterfowl (Appendix I).

In 1996, a group of waterfowl experts was assembled to examine criteria for determining significant waterfowl habitat. The group prepared a report that outlined a number of factors that should be considered when identifying significant waterfowl habitat. This report is included as Appendix K.

#### **How to find**

- Ask OMNR biologists and local hunters and naturalists for locations of habitats of greatest use. This is often determined by the number of broods on the wetland, although different ponds or wetlands may be used for nesting and brood habitat.
- Check OMNR Wetland Evaluations for indication of significant waterfowl nesting habitat.
- Check with Ducks Unlimited. Staff may know the locations of particularly productive sites.
- Use topographical maps to find areas with a large number of wetlands.
- Use aerial photographs to examine wetlands and determine density, and general nature of surrounding vegetation. Photographs can also help to determine the approximate configuration of the adjacent upland nesting habitat, as well as aggregations of small ponds and potential disturbances to the habitat.

#### **4.4.6 Shorebird migratory stopover areas**

Migrating shorebirds often follow shorelines of the Great Lakes in their movements between winter and summer ranges. Traditionally used areas provide safe places to rest and feed to replenish energy reserves needed to continue migration. Large numbers of shorebirds may accumulate in stopover areas during poor flying weather. Important areas must provide relatively undisturbed shorelines that produce abundant food (insects, clams, snails, and worms) for many birds of a variety of species. Great Lakes shorelines provide some of the best shorebird migratory stopover habitat because of their location along migration routes and because wave action maintains large and productive beaches. Southern James Bay is a critical shorebird staging area, particularly in autumn. Almost the entire world population of certain shorebird species may congregate here each year. The shorebird migration period may last one to three months in late summer and fall.

### **How to find**

- Staff at the CWS and OMNR may be aware of the most significant sites. Participants in a recently initiated shorebird monitoring program coordinated by CWS staff may also be aware of locally important sites.
- Ask knowledgeable people such as local birders. These people will probably know the locations of most of the important seasonal concentrations of shorebirds.

#### **4.4.7 Landbird migratory stopover areas**

Since flying across large water bodies such as the Great Lakes is potentially exhausting and dangerous for landbirds, many choose to cross at narrow spots (Point Pelee, Wolfe Island). During migration, large numbers of birds move along Great Lakes shorelines and stop at traditionally-used sites to feed, rest, and/or wait out periods of bad flying weather.

These stopover areas must provide a variety of different habitat types ranging from open fields to large woodlands, to provide abundant food and cover for the diversity of different species during migration. In addition, raptors will use updrafts along cliff faces to assist in migration during spring and fall.

### **How to find**

- Ask local birders for the location of important migratory stopover areas. Many of the best sites are found within 2 km of Lake Ontario and Lake Erie.
- Topographical maps and aerial photographs may be used to find natural habitats close to the Great Lakes that may be used by migratory landbirds.

#### **4.4.8 Raptor winter feeding and roosting areas**

Open fields, including hayfields, pastures, and meadows that support large and productive small mammal populations (mice, voles) are important to the winter survival of many birds of prey. Such fields usually have a diversity of herbaceous vegetation that provides food for mammals. Scattered trees and fence posts provide perches for hunting birds. Windswept fields in more open areas that are not covered by deep snow are preferred by raptors because hunting prey is easier. The best roosting sites will likely be found in relatively mature mixed or coniferous woodlands that abut these windswept fields. Some species, such as northern harriers and short-eared owls, roost in large grassy fields. Some feeding and roosting sites support many birds, especially in years when northern species are numerous. In areas with few remaining forested areas, woodlots with dense conifer cover may support numerous roosting birds, especially long-eared owls. Highway corridors appear to attract many hunting raptors throughout the year, because these areas are open and the vegetation is relatively low, making hunting easier. As with waterfowl nesting habitat, protection of large areas of potentially suitable habitat will increase the probability of including significant raptor winter feeding and roosting areas within a Natural Heritage System.

### **How to find**

- Residents are most likely to know where these habitats are found. Local naturalists may know the locations of winter concentrations of raptors.
- If a Christmas bird count (CBC) is conducted in the planning area, the compiler of the CBC data should be contacted to see if there are significant concentrations of wintering raptors.
- Farmers in areas of potential habitat often know when and where concentrations of raptors are found on their property.
- Use aerial photographs to locate open field areas next to woodlands comprised of at least some large trees. Prime areas would be hayfields, old fields, and pastures.
- Field investigations in potential areas should be conducted after first accumulation of snow. Usually, raptors are easily seen from roads.

#### **4.4.9 Wild turkey winter range**

Since most of its feeding is on the ground, the wild turkey's ability to move and forage freely is critical to its winter survival. Wild turkey will use fields and pastures, feeding on weed seeds and waste grain if the snow is not too deep. The birds do not stray too far from dense conifer cover. Dense coniferous forests provide the best winter habitat because they minimise snow accumulation on the ground and provide protection from the cold and predators. Coniferous stands used by turkeys are usually on valley floors or lower slopes. Hemlock stands appear to provide the best thermal protection and are often used during severe weather.

Wild turkey always roost at night for protection from predators. They prefer to use the largest conifers for roosts. Favoured roosts are normally found close to winter food supplies, which often includes agricultural fields where they can scratch for seeds left over from harvesting. Acorns are another favoured food. Wild turkeys readily move to new food sources and may change roosting sites from year to year. However, most significant winter roost sites will be used year after year.

The presence of groundwater seeps in the forest enhances wild turkey winter habitat because they melt the snow and expose food in the form of foliage and invertebrates. The best seeps are found on slopes with southern aspects that have increased exposure to sunlight, resulting in reduced snow depth and increased food availability. Turkeys also drink water regularly, so the presence of seeps or open watercourses is essential.

Wild turkey do not use winter range areas consistently over time. Use appears to depend on food supply conditions and availability of coniferous cover. Where coniferous cover is limited, they may use the same roosts more frequently. The most consistently used areas have stable, abundant, and high quality food sources located nearby (cornfields, oak



trees). Those sites that have consistent use year after year would be considered significant.

#### **How to find**

- Ask the OMNR biologist for the location of important winter turkey habitat. Many OMNR offices have been conducting post card surveys to determine the distribution of birds. Farmers may have observed wild turkey feeding in their fields and be aware of potential habitat in adjacent areas. Landowners may also know where groundwater seeps occur.
- Use FRI maps in conjunction with aerial photographs to identify older coniferous or mixed woods with a good proportion of conifers and/or oaks. Stands of large conifers can often be identified from aerial photographs, these areas are most likely to be used. In some areas, there is a shortage of coniferous forest and these pockets of conifers may be used. Birds may be forced to roost in hardwoods when conifers are rare.
- Conduct field investigations of most likely areas during winter. Flocks of feeding birds may be observed and winter roosts will usually be in the near vicinity.

#### **4.4.10 Turkey vulture summer roosting areas**

Turkey vultures like to roost on rocky cliff ledges and large, dead or partially dead trees, preferably in undisturbed areas, and often near water. Preferred day roosting areas appear to be open areas where the birds can easily take flight or sunbathe. Cliff ledges have excellent rising air currents that are conducive for flight and soaring. Significant sites are those that are used consistently year after year.

#### **How to find**

- Ask OMNR staff, local naturalists, and cottage owners for help in locating these areas.
- Use topographical maps in conjunction with aerial photographs to find areas with steep relief. Further examination of aerial photographs might reveal cliff areas with trees on the summit.
- Conduct field investigations on warm summer days after rainy periods, when birds frequently perch at roosts with outstretched wings. Copious amounts of whitewash (excrement) may be present at popular roosts.

#### **4.4.11 Reptile hibernacula**

Some species of snakes and turtles overwinter in sizeable concentrations in sites known as hibernacula. These sites are often in animal burrows, rock crevices, and other areas that enable the animals to hibernate below the frost line and often in association with water to prevent desiccation. Frequently hibernacula are found among broken rocks at the base of cliffs or in karst areas because these landforms provide an abundance of suitable subterranean crevices. In fall, snakes and turtles usually make a gradual movement

toward their hibernacula and may be observed basking in groups close to the hibernacula. In spring, many snakes may emerge together and usually remain close to the hibernacula for a few days before dispersing.

Few hibernacula are known and they are normally very difficult to find. Radiotelemetry studies may be required to locate them. Since hibernacula have ideal microclimate conditions, they are very important to long-term sustainability of local populations; therefore, a reasonable amount of effort should be made to find these sites. Searches can be focused near sites where snakes or turtles have been observed. The assistance of groups of volunteers might be enlisted to search the most likely locations at the best times of the year.

#### **How to find**

- Ask the OMNR ecologist for the location of potential reptile hibernacula. Local naturalists and experts, as well as university herpetologists may also know where to find some of these sites.
- The *Herpetofaunal Atlas* should be referred to. The records are mostly from observations during the summer. However, the records may reveal what species are most likely to inhabit the area, and Appendix G can be referred to for their preferred habitat.
- In spring, search any place where numerous snakes or turtles are encountered within a small area in less than a couple of hours. For snakes, prime spots to check are around slabs of broken or fissured bedrock, talus slopes, abandoned houses, and other places that provide access to subterranean areas. For turtles, prime areas are bogs and oxbows of rivers.
- Naturalists may provide assistance, especially for the more uncommon species.
- Consider conducting a public survey among residents and animal control professionals. In spring, some people observe the emergence of snakes from hibernacula on their property.

#### **4.4.12 Bat hibernacula**

Many species of bats overwinter in caves or abandoned mines. These winter hibernacula must have interior air temperatures slightly above freezing, relative humidity levels above 90%, and sufficient space for roosting. Preferred hibernacula are usually deep caves or abandoned mines, with remote and restricted openings with sufficient space for entry by flight. Flowing water helps moderate temperature and maintain sufficient humidity inside the cave. Largely because of their intolerance of disturbance, large, open caves and crevices are rarely used by bats in winter.

Hibernacula are relatively scarce and therefore large numbers of bats from several thousand square kilometres converge on certain sites every year. These populations are extremely vulnerable if these main hibernacula are altered, destroyed, or disturbed during

critical periods. Research has shown that disturbances in winter hibernacula are a major mortality factor. Bats must wake periodically during hibernation. This requires a considerable amount of energy obtained from the conversion of fat reserves. Any unnecessary disturbance further stresses the animals. Even minor disturbances can have a lethal impact. Aroused individuals produce an alarm response and a chain reaction, triggering the arousal of many others.

#### **How to find**

- Natural caves are scarce in Ontario. Large caves are usually found in limestone areas where underground water dissolves the rock and produces chambers (karst topography). Geological maps indicate the presence of limestone formations and the potential for caves. In southern Ontario, most caves and karst topography are found in the upper Ottawa Valley and along the Niagara Escarpment, including the Bruce Peninsula. Ask OMNR ecologists in these districts for locations of known hibernacula or for potential candidate sites.
- Contact the Ontario Ministry of Northern Development and Mines to obtain locations of abandoned mines in the planning area. They can be checked to determine if they are still open or have been sealed off.
- Some faculty members in university biology departments may know locations of hibernating bats. Contact the OMNR ecologist for names.
- Some recreationists explore caves and may know caves with hibernating bats. Contact the Sierra Club.

#### **4.4.13 Bullfrog concentration areas**

Bullfrogs are primarily aquatic and found in marsh habitat. They require permanent waterbodies for survival. Bullfrog tadpoles may take up to several years before undergoing metamorphosis. Numbers of bullfrogs in a wetland can vary drastically depending upon geographical location. Populations on the Canadian Shield tend to be smaller than those in located off the shield.

Bullfrogs will congregate in the early summer and males will chorus for breeding purposes. Populations have declined in Ontario due to habitat destruction and exploitation.

#### **How to find**

- Consult the *Ontario Herpetofaunal Summary* for distribution of bullfrogs. In addition, the CWS (Burlington) may have documentation of bullfrog populations through Amphibian Road Surveys, Backyard Amphibian Call Count.
- Ask the local OMNR ecologist, biologist for known populations.
- Use 1:50,000 NTS maps or aerial photography to locate marsh habitat
- Consult wetland evaluations for documented populations.
- Surveys could be conducted from mid-May to late June to locate chorusing population.

#### **4.4.14 Migratory butterfly stopover areas**

In fall, during the southward migration, some species of butterflies (monarchs) stop to feed, rest, or wait for inclement weather conditions to pass before they attempt to cross Lake Ontario, Lake Erie, and Lake Huron. Preferred stopover areas provide an abundance of preferred nectar plants, as well places for shelter and sunning.

##### **How to find**

- Ask the local OMNR ecologist, local naturalists, and butterfly experts for help in locating these areas. Agriculture Canada (Ottawa) has entomologists on staff with expertise in butterflies.
- Use aerial photographs to find fields and other open areas within 5 km of Lake Ontario, Lake Erie, or Lake Huron shorelines.
- Conduct field investigations of selected areas in mid September, preferably just after rainy periods

## **5 Identifying Rare Vegetation Communities or Specialised Habitats for Wildlife**

### **5.1 Definitions**

*Rare vegetation communities* include:

- areas that contain a provincially rare vegetation community
- areas that contain a vegetation community that is rare within the planning area

*Specialised habitats* include:

- areas that support wildlife species that have highly specific habitat requirements
- areas with exceptionally high species diversity or community diversity
- areas that provide habitat that greatly enhances a species' survival

### **5.2 Ecological function/effects of loss**

#### **5.2.1 Rare vegetation communities**

Rare vegetation communities often contain rare species, particularly plants and small invertebrates, which depend on such habitats for their survival, and cannot readily move to, or find alternative habitats. Some communities such as tall-grass prairies and savannahs were never widespread in the province. Now these habitats and many of the species they support are rare or threatened because of changes to the landscape. Often these habitats are very sensitive to changes in moisture or amount of vegetative cover.

The ecological function of these rare communities is to ensure that species that depend upon them will maintain viable populations and biodiversity of communities on the landscape. Loss or degradation of rare habitats will lead to an increase in the numbers of species that are rare, vulnerable, threatened, and endangered and, over time, to a decrease in biodiversity within the planning area and province. Protection of rare vegetation communities now, will protect their associated species and reduce costs of future species recovery programs.

#### **5.2.2 Specialised habitats for wildlife**

Certain wildlife species have highly specific requirements for their survival. For example, the larvae of some butterfly species require specific plants, many of which are confined to just a few small areas. Many species of birds and mammals require tree cavities in which to nest or find shelter. Salamanders require moist, sheltered, and temperate habitats for survival. Large fallen logs that are moss-covered and in an advanced state of decomposition provide such specialised habitat for them. Sometimes the presence of a specialised habitat may not mean life or death to the animal in the short-term, but it may



**Figure 5.1. Bogbean buckmoth, specific to eastern Ontario fen habitat, are known in only in two locations in Ontario.**

affect the long-term survival of them or their offspring. For example, black bears depend heavily on acorn crops to build fat reserves required for hibernation. If this food source is not available, their survival through winter may be jeopardised or females may lose their cubs.

Often the use of a specialised habitat is seasonal. For example, moose use at least two specialised habitats in early summer. Mineral licks provide specialised habitat that allows these animals to replenish sodium levels that have been

seriously depleted during the winter months. Aquatic habitat that contains abundant sodium-rich plants in early summer is also critical to moose.

The ecological function of specialised habitats is to enhance and, in some cases, ensure the survival of the associated wildlife species that depend on them. Protection and maintenance of these areas will contribute to higher biodiversity within the planning area. Loss or degradation of these areas and features could seriously stress and even eliminate the wildlife populations that intrinsically depend upon them.

### **5.3 Identification of potentially rare vegetation communities or specialised habitat for wildlife**

Since many rare vegetation communities and specialised habitats for wildlife exist within the other six natural heritage components, emphasis should be on finding habitats outside these areas. The following information sources can help the planning authority identify potentially rare vegetation communities and specialised habitats.

- Use the information outlined in Table 3-1 and discussed in Section 3.2 to identify these potentially significant habitats.
- The OMNR ANSI Site District and inventory reports can be particularly useful for identifying rare vegetation communities. For example, they identify provincially, regionally, and locally significant wetlands communities such as bogs and fens, and rare vegetation associations for the Site Districts they cover.

- Refer to Table I-3 in Appendix I for a list of information sources for identifying rare vegetation communities or specialised habitats for wildlife. The habitat matrices in Appendix G describe the habitat requirements of species associated with specialised habitats.

### 5.3.1 Potentially rare vegetation communities

A list of rare vegetation communities for southern Ontario (Site Regions 6 and 7) has been prepared and described in a document entitled “*Natural Heritage Resources of Ontario: S-ranks for Communities in Site Regions 6 and 7*” (Bakowsky, 1996). This document is found in Appendix J. All of the vegetation communities are listed for southern Ontario, including marshes, swamps, bogs, fens, beaches, sand dunes, barrens, alvars, prairies, savannahs, and forests. Dominant species and a site description based largely on soil moisture and texture are used to discern communities. The rarity of each community and its presence or absence in Site Regions 6E and 7E of southern Ontario are provided.

The Natural Heritage Information Centre also has a web site (see Appendix F), that can be checked to see if there are any updates.

*The Ecological Land Classification for Southern Ontario* (Lee et al. 1998), provided more specific details for vegetation communities in southern Ontario, including: descriptions of how each community is broadly defined; its status and distribution; the principle ecological factors that have helped to determine communities; topography and soils of the communities; the dominant and associated species; and sometimes the distribution of vegetation within the community.

Some vegetation communities described in these publications are difficult to identify because considerable field experience is required. However, they provide an excellent starting point for the identification of rare vegetation communities. Appendix L describes a practical approach for identifying rare vegetation communities using the Ecological Land Classification (ELC) system.

A summary of the approach to the identification of potentially rare vegetation communities is outlined below.

- Some provincially and regionally significant vegetation communities such as alvars and prairie remnants have already been described and mapped by the OMNR. Table 1 in Appendix M describes the locations of some of these rare vegetation communities. Ask the OMNR ecologist for locations of rare vegetation communities found within the planning area.
- Map (preferably at 1:10,000 scale) all these known rare vegetation communities.

- Use the *Ecological Land Classification for Southern Ontario* and the list of rare communities found in southern Ontario (Appendix J) as reference, and then use aerial photographs to locate and map the distribution of potential rare communities.
- Ask the OMNR ecologist, local botanists, and CAC members to help to verify the presence of suspected rare communities.
- Determine the potential rarity of a vegetation community by its degree of representation within the planning area.

### 5.3.2 Specialised habitats for wildlife

Below is an approach to identification of specialised habitats for wildlife.



**Figure 5-2. Monarch caterpillars feed strictly on milkweed.**

- find out what is already known about these habitats. The OMNR ecologist will know locations of previously identified specialised habitats in the municipality. In some areas, few will have been documented, but there may be some information about the following habitats:
  - old-growth forest
  - areas known to support an unusually high diversity of species or vegetation communities
  - raptor nesting habitat
  - areas with concentrations of cavity trees
  - moose or bear foraging areas
- map all these known specialised wildlife habitats, preferably at 1:10,000 scale.
- refer to the wildlife habitat matrices (Appendix G). These tables provide lists of species that use specialised habitats.
- Encourage the assistance of knowledgeable people to help find specialised habitats. A CAC could work on or coordinate such a task. Local naturalists are one of the best sources of information about such habitats because they spend much time exploring natural areas, and know the local flora and fauna. Landowners with potentially significant wildlife habitats on their property might be able to provide additional information.
- Sub-section 5.4.2 provides a detailed description of how to find specific specialised habitat.



## **5.4 How to find some rare vegetation communities or specialised habitats for wildlife**

The following sections provide detailed descriptions of rare vegetation communities and specialised habitat for wildlife. They are provided to familiarise the reader with these vegetation communities and habitats so they will be able to recognise them. Most of these habitats, especially the specialised habitats for wildlife, have not been identified and mapped, and finding them can be difficult. Some of these habitats may not exist in the planning area, while some habitats may exist, but the species that normally use it may not occur. For example, there may be springs and seeps that are not used by wintering wild turkeys.

Each rare vegetation community and specialised habitat description is accompanied by some specific suggestions on how to find them. The following is a list of information sources that can be used to find these habitats:

- Table 3-1, general information sources required to find significant wildlife habitat.
- Appendix F, list of agencies and their areas of expertise (these include web sites for updated information).
- Appendix I, information sources for the identification of specific significant habitat.
- Appendix G, wildlife habitat matrices, with lists of species that use specialised habitats.
- Appendix J provides a list of all the rare vegetation communities in Site Regions 6 and 7.
- Appendix M describes the locations of all known rare vegetation communities.
- Appendix L provides a suggested approach for using the Ecological Land Classification system to identify rare vegetation communities.
- Seek advice from the local OMNR ecologist for locations of rare or specialised habitats.
- Involve the CAC and local naturalists in searches for rare and specialised habitats.

### **5.4.1 Rare vegetation communities**

Refer to Table M -1 in Appendix M for a list of known locations of provincially and regionally rare vegetation communities of southern Ontario.

#### **5.4.1.1 Alvars**

Alvars are naturally open areas of thin soil over essentially flat limestone, dolostone or marble rock. They support a sparse vegetation cover of shrubs and herbs, and trees are often absent or scattered. In spring, alvars may have standing water; in summer, soils can become very hot and dry. Vegetation is adapted to these extreme variations in temperature and soil moisture. Some of the characteristic plants that can indicate the presence of alvar communities include spring forget-me-not, long-plumed purple avens,

false pennyroyal, small skullcap, and narrow-leaved vervain. Table N-1 in Appendix N is a list of alvar plant indicator species.

Approximately 85% of alvar sites and more than 90% of alvar landscape area in the Great Lakes region are in southern Ontario (Catling & Brownell, 1995). Concentrations of alvars are found in the following areas: Manitoulin Island, Bruce Peninsula, Lake Erie Islands, Carden Plain, Napanee Plain, and the Smiths Fall Plain. Many alvars have been identified in southern Ontario. Refer to Appendix L for locations of known alvars.



**Figure 5-3. Alvar, Misery Bay, Manitoulin Island.**

#### **How to find**

- Use soil reports and maps and aerial photographs to locate open areas of flat topography, with shallow soils over limestone bedrock.
- Check “Barren and Scattered” areas on FRI maps with corresponding aerial photographs.
- Refer to the list of plant species that are considered indicators of an alvar (Table N-1 in Appendix N).
- Published alvar reports (e.g. Catling and Brownell 1995, etc.)

#### **5.4.1.2 Tall-grass prairies**

Tall-grass prairies in Ontario are usually small remnants (< 1 ha) located mainly in the southwestern part of the province. High quality prairies have few trees, non-native plant species, and a large proportion of provincially significant species. A history of burning eliminates or controls invasion by woody shrubs and maintains this rare community. Prairie habitats are very susceptible to natural succession and must be frequently disturbed by such natural processes such as fire in order to be maintained. Many of the prairie remnants that remain have invasive plant species.

Indicator species are usually the dominant grasses including big bluestem, Indian grass, switch grass, and tall cord grass. Soil depth is variable; soils are usually fine-textured, ranging from dry-mesic sands to wet-mesic sandy loams, over limestone bedrock. Table N-2 of Appendix N is a list of Tall-grass prairies and Savannah indicator species.

Many prairie remnants have been identified. In Site Region 7E prairie remnants have been identified on the following landforms: Horseshoe Moraines, Caradoc Sand Plains, Bothwell Sand Plains, St. Clair Clay Plains, Norfolk Sand Plain. In Site Region 6E prairie remnants are found on the Peterborough Drumlin Field. See Appendix M for locations of known provincially or regionally significant sites.

### **How to find**

- Use aerial photographs in conjunction with County Soil Survey reports and maps, and FRI maps to find open, treeless areas of non-cultivated land.
- Early writings or maps documenting the location of aboriginal communities may help to find remnant prairies. The frequent burning in these areas helped to maintain these habitats.
- Maps of vegetation communities have been prepared from the original surveyors' notes, and these may identify where prairies originally occurred. These are available for southern Ontario from the Ministry of Citizenship, Culture, and Recreation.
- Refer to Table N-2 in Appendix N for a list of tall-grass prairie plant indicator species.

### **5.4.1.3 Savannahs**

Savannahs are characterised by widely-spaced, open-grown trees producing a cover of 60% or less growing in association with an assortment of grasses and forbs that are characteristic of prairie communities. Soil depth is variable and is usually underlain by limestone bedrock. Soils are often silt loams and Farmington loams. In the spring, they are frequently saturated and internal drainage is restricted due to the underlying bedrock. Conversely, in mid to late summer, soils dry out, often creating drought-like conditions. Fire maintains these communities by controlling the invasion of woody shrubs and non-native species of grasses.

The trees are usually oaks and hickories, mainly black oak, bur oak, and shagbark hickory. Black oak is the dominant species in southern Ontario savannahs. On dry sites, other dominant species include white oak and red cedar. Some dominant or indicator plant species of oak savannahs include big bluestem, hair grass, rough-leaved dogwood, wild bergamot, gray-headed coneflower, nodding wild onion, fragrant sumac, and common juniper. Poorly-stocked, and barren and scattered stands as depicted on FRI maps, should not be considered savannahs unless they have the appropriate canopy and understory characteristics. Refer to Table N-2 of Appendix N for a list of savannah indicator species.

Many savannahs have been identified. These communities are found mainly in southwestern Ontario. In Site Region 7E they are found on the following landforms: St. Clair Clay Plains, Horseshoe Moraines, Norfolk Sand Plain, and Erie Spits. In Site Region 6E they are found on the Oak Ridges Moraine. See Appendix M for locations of some provincially or regionally significant savannahs.

### **How to find**

- Use aerial photographs and soil survey reports to find open areas of flat topography, with shallow soils over limestone bedrock, and scattered trees.
- Check “barren and scattered” areas on FRI maps with aerial photographs.
- Check the distribution maps of some savannah indicator species, such as black oak.
- Refer to Table N-2 in Appendix N for a list of savannah indicator species.

#### **5.4.1.4 Rare forest types**

Forests are treed communities with greater than 60% canopy closure. A deciduous forest is a forest in which deciduous tree species are more than 75% of the total tree cover. In Site Districts 6E and 7E, there are several rare deciduous forest types consisting mainly of regionally or locally uncommon tree associations or supporting some provincially or regionally rare trees. A mixed forest has greater than 60% canopy closure, and both coniferous and deciduous tree composition, with each component forming greater than 25% canopy cover. A coniferous forest has greater than 75% conifer composition. Potentially rare forest community types are listed in Appendix J.

Reports produced by the Ontario Soil Survey can further help in finding rare forest habitats. Soil formation, soil depths and textures, drainage, relief, and indigenous forest associations of the counties of southern Ontario are summarised. This information can be used to narrow the search for certain forest types. These soil surveys and maps are available from the Ontario Ministry of Agriculture, Food and Rural Affairs in Toronto. More information about landforms, their formation and distribution, can be found in the *Physiography of Southern Ontario* (Chapman and Putnam 1984). Finally, *Trees in Canada* (Farrar 1995) is a good reference textbook for information about the habitats and distribution of trees in the province.

The forest communities listed in Appendix J are those that may be significant at the provincial level. Planning authorities may wish to identify additional forest community types that may be significant within their jurisdiction. Certain community types that are common within the province or site district may be rare within a municipality. This may occur if the municipality is at the periphery of a vegetation community’s distribution range, or if land-use practices have resulted in the loss of a high proportion of the community.

### **How to find**

- Use FRI maps to locate potentially rare tree associations and to determine relative rarity of existing associations within the planning area. FRI maps note tree composition of forest stands.
- Use Ontario Soil Survey reports and maps to determine the range of specific soils types, textures, and depths in the planning area. This information, used in conjunction with Appendix J and the ELC for southern Ontario, FRI maps, and *Trees in Canada* can help to indicate areas with good potential to support rare communities.

- Check the OMNR site district report(s) that apply to the municipality for descriptions of potentially rare forest types. Site district and inventory reports often include detailed site descriptions that can narrow the search and they identify landforms that may support some of these forest types.
- Contact the director of the Ontario Tree Atlas Program at the Arboretum, University of Guelph, for information about the location of locally and regionally uncommon or rare trees in southern Ontario. Volunteers have collected data on tree species distribution in southern Ontario, within 10 x 10 km blocks.
- Conduct field investigations of the most likely areas.

#### **5.4.1.5 Talus slopes**

These habitats are characterised by blocks of limestone/dolostone, sandstone, or granite of variable size, found at the base of cliffs of steep slopes. Often substantial amounts of rock rubble accumulate through the formation and weathering of cliffs. These sites have coarse rocky material occupying greater than 50% of the ground surface. Soils are shallow, have little mineral material, and are primarily made up of organic debris. In general, vegetation is sparse and patchy.

Talus slopes provide specialised habitat (hibernacula) for some snakes. The accumulated broken rocks at the base of the cliffs frequently provide subterranean entry points for snakes that must hibernate below the frost line. Often these slopes support diverse vegetation communities, particularly if they have a southern exposure, basic soils, and presence of some water.

#### **How to find**

- Use topographical maps to locate areas of sharp relief that could be searched. Sometimes abandoned quarries will provide talus habitat.
- Check geological maps for areas of limestone outcrops.

#### **5.4.1.6 Rock barrens**

Rock barrens are open to moderately-treed sites (up to 60% crown coverage) characterised by exposed bedrock and very shallow soils (less than 15 cm). Precambrian barrens, including the more common metamorphic types, and the less common granitic and marble types are normally found on ridges and other elevated, glacially scoured sites. Paleozoic barrens, including limestone/dolostone and sandstone types are generally flat.

In southern Ontario they are largely restricted to Site Region 6E, where they are found on limestone plains adjacent to the Precambrian Shield. Good examples of metamorphic/granitic rock barrens are found on the northern part of the Frontenac Axis in eastern Ontario. Extensive limestone rock barrens (also referred to as dolostone pavement) are found on Manitoulin Island, the Bruce Peninsula and the Napanee Limestone Plain. Sandstone barrens are much rarer. Small examples occur on the Nepean Sandstone Formation in eastern Ontario.

Several provincially rare species are associated with granitic rock barrens including pitch pine found only in Leeds County, winged sumac, small prickly pear cactus, bear oak, Case's ladies' tresses, sharp-leaved goldenrod, and several grasses and sedges. Precambrian rock barrens often attract mammals such as red fox, coyote, and black bear that come to forage on berries and insects found under rocks. Flat rocks on many barrens also provide important foraging and cover habitat for many snakes and five-lined skinks. They may also function as animal movement corridors, especially in areas with numerous wetlands and ponds.

#### **How to find**

- Use aerial photographs to locate open areas and large rock outcrops with little or no vegetation.
- Check distribution maps for some of the species listed above.

#### **5.4.1.7 Sand barrens**

Sand barrens are open (tree cover < 25%) herbaceous communities occurring inland on dry, deep sand deposits. These rare vegetation communities are dominated by species such as bracken fern, hay sedge, deep-green sedge, and New Jersey tea. Mosses and reindeer lichen form a substantial component of the vegetation cover. Vegetation is usually low to the ground, sparse and patchy, and there is much exposed mineral soil. These rare habitats are known to occur in Site Region 6E on the Iroquois Plain. See Appendix M for a description of some of their locations.

#### **How to find**

- Use County Soil Survey reports and maps to locate areas with deep sandy soils.
- Use aerial photographs to locate open areas with little noticeable vegetation cover in parts of municipality with deep sandy soils.

#### **5.4.1.8 Great Lakes dunes**

Great Lakes dunes are open vegetation communities occurring on sand dunes along the shores of the Great Lakes. Soils are severely-drained calcareous sands. Further back from more active shoreline areas, the more stabilised sand has greater cover of trees and shrubs. Dominant tree species include eastern cottonwood, red cedar, white pine, red pine, black oak, red oak, and white oak. Characteristic grasses include beachgrass, Canada wild rye, switch grass, and little bluestem; characteristic plants include tall wormwood, rock sandwort, and starry false Solomon's-seal. The beach communities consist mainly of sea rocket, seaside spurge, Russian thistle, and horsetail, among other species.

Several important dune areas have been identified and include: along Lake Huron shorelines at Manitoulin Island, Sauble Beach, McGregor Point, Inverhuron, Grand Bend, Pinery, Ipperwash; along Lake Erie shorelines at Point Abino, lesser remnants at Fish Point, Port Burwell; and along Lake Ontario at Burlington Beach, Weller Bay, Prince Edward Peninsula. Other dunes are found in Georgian Bay and include the Mississagi

River mouth, Wasaga Beach, and the Penetang Peninsula. See Appendix M a description of the locations of some provincially and regionally significant Great Lakes dunes.

#### **How to find**

- Use County Soil Survey reports and maps in conjunction with aerial photographs to locate areas of sand along the Great Lakes.

### **5.4.2 How to find specialised habitats for wildlife**

Most specialised habitats have not been formally identified and mapped by any agency. The planning authority can identify many of them by working with knowledgeable people who know the natural heritage features and areas of the municipality (local naturalists, CAC, OMNR, landowners). OMNR site district and inventory reports and wetland evaluations, as well as consultant and naturalist reports, are good sources of written information.

Many of the specialised habitats described below can be identified using the information discussed in Section 3.2 and listed in Table 3-1, plus some knowledge of the natural history of their associated species and the unique physical structure of each habitat. Many specialised habitats are likely to exist in most municipalities. The following is a description of several potentially specialised habitats, their value to wildlife, and how to find them.

#### **5.4.2.1 Habitat for area-sensitive species**

Some wildlife species require large areas of suitable habitat for their long-term survival. This seems to be particularly true for larger mammalian carnivores such as gray wolf, lynx, and fisher. On a smaller scale, many birds require substantial areas of suitable habitat for successful breeding and their populations decline when habitat becomes fragmented and reduced in size. Over time, competitive species, predators, and nest parasites (primarily the brown-headed cowbird) reduce productivity of these birds. See the habitat matrices in Appendices C and G for a list of area-sensitive bird species of forested and open areas such as grasslands.

The larger and least fragmented forest stands within a planning area will support the most significant populations of forest-area sensitive birds. Forests should cover about 30% of the regional landscape to provide minimal conditions for these species and there should be several large woodlands (30 to 100+ ha) present to provide enough suitable forest-interior bird nesting habitat. Forests comprised of a mainly closed canopy of large trees and a variety of vegetation layers tend to support a greater diversity of species because of the broader range of habitats they provide.

The minimum forest habitat for area-sensitive species is at least 100 metres from any edge habitat. Edges can have adverse effects on forest-interior habitat. For example, some

forest birds may nest near or in forest edge habitat and then suffer reduced reproductive success because of nest predation and parasitism.

For area-sensitive grassland bird species, large grassland areas are required as they are more likely to be buffered from disturbance, more likely to increase the distance of nesting habitat to woody edges (thereby reducing nest predation and parasitism), and provide more opportunities for nesting. An endangered species in Ontario, the Henslow's sparrow, appears to prefer tall-grass fields of at least 30 ha. Sufficient habitat is required for several breeding pairs before the habitat will be used, although one pair of birds may only use an area of 1 to 2 ha in size. Even more common grassland species such as bobolinks, savannah sparrows, and grasshopper sparrows are more abundant as breeding birds in grasslands of at least 10 ha. Grasslands with a variety of vegetation structure, density, and composition tend to support a greater diversity of grassland nesting birds because different species require different nesting habitat.

Protecting significant woodlands as suggested in the *Natural Heritage Section of the Provincial Policy Statement*, will also maintain some critical habitat for area-sensitive forest species. The significant woodland component is closely linked to this important significant wildlife habitat. The largest, least-disturbed grasslands might also be identified for their value to area-sensitive grassland species and provision of further landscape diversity. Each planning area should protect representative examples of these habitats.

### **How to find**

- Use FRI maps together with aerial photographs of the municipality to identify potentially significant forest-interior habitats.
- Use aerial photographs to determine the amount of contiguous forest cover and potential grasslands, the spatial arrangement of forest and grassland fragments, and the extent and nature of edge habitat within the planning area.
- Planning authorities with their resource data in a GIS system can make queries of forest stands based on size.
- Ask local birders for local woodlands and grasslands that support abundant and species rich populations of area-sensitive species. These people may know many of the most important areas. Appendix C provides a list of area-sensitive birds and important references.
- Contact the Canadian Wildlife Service (CWS) for the location of forest bird monitoring sites and names of volunteers who might assist the planning authority in locating important areas.
- Bird Studies Canada may be of assistance. They conducted a 3-year study of 287 woodlots to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species.



- Conduct field investigations of the most likely looking areas in spring and early summer when birds are singing and defending their territories.

#### **5.4.2.2 Forests providing a high diversity of habitats**

Forests with a variety of vegetation communities and dominant tree cover are most likely to have the highest diversity of plant and wildlife species. Complexes of upland and wetland habitats also may have high diversity.

Many species of wildlife such as squirrels, and cavity-nesting birds like pileated woodpeckers, barred owls, and wood ducks use large trees with hollow cavities to bear and raise young. These trees can also provide resting or loafing habitat for mammals like raccoon and porcupine. Refer to the habitat matrices in Appendix G for the habitat preferences of species that depend on tree cavities. Older forest stands usually have more cavity trees and support a higher diversity of species than young stands. Best sites contain a mix of large and small tree cavities. Cavities in living trees are generally better than those in dead trees because they last longer. Some tree species make better cavity trees than others do. For example, species such as red pine or white birch break down very quickly and are of limited use for cavities.

Very tall trees, such as white pine, that grow above the main canopy (supercanopy trees), provide important habitat for birds of prey, that may use these trees for nests, roosts, and hunting perches.

Forests with numerous vertical layers of vegetation also contribute greatly to site diversity because of the many microhabitats they provide for wildlife. In addition, an abundance of ground structure such as large fallen logs and leaf litter further enhances a site's ability to support wildlife. Fallen logs are essential habitat for some salamanders, members of the weasel family, certain woodpeckers, and many invertebrate species.

#### **How to find**

- Examine FRI maps for older forest stands (average tree age greater than 100 years old or the oldest stands in the planning area), forests with several stand types, and stands with composition consisting primarily of trembling aspen, largetooth aspen, beech, basswood, white cedar, and white pine. These tree species readily form cavities that are important to wildlife.
- Use aerial photographs to locate the largest, contiguous forests in the planning area. In addition, forest stands that are closely associated with other forest stands usually provide greater diversity than isolated stands.

#### **5.4.2.3 Old-growth or mature forest stands**

Although definitions of old-growth forest vary depending on tree species, generally these sites are characterised by having a large proportion of trees in older age classes, many of them over 120 to 140 years old. Other features include: a broad spectrum of tree sizes

with some very tall trees, an uneven canopy with scattered gaps due to fallen trees and large limbs, and abundant fallen logs in various stages of decomposition. These older, relatively undisturbed forests usually support a high diversity of wildlife species.

Old-growth forest stands are rare throughout the province, particularly in southern Ontario, largely due to past logging practices. Most candidate sites will likely be small stands that have experienced little or no forestry management.

#### **How to find**

- Ask OMNR foresters for locations of old growth candidate sites in the planning area.
- Examine FRI maps to locate the oldest stands and use aerial photographs to verify FRI information.

#### **5.4.2.4 Foraging areas with abundant mast**

Over 75 species of birds and mammals consume fruit and nuts within the Great Lakes-St. Lawrence forest region and abundant supplies can enhance their survival and productivity. In summer and fall, black bears search for areas of abundant food. The most important areas are forests containing numerous large beech and red oak trees that supply the energy-rich beechnuts and acorns that bears prefer. These sites are especially important in the fall because the animals are building fat reserves for hibernation. Other animals such as white-tailed deer that remain active throughout winter may also rely on supplies of nuts to build fat reserves. In summer, in more open areas, large patches of berry-producing shrubs (blueberries, raspberries, huckleberries) provide important feeding habitat for a variety of animals and birds. Black cherry, mountain ash, and apple trees also may attract wildlife. If these food sources are unavailable or drastically reduced, bears may wander into human communities in search of food.

#### **How to find**

- Ask OMNR staff for locations of known feeding areas as well as sites with a high composition of mast-producing trees. Landowners and local hunters may also know of important sites, particularly more visible “bear nests” or claw marks in beech and oak trees.
- Use FRI maps to locate forest stands with high proportion of beech and red oak trees.
- Use aerial photographs to locate large bedrock outcrops where shrubs producing berries are often found. Forest openings, old fields, and utility corridors are often excellent sites.

#### **5.4.2.5 Amphibian woodland breeding ponds**

These ponds are used for breeding by several species of frogs and salamanders. Such water bodies may be small and ephemeral but nevertheless, important to local amphibian populations, especially if they provide the only suitable habitat in the area.

The best breeding ponds are unpolluted, and contain a variety of vegetation structure, both in and around the edge of the pond, for egg-laying and calling by frogs. The best adjacent habitats are closed-canopy woodlands with rather dense undergrowth that maintains a damp environment. Moist fallen logs are another important habitat component required by salamanders. Sites with several ponds and/or ponds close to creeks are especially valuable.

### **How to find**

- Ask the OMNR ecologist and biologist and local naturalists for locations of important woodland ponds. Local landowners may also provide assistance as they may hear springtime choruses of frogs on their property.
- Soil reports and maps may indicate presence of ponds by describing drainage patterns and locations of shallow soils over rock and relatively impervious soils (clay soils), physical characteristics that often lead to pond formation.
- Examine topographical maps to locate low-lying, poorly drained areas of the municipality.
- Ask CWS (Burlington) if amphibian-monitoring programs (amphibian call counts and backyard surveys) are being conducted in the planning area. If so, they can provide names of volunteers and areas surveyed.
- Contact Bird Studies Canada for information on their marsh-monitoring program.
- Conduct field investigations in spring; warm spring evenings in April are good times to listen for calling frogs to determine their relative abundance. For later-calling species such as green frog and bullfrog, late May and early June is more optimum timing.
- Refer to the Ontario Herpetofaunal Summary for historical records.

#### **5.4.2.6 Turtle nesting habitat**

In spring and early summer, turtles lay their eggs in areas that may be used year after year. Preferred nesting habitats are usually on relatively soft substrates such as sand or fine gravel that allow turtles to easily dig their nests, and are located in open, sunny areas (enhancing development). In general, the best nesting habitats are close to water and away from roads (less mortality of adults and hatchlings) and sites less prone to loss of eggs by predation from skunks, raccoons, and other animals.

Areas with numerous turtle nests are hard to find and it is unlikely that many such sites will be found. However, the following suggestions will help to narrow the search for prime areas.

### **How to find**

- Use Ontario Soil Survey reports and maps to help to find suitable substrate for nesting turtles (well-drained sand and fine gravel).
- Check the Ontario Herpetofaunal Summary records for uncommon turtles; location information may help to find potential nesting habitat for them.
- Use aerial photographs and maps to narrow the search for prime nesting areas including shoreline beaches located near good turtle habitat (weedy areas of wetlands, lake and river shorelines), road embankments near turtle habitat, and stream crossings/culverts on water bodies.
- Conduct field investigations during prime nesting season near wetlands deemed to provide the best turtle habitat.

#### **5.4.2.7 Specialised raptor nesting habitat**

Several raptors, including ospreys, those nesting and hunting in forests, and several other woodland and grassland raptors require somewhat specialised nesting habitat for their long-term survival. For example, red-shouldered hawks prefer mature forests with closed canopies, near water. If the site remains undisturbed, they may continue to use the same nest or site in consecutive years. Osprey nest along lake shorelines as well as in wetlands close to productive fishing waters. Short-eared owls nest on wet ground in open areas, including marshes and wet fields with sufficient ground cover.

Shorelines of productive water bodies with numerous large conifers and/or deciduous trees and with extensive areas of shallow water (< 1 m) for fishing are prime nesting habitat for ospreys. Trees used for perching and nesting are large and sturdy, and provide birds with clear flight paths and good visibility.

Most woodland raptors require mature trees that are large enough to support the nest, full canopy closure, and a minimum of trees and shrubs in the understorey. Since these birds of prey hunt within the forest, an unimpeded flight zone under the canopy is required.

The presence of displaying or vocalising adults or active nests, is the most expedient approach to take when attempting to identify specialised habitat for these species. Also, the presence of inactive nests can indicate important raptor nesting habitat because some species may have several inactive nests within their nesting territory. see habitat matrices in Appendix G for descriptions of nesting habitats of raptor species and Appendix O for how to find and identify their nests.

### **How to find**

- Use FRI maps and aerial photographs to identify the largest tracts of contiguous forest in the planning area. FRI maps indicate species composition and age of forest stands (two important factors in nesting habitat selection for several species of raptors, including red-shouldered hawk). To find potential osprey nesting habitat, focus on old

shoreline forest stands first. FRI maps and aerial photographs may also be used to identify large (>75 ha) fields and meadows that may be suitable for short-eared owl nest sites.

- Use maps and aerial photographs to identify forests with few roads that tend to have less human disturbance. Use aerial photographs to identify areas of water within forested areas that may provide red-shouldered hawk nesting habitat.
- Ask the OMNR ecologist or biologist. They may be aware of locations of nesting raptors. Often osprey nests are reported to OMNR. In addition, these staff may know local naturalists that may be aware of the locations of raptor nests.
- Conduct field investigations from mid April to the end of May. The use of tape-recorded hawk calls can help to find raptor nests by eliciting calling responses from courting or nesting hawks.
- Short-eared owls may hunt with other raptors in winter seasonal concentration areas (open fields with abundant small mammals). If suitable nesting habitat is present, some birds may remain to breed.
- Check data from the red-shouldered hawk survey administered by Bird Studies Canada.
- Conduct aerial flights, concentrating on shorelines of lakes, large rivers, and marshes.
- Check the *Atlas of Ontario Breeding Birds* or *Rare Breeding Birds in Ontario* for species documented in your planning area.

#### **5.4.2.8 Moose calving areas**

Shortly before giving birth in mid-May, solitary cow moose move to areas providing isolation, cover, and escape paths from predators. Calving sites are usually slightly elevated areas. Islands and peninsulas seem to be preferred, but shorelines and upland areas are also used if they are relatively close to open water (100 to 500 metres). These sites are hard to find by field investigation because at this time of year moose are solitary and intentionally looking for secluded areas.

The OMNR has the greatest expertise in looking for and finding moose calving areas, as well as moose aquatic feeding areas and mineral licks briefly discussed below. OMNR biologists are aware of these specific habitat requirements. Very few calving sites will be known.

#### **How to find**

- Topographical maps used with aerial photographs will help locate potential habitats such as islands and peninsulas.
- Consult the OMNR biologist for known calving sites.

#### **5.4.2.9 Moose aquatic feeding areas**

From June through July, moose move as far as 30 km to consume large quantities of aquatic plants, especially subagant species, to replenish their bodies with sufficient sodium. They feed several times a day at preferred aquatic feeding sites. Ideal sites provide abundant food, particularly pondweeds, water milfoil, and yellow water lily, and have adjacent stands of lowland conifers to provide shade and hiding cover. Several moose may use prime sites.

##### **How to find**

- Use aerial photographs to identify bays, shorelines, and river and creek systems with aquatic vegetation.
- Contact the OMNR biologist for the locations of potential sites.
- Use FRI maps and aerial photographs to locate coniferous tree cover adjacent to potentially suitable areas.
- Conduct aerial flights in June and July to locate concentrations of moose or evidence of use (an OMNR protocol is available).

#### **5.4.2.10 Mineral licks**

In spring, moose seek mineral licks to consume sodium that is found in upwelling groundwater and the soil of these seepage areas. Mineral licks surrounded by forest cover and free of human disturbance may be used by large concentrations of moose for many years. These sites are rare, occurring most frequently in areas of sedimentary and volcanic bedrock. They rarely occur on granitic bedrock, except where the site is overlain by calcareous glacial till.

##### **How to find**

- Contact the OMNR biologist for the location of any known or potential areas. Local residents may also know the location of licks.
- Consider using a small aircraft to verify reported sites because mineral licks are uncommon; however these areas stand out because they are so trampled.

#### **5.4.2.11 Mink, otter, marten, and fisher denning sites**

These species are members of the weasel family. They are predators with large home ranges and must cover a large area in search of food (a male fisher may have a home range of 17.5 to 39 sq. km). Like most larger carnivores, they are rarely found in high densities, and have specific habitat components critical to their survival.

Mink prefer shorelines dominated by coniferous or mixed forests for feeding and denning. Dens are usually located underground, especially where shrubs and deadfalls provide more cover for dens and habitat for prey. They also den in abandoned muskrat lodges.

Since otters avoid humans, undisturbed shorelines with abundant shrubby vegetation and downed woody debris provide prime denning habitat. They often use old beaver lodges for dens and log jams and crevices in rock piles. Since this mammal eats primarily fish, it requires shoreline habitats that support large, productive fish populations.

Marten and fisher share the same general distribution and habitats. Both require large unbroken tracts of coniferous or mixed forest with abundant large trees for maternal denning sites. Fisher dens are usually in cavities in dead or living trees or fallen logs and these animals appear to prefer trees larger than 40 cm diameter at breast height. Marten often use cavities originally made by woodpeckers.

Exhaustive searches are not recommended, since feeding and denning sites for all these mammals are usually very hard to find. Long-term survival of these species and other carnivores with large ranges is best assured by taking a broad, landscape approach to Natural Heritage System planning by identifying and protecting large natural areas that include the best quality habitat for these species. Protection of sufficient habitat for these area-sensitive species will also help provide suitable habitat for many other species.

#### **How to find**

- Although specific sites are hard to find, OMNR biologists and foresters, local naturalists, and residents may know the location of some potential feeding and denning habitats. OMNR staff can also provide contact with trappers who may know the location of prime habitats.
- Use aerial photographs, topographical maps, and FRI maps to locate relatively undisturbed shorelines, wetlands, and closed-canopy forests with larger, older trees that might provide suitable structure.
- Habitat supply models are available through OMNR.

#### **5.4.3 Highly diverse areas**

These are areas of high species or vegetation community diversity. If protected within a Natural Heritage System, such sites will contribute greatly to maintenance of overall biodiversity. Although these areas may be found throughout the province, they have certain characteristics that can help to narrow the search for them. Often highly diverse areas contain a wide range of habitats or ecosystems and the large variety of plants and animals associated with them. These areas frequently have species with both northern and southern affinities, and rare species are often found on such sites.

The deciduous forest region of Ontario (the Carolinian zone) has long been recognised as a part of the province with many highly diverse areas. More vulnerable, threatened and endangered species are found here than in any other Canadian life zone. Other parts of southern Ontario with many highly diverse areas include the Frontenac Axis of

southeastern Ontario; Grey and Bruce counties; and parts of Frontenac, Lennox-Addington, Lanark, Renfrew, Hastings, and Haliburton counties.

On the Canadian Shield, areas underlain by carbonate bedrock frequently support rich communities because these substrates are less erosion resistant than the acidic granite and gneiss bedrock types, and encourage development of more nutrient-rich, basic soils. In southern Ontario, sites within the contact zone between Paleozoic limestone and the precambrian bedrock of the Canadian shield often support highly diverse communities.

### **How to find**

- Use local expertise, aerial photographs, and maps to look for areas with the following characteristics that frequently result in highly diverse communities:
  - good diversity of vegetation and vertical structure, usually in the form of different vegetation layers
  - good diversity of ecosystems such as wetlands, forests, and old fields
  - biophysical features such as the presence of cliffs; springs or seeps; pockets of deeper, more fertile soils; abundant organic debris on the ground (e.g., large decaying logs)
  - relatively little human disturbance
- Conduct field investigations where necessary to check potentially diverse sites.
- Site district and inventory reports and environmentally significant areas studies often provide descriptions of many sites. This information may provide a start for further investigations.

### **5.4.4 Cliffs**

Cliffs are dominated by bedrock with sharp or variably broken edges and a vertical relief greater than three meters. Average soil depth is usually less than 15 cm and restricted to places where organic debris and mineral material can accumulate such as in cracks, hollows, and along the upper rim.

Many cliffs may be locally significant because of their value as specialised habitat for wildlife such as nesting peregrine falcons or rare plants such as purple-stemmed cliff brake. During summer, large numbers of turkey vultures may roost on secluded cliff faces. Many cliffs have areas where groundwater seepage creates a thin film of water running over the rock surfaces. Often unique floral and insect species are associated with these specialised habitats. Some surfaces contain a diverse assemblage of algae and fungi that live within the crystalline structure of the rock.

Cliffs composed of limestone, dolostone and/or sandstone are most prevalent along the Niagara Escarpment, from Manitoulin Island to near Niagara-on-the-Lake. Granite cliffs



are more widespread in the province, but metamorphic/granitic cliffs are only found on the Frontenac axis in Site Region 6E.

**How to find**

- Use topographical maps to locate areas of sharp relief.

**5.4.5 Seeps and springs**

Seepage areas, springs, and small intermittent streams provide habitat for numerous uncommon species such as northern two-lined salamander and ginseng. In winter, wild turkey and white-tailed deer also forage in these areas because of the lack of snow on the ground. Often these areas support a high diversity of plant species. Many of the most important seeps are in forested areas where the canopy maintains cool, shaded conditions.

These landscape features are hard to find but, because of their importance to many species, considerable effort should be made to find them, especially sites with several seeps and springs.

**How to find**

- Use topographical maps and aerial photographs to locate small streams and headwater areas that could indicate the presence of seeps. Headwater areas for coldwater streams are often excellent areas to find seeps and springs. These areas often have rolling topography.
- Use of thermography, location of brook trout redds and reference to local to hydrogeological studies.

## 6 Identifying Habitats of Species of Conservation Concern

### 6.1 Definition

Species that can be considered species of conservation concern include:

- species identified as nationally endangered or threatened by the Committee on the Status of Endangered Wildlife in Canada, which are not protected in regulation under Ontario's *Endangered Species Act*
- species identified as provincially vulnerable based on lists of *Vulnerable, Threatened, Endangered, Extirpated, or Extinct Species of Ontario* that are updated periodically by the OMNR (Appendix P)
- species that are listed as rare or historical in Ontario based on records kept by the Natural Heritage Information Centre in Peterborough (S1 is extremely rare, S2 is very rare, S3 is rare to uncommon)
- species whose populations are known to be experiencing substantial declines in Ontario
- species that have a high percentage of their global population in Ontario and are rare or uncommon in the planning area
- species that are rare within the planning area, even though they may not be provincially rare
- species that are subjects of recovery programs (e.g., the Black Duck Joint Venture of the North American Waterfowl Management Plan)
- species considered important to the municipality, based on recommendations from the Conservation Advisory Committee

Habitat for these species is exclusive of those habitats for species covered under the Habitat of Endangered and Threatened Species of the Natural Heritage Component of the Provincial Policy Statement.

### 6.2 Ecological function/effects of loss

The ecological function of this habitat is to ensure that associated species can maintain long-term, viable populations. Loss or degradation of this habitat may threaten the global existence of some species, and lead to accelerated declines of species already at risk. At the local level, the loss of species will result in loss of biodiversity.

### 6.3 Identification of habitat of species of conservation concern

Preliminary estimates in 1996 indicate, at the provincial scale, there were at least 105 species of conservation concern (not including species designated vulnerable by OMNR's Committee on the Status of Species at Risk in Ontario). Thirteen Ontario species are nationally endangered; at least 57 species have a high percentage of their global

population in Ontario; and 35 species of birds in Ontario are experiencing significant population declines. These numbers are based on long-term data, such as 25 years of breeding bird survey data. Experts are aware of declines in other groups of wildlife, such as amphibians however; they do not have long-term data on these species.

In this guide, the species of conservation concern do not include species that have been designated threatened or endangered by the OMNR. These species are protected under the *Habitat of Endangered and Threatened Species* component of the Natural Heritage section of the *Provincial Policy Statement* and there are methods for determining the significant portions of their habitat. Yet, some of the methods described in this guide may be useful for finding any rare species. Refer to Appendix P for a list of endangered, threatened, rare, vulnerable, or declining wildlife species of Ontario.

Many species of conservation concern are uncommon or rare species that normally do not exhibit high population densities (red-shouldered hawks, lynx). Others have fairly specialised habitat requirements or narrow tolerances for survival that are poorly understood. Other species may be uncommon because their habitat is rare. Because of the sensitive nature of these species, even seemingly minor alterations to their habitats often result in their disappearance. Protection of their habitats in the municipality will help to maintain local populations and contribute to their recovery.

### **6.3.1 A suggested approach to habitat identification**

Although there is often little specific information about the habitat requirements of many species of conservation concern, most of these species can still be protected within a Natural Heritage System. To accomplish this, the planning authority will need to answer the following questions:

#### **What species of conservation concern are likely to occur in the municipality?**

Appendix F provides a list of information sources that can be used to identify many habitats of species of conservation concern that are found in the planning area. The OMNR Ecologist will know which endangered, threatened, or rare species listed in Appendix P occur or are likely to occur in the planning area. Bird Studies Canada and the OMNR recently prepared a list of Ontario breeding landbirds with high conservation priority. Appendix G provides lists of plants and animals, describes their distribution, and gives an indication of where they may be found.

#### **Where are these species likely to be found in the municipality?**

The information sources listed in Table I-3 in Appendix I may provide locations of some of these species but most will not be located easily. Therefore, it is suggested that the planning authority consider forming a Conservation Advisory Committee (CAC)

consisting of experts familiar with the flora and fauna of the municipality (see Section 3.4). Atlas data indicates areas where species of conservation concern may occur.

Many species and habitats of conservation concern will be contained within the other natural heritage features and areas of the Natural Heritage Component of the Provincial Policy Statement (significant woodlands, wetlands, valleylands, ANSIs, fish habitat) as well as the other components of *Significant Wildlife Habitat*. It is common to find several species of conservation concern in close proximity. Therefore, the planning authority should focus its effort on habitats and species of conservation concern that will not be adequately protected through the identification of these other components.

**Which of these species should the planning authority protect under this component of *The Natural Heritage Policy*?**

The planning authority is urged to protect species of conservation concern and their habitats in the following order of priority:

- globally rare
- nationally rare
- provincially rare
- regionally rare
- locally rare species
- species of concern to the planning authority

Ontario's wildlife species have been ranked for rarity by staff at the Natural Heritage Information Centre (NHIC) in Peterborough. Planning authorities can obtain these lists from the OMNR ecologist or from the NHIC website (Appendix F). In addition, Table Q-3 in Appendix Q provides a list of criteria that the planning authority can use to determine species of conservation concern. This does not include species designated as endangered under the *Endangered Species Act*. Many species (globally rare etc) are not designated.

**6.3.2 Summary**

The following guidelines summarise the process of identification of species and habitats of conservation concern.

- Contact the OMNR ecologist and Appendices G and P for a list of potential species of conservation concern that are known for the planning area, based on provincial and regional lists. Additional species may be added to this list based on recommendations from the Conservation Advisory Committee.
- Afford the highest priority for protection to habitats of the rarest species regardless of where they are found.
- Next, concentrate protection efforts on species of conservation concern that are most threatened and/or currently unprotected because their habitats are found

outside other natural heritage features. Refer to the habitat matrices (Appendix G) for information regarding the habitat requirements of some of these species.

- Conduct field investigations of sites that may be important to these species, but have not had their conservation importance assessed. See Table Q-3 in Appendix Q for criteria that could be used to evaluate these sites. See Appendix D for information about how to conduct field investigations and Appendix G for the habitat requirements of species.

## 7 Identifying Animal Movement Corridors

### 7.1 Definition

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another. They exist at different scales and frequently link or border natural areas. Animal movement corridors encompass a wide variety of landscape features including riparian zones and shorelines, wetland buffers, stream and river valleys, woodlands, and anthropogenic features such as hydro and pipeline corridors, abandoned road and rail allowances, and fencerows and windbreaks. The Natural Heritage Component of the Provincial Policy Statement states that *natural connections between natural features should be maintained and improved where possible.*

### 7.2 Ecological function/effects of loss

Animal movement corridors allow animals to travel freely and safely across the landscape by providing cover, shelter from harsh weather conditions, and by minimising encounters with predators and people. They are especially important to animals that require a variety of habitats to survive.

Animals move for several reasons. Often a particular area does not satisfy all seasonal habitat requirements of a species. For example, some forest salamanders spend the summer and winter in forest soils but, in spring, breed and lay their eggs in ponds, marshes, or temporary pools that may or may not be located in forest. Larvae mature in the aquatic environment, emerge as adults, and then move back to the forest. Large mammals often must travel over large areas for all of their needs.

Other animals move in response to seasonal changes in climate (white-tailed deer, moose, caribou, and migratory birds). Often these animals follow traditional migration routes or corridors. For example, the north shores of Lake Ontario and Lake Erie form an important migratory corridor for land birds flying south during fall migration.

Subadult animals of many species disperse from their place of birth to establish territories of their own. In order for populations to persist, enough individuals must be able to move among suitable habitats to balance local extirpations and ensure genetic diversity.

Corridors often provide permanent dwelling habitat for some plants and animals. For example, a creek connecting two wetlands may support amphibians and reptiles that are also found in the wetlands; or some corridors connecting patches of forest can provide the entire required habitat for smaller forest mammals such as chipmunks and mice.

Adding corridors to a natural heritage conservation system may increase dispersal abilities of many wildlife species and help maximise biological diversity within a given planning area. They are one way to help offset the negative impacts on wildlife of highly fragmented landscapes, and in some situations, may increase habitat and populations of some species. They may also function as buffer zones, by protecting natural areas and their ecological processes from adjacent land-use activities.

Loss of wildlife movement corridors makes species more vulnerable to predation and disturbance. Local populations of some species (e.g. white-footed mice) may even be extirpated when re-colonisation is impossible due to an absence of corridors.

### **7.3 Identification of animal movement corridors**

In many municipalities in southern Ontario, corridors consist of naturally vegetated areas, often forested land, that run through more developed and open landscapes. They connect the remaining natural areas within and beyond the municipality. Other potentially significant corridors include forested river valleys, shrubby riparian vegetation along smaller watercourses such as creeks, and undeveloped lake shorelines. Sparsely vegetated areas can also function as corridors provided they link relatively natural areas. Many wildlife species move freely through agricultural land to reach natural areas.

It is seldom possible to observe wildlife species using corridors. Some species pass through corridors quickly whereas others may reside there for some time. Often animal movement corridors can be determined accurately using maps, aerial photographs, and a sound knowledge of species' habitat requirements. The following guidelines are presented to help identify potentially significant animal movement corridors.

- Identify animal movement corridors only after other natural heritage features, including significant wildlife habitats have been located and mapped.
- Contact OMNR for their suggestions on the locations of corridors and restorable corridors. Knowledgeable local residents may be aware of locations of some corridors, especially for large, visible species.
- Use knowledge of habitat requirements and behaviour of key species to help identify potential corridors for them.
- Use the most recent aerial photographs and maps (topographical, FRI, wetland, ANSI, land use) to help to identify potentially significant corridors. Use them to locate:
  - the largest natural areas within the municipality and adjacent municipalities that should be linked by existing or restorable inter-regional movement corridors. These inter-regional corridors will be visible on aerial photographs and topographical maps as mostly naturally-vegetated links.
  - the largest and oldest forest stands in and adjacent to the planning area. These areas are likely to support high species diversity. Use the FRI maps to

determine the age and composition of the forest stands in the region. Examination of aerial photographs will help to verify the accuracy of FRI maps.

- the largest and most diverse wetlands. Examination of aerial photographs and topographical maps of wetlands will reveal their configurations and spatial relationship to other natural heritage areas, as well as help to indicate important linkages among them.
- relatively steep and undeveloped river valleys and riparian zones along lakes, rivers and streams. Although it is easy to identify these areas by using aerial photographs and topographical maps, an evaluation of at least some of them is recommended. In some of the most densely populated municipalities of southern Ontario, these riparian areas may be the most important remaining animal movement corridors.
- the most probable linkages to and from known significant wildlife habitat such as winter deer yards and amphibian breeding ponds.
- unopened road and rail allowances, and utility corridors that are potential animal movement corridors.
- hedgerows, windbreaks, and old fields that could function as animal movement corridors. Examination of aerial photographs can help to identify these smaller linkages. In densely populated and heavily developed parts of some municipalities, these small corridors may be the only remaining natural areas that allow animal movement from one area to another.

Identifying the most important corridors that provide connectivity across the landscape is challenging because of a lack of specific information concerning animal movements. There is also some uncertainty about the optimum width and mortality risks of corridors. Furthermore, a corridor may be beneficial for some species but detrimental to others. For example, narrow linear corridors may concentrate breeding species. Raccoons, cats, and other predators can quickly decimate these populations. Also, narrow corridors dominated by edge habitat may encourage invasion by weedy generalist plants and opportunistic species of birds and mammals. Despite the difficulty of identifying exact movement corridors for all species, these landscape features are important to the long-term viability of certain wildlife populations.

### **7.3.1 Recommendations**

The following recommendations are based on widely accepted principles of corridor identification and design.

- All potentially significant corridors should allow safe movement of animals and provide safe dwelling habitat for resident wildlife populations. Corridors should protect moving animals from predators and road mortality.



- Emphasis should be on retaining connections among the most significant and similar natural areas at the larger scale (inter-regional) and within the municipality as well as habitats of species most in need of conservation.
- Maintain corridors that provide several benefits. For example, riparian corridors permit animal movement and help to ensure stable soils, necessary inputs of organic matter, and good water quality. Often these corridors are diverse natural areas because of fertile soils, a variety of habitat structure, a dependable source of water, abundant insect and plant foods, and several different microclimates.
- Corridors should be as continuous and unfragmented as possible. However, some gaps in a potential corridor should not preclude it from consideration.
- There should be no barriers to animal movement within designated corridors.
- Wherever possible, select corridors in regions of the landscape with the lowest road density. Roads can be a serious cause of mortality for species such as nesting and migrating turtles, basking snakes, and frogs, as well as mammals and birds that feed near roadsides.
- Generally, corridor habitat should be as similar as possible to the habitat in which the target species lives.
- Incorporate known animal migration routes into corridors.
- Shorter corridors are preferred since the longer the corridor, the greater the likelihood of increased mortality, barriers to movement, and unsuccessful dispersal attempts. Longer corridors may also need to be wider.
- Generally, the widest possible corridors are best for linking patches of a species' habitat that are farther apart than normal juvenile dispersal distances. Wider corridors minimise edge effects. However, for some small animals at least, corridor width may not be as important as corridor presence. Even small fencerow corridors may be beneficial to the movement of small mammals such as chipmunks.
- Corridors surrounded by inhospitable habitat need to be as wide as possible.
- Corridors should have a good diversity of vegetation structure and composition.
- Consider restoring corridors that link important natural areas or wildlife habitats when and where restoration activities such as reforestation, stream rehabilitation, and regulation of land uses are feasible.
- Natural areas that have been historically isolated should not be connected as they are unique and have evolved to their existing condition.

## 8 Evaluation of Significant Wildlife Habitat

Evaluation is the process of determining if wildlife habitat should be considered significant under the *Natural Heritage Features and Areas Policy* and therefore warrants protection under the *Planning Act*. Specific wildlife habitats are compared to evaluation criteria to determine if they should be considered significant. Appendix Q provides lists of evaluation criteria for significant wildlife habitat. The evaluation process can be used to determine if a habitat meets a minimum standard for significance. The evaluation criteria can also be used to compare one potential significant wildlife habitat to another, if they need to be ranked. This may be necessary where there are several potential sites and the planning authority wants to place the greatest emphasis on the best sites.

The evaluation process is an important step for designating lands for protection. It can also be used to identify sites that merit further study because of their apparent conservation value or to identify suitable candidates for future restoration efforts. Evaluation allows a planning authority to focus its time and resources on sites that are most likely to be significant. The degree of representation of significant natural heritage features and areas within a planning area is a very important element of evaluation. In order to achieve a comprehensive Natural Heritage System, all natural heritage features and areas should be well represented, or at the very least opportunities for restoration should be identified.

Not all identified wildlife habitats will prove to be significant for the purposes of the Natural Heritage Features and Areas Policy. In landscapes that are still very natural, there are more likely to be some habitats that, although they have value for wildlife, will not be considered significant because they are well represented in the planning area. In areas with very little natural cover remaining, it is more likely that a high proportion of the identified habitats will be considered significant.

### 8.1 Evaluation criteria and guidelines

The evaluation process involves examining a number of criteria that describe key ecological functions of the habitat. Table 8-1 provides a list of criteria for evaluating wildlife habitat. They provide a comprehensive overview of the most common evaluation criteria used by wildlife and conservation biologists. More specific criteria are presented in Appendix Q.

The criteria listed in Table 8-1 have not been weighted, although this can be done as part of a ranking process (see Chapter 9). However, a high emphasis should be placed on representation. It is expected that for many of the wildlife habitats listed in this guide, the application of the criterion *current representation of the wildlife habitat in the planning area* will be sufficient to determine that a specific habitat is at least locally significant. If

a particular type of habitat is poorly represented in the planning area, then it is very likely all examples of this habitat should be considered significant. There may not be a need to apply every criterion to a particular habitat if it has already been determined to be significant. Some further examination may be beneficial in situations where there is a desire to determine what aspects might be improved at some point in the future. A planning authority may also consider breaking their planning area into physiographic units for determining representation within the planning area. Some physiographic features are unique, such as the Oak Ridges Moraine or Niagara Escarpment, and representation within that feature may make more sense than representation within the planning area as a whole.

In general, habitat evaluation should not be a costly and time-consuming exercise. It should first concentrate on criteria that can be evaluated using existing information. Some criteria can be applied using aerial photographs and topographic maps. If the habitat is deemed significant using these criteria, it may not be necessary to conduct a field survey. However, there may be situations where fieldwork is necessary.

Extensive searches for hard-to-find habitats, such as snake or bat hibernacula are not recommended, particularly if the species is unlikely to occur in the planning area. In areas where particular species have been recorded, but critical habitats have not been found, some potential sites can be indicated on maps so that future investigations can be focused on these areas.

The difficulty of finding precise locations of the significant wildlife habitats of some species emphasises the value of adopting some of the basic principles of a landscape approach to planning, discussed in Chapter 2. This includes ensuring that there is adequate representation of all habitat types within the planning area. Although this approach cannot guarantee that all critical portions of habitat of a particular species will be adequately protected, there is a greater probability that these important habitats will be protected than if some habitat types are not included in the Natural Heritage System.

**Table 8-1. General evaluation criteria for wildlife habitats.**

Criteria	Definition and implications
Current representation of wildlife habitat, species, or natural features in the planning area	<ul style="list-style-type: none"> <li>• refers to the existing range of wildlife habitats, natural features, and species in the planning area, with the primary goal of protecting as complete a representation as possible of them</li> <li>• it applies to both rare and common species</li> <li>• normally assessed at the site district level, but could also be done at the local level</li> <li>• representative natural areas, features, landforms, and wildlife habitats are a solid foundation around which a Natural Heritage System can be designed</li> </ul>

Abundance	<ul style="list-style-type: none"> <li>refers to the number of individual plants or animals of particular species or guild within a given site, community, or habitat.</li> <li>it is often based on population estimates for a given area</li> <li>also can refer to the amount of a given habitat feature (food, ground debris, tree cavities) within an area or habitat</li> </ul>
Species diversity	<ul style="list-style-type: none"> <li>refers to the number of different species present</li> <li>sometimes it is applied more specifically (referring to only breeding or migratory species)</li> <li>generally areas of high species diversity are more significant than areas of lower diversity</li> <li>areas of lower species diversity may be significant (if site is habitat of species of conservation concern, or site is uncommon in the planning area)</li> </ul>
Presence of species of conservation concern (e.g. rare, vulnerable, threatened, endangered, declining, uncommon, sensitive, endemic species)	<ul style="list-style-type: none"> <li>usually refers to species that are encountered less often than most other species, or whose population is declining</li> <li>may refer to species that are rare at some larger scale (ecological region, province, global)</li> <li>such species may be rare in the planning area but common elsewhere, or common in the planning area but rare elsewhere</li> <li>such species may be more numerous than perceived but due to size, secretive nature, or other factors, are infrequently encountered</li> <li>some species may be quite numerous but found at few locations</li> <li>sensitive species are those species that can least tolerate many human activities or that have very specific microhabitat requirements</li> <li>endemic species are species restricted to a specified region or locality</li> </ul>
Ability of the site to meet the known habitat requirements of target species	<ul style="list-style-type: none"> <li>refers to the presence of biophysical features and attributes required by target species for survival and long-term maintenance of viable populations</li> <li>usually wildlife agencies can provide this habitat information for well-studied species</li> </ul>
Condition/quality of site	<ul style="list-style-type: none"> <li>refers to the general level of disturbance (either natural or human) on the site</li> <li>determined by comparison with perceived “pristine” sites</li> <li>condition often determined by assessing such features as the proportion of non-native species on site; level of human use; number of roads, vehicle tracks, amount of refuse</li> <li>undisturbed or lightly-disturbed areas are usually more significant than disturbed areas</li> <li>undisturbed areas have additional value as potential areas for research, provision of baseline information</li> </ul>
Potential for long-term protection of site/habitat	<ul style="list-style-type: none"> <li>refers to the likelihood of enacting restrictions on land uses that will result in protection of identified habitat and associated species for many years</li> <li>can also refer to habitats where no restrictions are required because habitat is part of an existing protected area or habitats protected by their inaccessibility</li> </ul>
Provision of several significant wildlife habitats	<ul style="list-style-type: none"> <li>refers to the presence of more than one of the significant wildlife habitats discussed in this guide</li> </ul>
Size of habitat/site	<ul style="list-style-type: none"> <li>larger habitats/sites are usually more significant because they tend to support more wildlife, including sensitive species, than smaller areas, due to their tendency to have a broader range of habitats and features, larger interior, and better resilience</li> </ul>

	<ul style="list-style-type: none"> <li>to impacts</li> <li>small areas may also be significant, especially when they support rare species, or provide several representatives of a particular habitat or natural feature</li> </ul>
Shape of habitat/site	<ul style="list-style-type: none"> <li>refers to the physical configuration of the habitat/site</li> <li>round or block-shaped sites contain less edge per unit area than long, narrow sites and may help protect some species from predation, parasitism, and competition from edge species</li> </ul>
Location of habitat/site	<ul style="list-style-type: none"> <li>location refers to geographical position relative to other habitats, natural areas, corridors; its degree of isolation from other similar habitats; and/or its spatial distribution across the landscape</li> <li>generally, habitats within or close to other natural areas are more significant than those that are separated or distant from natural areas</li> </ul>
Habitat diversity/complexity	<ul style="list-style-type: none"> <li>refers to important physical (configuration of site; local topographic, soil, and moisture conditions; presence of water or corridor/linkage) and biological characteristics (presence of certain species; species and community diversity; diversity of layers of vegetation) that can meet wildlife habitat requirements</li> <li>high habitat diversity/complexity usually indicates a greater probability that the site is of significant value to wildlife</li> </ul>
Evidence of use	<ul style="list-style-type: none"> <li>refers to signs of current or traditional use of the habitat by the associated species</li> <li>usually refers to observations of wildlife or signs of presence of wildlife (scats, tracks, feathers, fur, lodges, nests etc.)</li> </ul>
Other perceived values	<ul style="list-style-type: none"> <li>refers primarily to values of a site to the larger ecosystem in which it is found (maintenance of hydrological and nutrient cycles, erosion control)</li> <li>also refers to values of a site to humans (scientific and educational studies, aesthetic and recreational values)</li> </ul>

## 8.2 Field investigations

At times, there will be a need for field investigations to collect important habitat information pertaining to some of the evaluation criteria (habitat quality, species richness). More than one visit to a site is not encouraged, unless necessary, such as to obtain seasonal information. If a site is visited during identification, then sufficient information should be collected at that time for evaluation. Appendix D describes the types of information that should be collected during a field investigation.

The following Sections (8.3 to 8.6) discuss important factors to consider when evaluating specific wildlife habitats.

### 8.3 Evaluation of habitat of seasonal concentrations of animals

Table Q-1 in Appendix Q lists criteria and suggested guidelines for evaluation of seasonal concentrations of animals. The following section describes key factors to consider during the evaluation of seasonal concentrations of animals. It expands on some of the criteria and provides additional detail that is not in the table. In general for determining significance, the greatest emphasis should be placed on the following:

**Representation**—this can include representation at the large scale, such as habitat for species that are provincially rare, or it can include representation at the local level

**Abundance**—habitats supporting high numbers of animals relative to other habitats of the same species within the planning area

**Rare Species**—the presence of rare species (or species of conservation concern) in an animal concentration area, adds to the probability it will be significant

**Multiple Benefits**—these are habitats that not only provide habitat for a seasonal concentration of animals, but also other significant wildlife habitat as well, such as rare vegetation communities, specialised habitat for wildlife, habitat for species of conservation concern and/or and animal movement corridor.

Not all sites identified as candidates for protection will be significant. In some cases there will be better examples of the same habitat within the planning area. Some habitats may not be sustainable due to serious habitat limitations that were not identified earlier. Some habitats may not meet a minimum standard for habitat quality and sustainability. For example, a winter deer concentration area may have been identified. However, the site may support only a very small number of deer in winter. Although any concentration of deer may be important, the number of deer using the concentration area may be too small to be considered significant in the context of land-use planning.

Habitat evaluation can be difficult. One difficulty is in finding some of the habitats. This has been discussed in Chapters 2 and 4. Another difficulty is determining the degree of significance of some of the criteria for the identified habitats. Examples include knowing the relative importance of a winter deer yard to the local deer population and knowing the relative importance of a colonial bird nesting site to the local population. The planning authority may not have the expertise to be confident in making a decision on these criteria. Many government agencies and non-government organisations have knowledge of many of these species and their habitats. These organisations should be consulted whenever possible. Appendix F provides a list of agencies and their areas of expertise. Appendix G lists information sources for seasonal concentrations of animals. This information will be helpful when using the evaluation criteria.

See Chapter 4 for a detailed description of seasonal concentration areas and their functions.

### **8.3.1 Winter deer yards**

The OMNR is responsible for managing deer in Ontario. Staff responsible for deer management, are aware of most deer winter habitat and should be consulted about the relative importance of deer yards to the planning area.

The significance of a particular deer yard depends on its context in the landscape. In areas where deer populations are high (and there are a number of large deer yards distributed across the landscape), some of the smaller yards may not be considered significant with respect to the application of the *Natural Heritage Features and Areas Policy*. That is not to say those small deer yards do not have value. All winter habitat for deer has value. It simply means that not all areas will be designated as significant wildlife habitat. In areas where deer are not as abundant and wintering deer are found in a limited number of small yards, all of the deer yards may be considered significant.

Deer management goals can also be used to determine significance. In many parts of Ontario, deer provide high numbers of recreational opportunities, both for viewing and for hunting. Revenue generated from these opportunities is not only important to the local economy, but to the province as a whole. This contrasts to some urban areas where too many deer may be considered a hazard on the roads and a nuisance to landowners. These areas are often not open to hunting.

Deer yard quality is determined from field investigations. Deer yard surveys can be used to determine the quality and extent of the conifer cover, the amount of food available and the relative density of the deer population with respect to the carrying capacity of its habitat.

The planning authority must work cooperatively with the Ministry of Natural Resources in setting deer management objectives. If there are numerous complaints about crop depredation or concern about high numbers of deer-motor vehicle accidents, the Ministry can set higher harvest targets to keep numbers down.

### **8.3.2 Moose late winter habitat**

The OMNR is responsible for the management of moose in Ontario. The Ministry conducts aerial moose inventories once every three years for each Wildlife Management Unit having moose populations. The inventories are normally conducted in January and early February. Although the surveys are not conducted specifically in late winter, OMNR staff may be aware of locations of late winter habitats. They should be contacted for information about the relative importance of any late winter moose habitat.

If moose are common in the planning area, the planning authority should be aware there might be late winter moose habitat that has not been identified. This may be of greatest concern when associated with the shorelines of lakes where there may be potential for conflict with cottage development.

It is recommended that the planning authority contact the OMNR to find out the location and importance of any known late winter moose habitat on Crown land within their jurisdiction, particularly those areas of Crown land that are closely associated with private land where there could be potential conflict.

### **8.3.3 Colonial bird nesting sites**

Agencies such as OMNR, Canadian Wildlife Service, and Bird Studies Canada have information on colonial nesting species. Staff at these agencies can be consulted as well as reference texts such as the *Atlas of the Breeding Birds of Ontario* to determine the relative importance of colonial nesting species in a particular planning area. Nesting colonies that are poorly represented should be considered most significant.

Nesting colonies that support rare species and species that are highly sensitive to disturbance should be considered significant. Higher priority should be given to rarity at the larger scale, such provincial rarity, than rarity at the local level.

Often when evaluating and ranking more than one colony, the number of nests in the colony is one important criterion used to compare colonies. This criterion should also consider whether the colony is expanding or declining. A new colony that is expanding may have a greater chance of long-term sustainability, than a colony that is declining.

Historical use of a colonial nesting site can be an important criterion. Colonies with a long history of use are highly significant. The evaluator should also consider new and expanding populations. Some populations may be recovering due to improvements in water quality or habitat. Colonies for some of these species may not have a long history of use, but they are still very important.

In some cases, potential habitats may also be considered for protection, particularly for species with expanding populations or for species that are forced to move periodically (such as herons where the nesting trees fall down).

Some colonial nesting species can be considered a nuisance when their populations get too high. Examples are ring-billed gulls and double-crested cormorants. These birds and their nesting habitats are protected under the *Migratory Birds Convention Act*. The planning authority must decide if the colonies in their jurisdiction require additional protection through the *Planning Act*.



### **8.3.4 Waterfowl stopover and staging areas**

Generally, the most significant areas support the greatest number of birds and/or species in the planning area. The best areas tend to be very large wetlands. These are often associated with lakes, but that is not always the situation. The best wetlands generally have a diversity of vegetation communities interspersed with open water. Many of the marshes along the Great Lake shorelines are particularly valuable as waterfowl migration stopover habitat because they have an excellent mix of deep open water and shallow marsh habitat.

The Canadian Wildlife Service (CWS) is the lead agency for waterfowl management in Canada. They routinely conduct migration surveys in late fall and early winter. CWS staff are knowledgeable of most of the major migration stopover sites. OMNR conservation officers check waterfowl hunters in the fall and are often aware of locally significant staging habitat. These staff may also know if some uncommon species frequently use certain wetlands. OMNR staff is frequently involved in waterfowl management projects, such as projects associated with the Eastern Habitat Joint Venture. OMNR wetland evaluations include the degree of use of the wetland by migrating waterfowl. Staff at these agencies should be contacted for advice on the relative importance of waterfowl migration stopover and staging habitat.

The amount and distribution of staging areas within the planning area may determine the significance of some locally important staging areas. Some planning areas will have very few large wetlands with open water that can be used by staging waterfowl. All of these wetlands may be very important. Other planning areas may have several locally important staging habitats and the planning authority may want to use the criteria in Appendix Q to determine which areas are best.

Appendix G, the wildlife habitat matrices, lists the habitat requirements of migrating waterfowl. Knowledge of waterfowl staging habitat requirements is important when determining which sites are most significant.

The permanency of wetlands should be considered. Some wetlands, such as new beaver floods, may be temporary. Some of these ponds may be very attractive to locally staging waterfowl for a few years, but when beaver leave the pond they may no longer support staging waterfowl. The highest significance should be placed on permanent wetlands and wetlands that have provided habitat for staging waterfowl for many years.

### **8.3.5 Waterfowl nesting habitat**

Marshes and swamps have greater value to nesting waterfowl than bogs and fens because they are more productive and have more permanent open water. However, bogs and fens are important to certain waterfowl species, and should not be ignored as potential

significant waterfowl nesting habitat. Large wetlands and clusters of small wetlands located close to one another usually support greater waterfowl production than single small wetlands.

A number of agencies such as the OMNR, Canadian Wildlife Service, and Ducks Unlimited are very actively involved in waterfowl management in Ontario. Some of these agencies routinely conduct brood surveys in late spring and early summer. OMNR has completed about 2000 wetland evaluations in southern Ontario. Each of these evaluations provides an estimate of the relative value of the wetland for waterfowl nesting. These agencies should be contacted for advice on the relative importance of waterfowl nesting habitat in the planning area.

In 1996, a group of waterfowl experts assembled to develop criteria for determining the significance of waterfowl breeding habitat. Their report is included as Appendix K.

In general, the most significant sites will consistently support large concentrations of nesting waterfowl, species of conservation concern, or a variety of species. All known nesting habitat for ruddy duck, gadwall, northern pintail, green-winged teal, American wigeon, and northern shoveler should be given high priority for protection. These species are uncommon nesters in Ontario. Black duck populations have declined in many parts of North America, in large part due to hybridisation with mallards. In southern Ontario, wetlands supporting black duck nesting should be considered significant. Due to the decline of waterfowl, populations in North America, Canada and the U.S.A. signed the *North American Waterfowl Management Plan*. Considering the continental objectives for waterfowl, sites with high concentrations of more common nesting species, such as mallards and blue-winged teal, should also be considered significant.

A good distribution of nesting habitat should be protected across the planning area. In parts of the planning area where no large highly diverse wetlands remain, some smaller wetlands should be considered significant because they add to the diversity of the planning area.

### **8.3.6 Shorebird migratory stopover sites**

There are a number of sources that can be consulted for information on shorebird stopover habitat (see Appendices A and F). Agencies that have knowledge of important shorebird stopover habitat include OMNR, Canadian Wildlife Service, Bird Studies Canada, and The Federation of Ontario Naturalists. Staff with these agencies and other information sources should be consulted to determine the relative importance of shorebird habitat in the planning area.

The Great Lakes shorelines provide some of the best habitat for migrating shorebirds. Many of these sites have been used for many years and should be considered significant.

High quality shorebird stopover habitat is often in short supply. If a site is lost, birds have no alternate habitats to use or may be forced to use inferior sites which results in increased mortality and subsequent population declines.

Most significant shorebird stopover habitats have a long history of use. Many local birdwatchers will be knowledgeable of these areas.

If there is little information about shorebird stopover sites for a planning area, an examination of aerial photographs and topographic maps will be helpful in determining the relative importance of a site.

Natural, permanent sites are generally more significant than artificial sites such as sewage lagoons or temporarily flooded or exposed areas such as mudflats. An exception would be where natural sites do not exist in the planning area and the only sites available are artificial.

The level of threat to a site should also be considered during evaluation. This is particularly important when considering the Lake Ontario and Lake Erie shorelines. Large portions of these shorelines have been developed, especially near large urban areas. Those sites that remain are extremely important and should be considered significant.

### **8.3.7 Landbird migratory stopover areas**

There are a number of information sources on migrating landbirds (see Appendix F). There are also a number of agencies involved in the protection and management of landbirds. These include Canadian Wildlife Service, Bird Studies Canada, Federation of Ontario Naturalists, and the Ontario Ministry of Natural Resources. The sources and staff from these agencies should be consulted for information on the relative importance of stopover sites in a planning area.

Many significant landbird stopover sites are located within 2 to 10 km of Great Lake shorelines because migrating birds follow these shorelines moving to narrow crossing points to continue their migration. The Niagara Escarpment forms a natural corridor for migrating birds from Niagara Falls to the Bruce Peninsula and onto Manitoulin Island and northern Ontario. Sites with a high diversity of habitat types are best.

Sites that consistently support high numbers of birds, as well as a high diversity of species, including rare species, should be considered significant. Many of these sites will have a long history of use. This type of information can be obtained from local birdwatchers.

### **8.3.8 Raptor wintering areas**

Many raptor wintering areas are used year after year. Few agencies actually monitor these habitats and they will have little information on the relative importance of a particular site. It is important to ensure there is good representation of this habitat in the planning area. Often local naturalists will be aware of sites that consistently attract raptors. Site visits in winter may be necessary to confirm that an area is used by wintering raptors. If a Christmas bird count is conducted in the area, the coordinator of the count should be contacted to find out where raptor concentrations occur.

Raptors frequently hunt over large areas and, as winter progresses, prey populations decline. Therefore, it is important to protect sites that are large enough to support wintering raptors for the entire winter. The best sites should be at least 25 to 30 ha in size.

Sites that consistently support large numbers of birds should be considered significant. The presence of large numbers of birds throughout the winter is a good indication that there are abundant prey populations and there is the right mix of food and cover.

The landuse of a site should be noted. Sites that are most likely to remain unchanged for several years are preferred. Cattle pastures often remain unchanged for many years, whereas hay fields can be cultivated and different crops planted that make the site unsuitable. Sites that are least disturbed are preferred and sites that are part of a rural landscape are preferred to those surrounded by urban development.

### **8.3.9 Wild turkey wintering areas**

The OMNR has responsibility for wild turkey management in Ontario. Staff from the OMNR should be contacted for advice on the relative importance of wild turkey winter roosting habitats to the local planning area. Sites that consistently support large numbers of birds are most significant.

The amount of potential roosting cover is an important consideration when determining significance. In some parts of a planning area, conifer cover may be in short supply. It is common in these situations for the birds to move a considerable distance from their daily feeding area to their nighttime roosting cover. These roosting sites are very important and should be protected. Areas of potential roosting cover can be identified on aerial photographs and these can be compared to the distribution maps from the local OMNR.

At times, turkeys will roost close to houses and people. These birds are susceptible to disturbance. Activities such as snowmobiling and free-running dogs can prevent turkeys from using a suitable area. Greatest significance should be assigned to the least disturbed sites.

### **8.3.10 Turkey vulture summer roosting areas**

These habitats are not easy to identify. Large numbers of birds may not be observed using a roosting site every day. Often birds can be observed in the daytime soaring in search of food. They range over broad areas, often returning to their roosts at night. Any sites where roosting birds have been reported should be checked to note the characteristics of the site. Suitable known sites will likely be poorly represented in the planning area and should be considered significant. Sites that consistently support the largest numbers of roosting birds and are exposed to the least amount of disturbance are most significant.

### **8.3.11 Reptile hibernacula**

All sites of locally rare or uncommon species should be considered significant. There should also be representation of sites for more common species, such as the garter snake. This species uses habitats with a good mix of open grassy habitat mixed with forest stands. This type of habitat is also used by many other species.

The most common situation will be where certain species are known to exist in the planning area, but hibernacula have not been located. These species are very important to the biological diversity of a planning area. Areas of suitable habitat for these species should be identified and representative examples should be protected. Areas of suitable habitat can be identified by referring to Appendix G and reference texts. Areas with the greatest potential for having hibernacula should be identified and subsequent investigations can focus on these areas.

The criteria listed in Appendix Q (Table Q-1) can be used to evaluate reptile hibernacula. Areas of suitable habitat should be examined using different criteria. For example, the highest significance should be assigned to:

- sites that are known to have populations of snake or turtle species that concentrate in winter
- the largest areas containing suitable habitat. These are most likely to contain critical features such as hibernacula.
- sites containing the greatest diversity of habitat types
- the least disturbed areas, as they have the greatest probability of maintaining snake or turtle populations. Many snakes and turtles are killed on roads, especially in spring and fall when they are attracted to warm asphalt or are moving to nesting areas. Also, many people do not like snakes and will destroy them.

### **8.3.12 Bat hibernacula**

All known sites should be considered significant. Potential habitats can be identified from geological maps and from the Ministry of Northern Development and Mines. Individuals who explore caves recreationally are known as spelunkers. They commonly map caves

and note their characteristics. Information about the size of the cave opening, depth of the cave, presence of water in the cave, winter air temperature and humidity, and evidence of any bat use would be helpful in determining the potential of the cave to supply winter hibernation habitat. Potential sites should be investigated by someone knowledgeable of bats who would know where to look and what species they might encounter. Bats should not be disturbed in winter and that is another reason why someone with expertise should conduct any investigations. University researchers may know of potential habitats that can be investigated.

Appendix Q (Table Q-1) lists criteria for evaluating identified bat hibernacula. Potential habitats such as caves, if they are found in the planning area, should be considered significant. These habitats are uncommon in Ontario and they provide a unique habitat, not only for bats, but other species as well.

### **8.3.13 Bullfrog concentration areas**

The OMNR has responsibility for managing bullfrog populations in Ontario. They have knowledge of local populations and distribution of the species. Staff at the OMNR should be consulted for advice on the relative importance of bullfrog concentration areas in the planning area.

The planning authority should ensure there is good representation of this habitat in the planning area. The criteria listed in Appendix Q (Table Q-1) can be used to evaluate bullfrog concentration habitats.

Greatest significance should be assigned to sites that consistently support the highest number of bullfrogs. Bullfrogs are very vocal and easy to observe. Surveys should be conducted in mid-May to late June, when they are concentrated and males are in full chorus. Field investigations should include information on the relative abundance of bullfrogs; a description of the habitat, including size, vegetation species and shoreline cover; adjacent land uses and any other potential concerns, such as water-level fluctuations.

In areas where bullfrogs have declined and there is potential for population recovery, even small concentrations of bullfrogs may be considered significant. This is especially the case in planning areas where there is poor representation of bullfrogs and bullfrog habitat. Sites supporting low densities of bullfrogs may be significant if they are near the limits of the species' range.

### **8.3.14 Migratory butterfly stopover areas**

Agencies such as Agriculture Canada (Ottawa) and the Federation of Ontario Naturalists monitor some populations of butterflies and have a particular interest in monarch

butterflies. Also individuals devote considerable time tracking monarch butterflies each fall and spring. Staff at the above agencies, as well as Ontario Parks staff at provincial parks along the shorelines of lakes Erie, Ontario and Huron can be consulted for advice on the relative importance of identified butterfly stopover areas. They may be able to offer advice on the historical use of sites and on the relative numbers of butterflies using sites.

The criteria listed in Appendix Q (Table Q-1) can be used to evaluate identified butterfly stopover habitats. Large sites are usually most significant because they contain the greatest diversity of plant species.

#### **8.4 Evaluation of rare vegetation communities**

All provincially rare vegetation communities (S1 to S3 ranking) as described by Bakowsky (1996) in the planning area should be considered significant. The precise locations of many of them are known and the planning authority should contact the OMNR ecologist for more specific information. See Appendix J for a list of the provincially rare vegetation communities and Appendix M for some of their locations.

Table Q-2 in Appendix Q lists criteria that could be used to evaluate potentially rare vegetation communities. One of the most important criteria is current representation of the community in the planning area based on its area relative to the total landscape or the number of examples of it within the planning area.

Geomatics International Inc. (1991) used the criterion of five or fewer documented locations of a community type within Halton Region to define remnant habitat. Brownell and Larson (1995) prepared a preliminary list of regionally rare communities found in the Region of Ottawa-Carleton based on the area of each community; each of these communities represented less than one percent of the remaining natural area of the municipality. In addition, the OMNR has recommended that any forest cover type comprising less than five percent of the forest group to which it belongs (deciduous, coniferous, mixed) should be considered uncommon and significant. The Nature Conservancy in the United States considers vegetation communities rare if they represent less than three percent of the remaining natural area in the planning area and/or are found in five or fewer locations.

In addition to the criteria of rarity and representation, other criteria such as the rate of loss or degradation of a specific community and its value to wildlife might also be used to evaluate its level of significance. For example, in many areas, riparian areas that not only support rare vegetation communities, but often other significant wildlife habitats, are disappearing because of shoreline development along some lakes and rivers. Early successional fields that support rare vegetation communities and provide important

nesting habitat for several species of birds are being lost to development or natural succession. Recognition of these important sites, followed by their protection, will safeguard many species.

#### **Key information to know**

- significant sites identified by local naturalists, Federation of Ontario Naturalists, Agriculture Canada (Ottawa)
- current representation of the rare community in the planning area
- presence of species of conservation concern
- presence of other significant wildlife habitats
- level of disturbance in the community (least disturbed sites often are of higher quality and contain more species of conservation concern)
- age of woodland (mature woodlots often contain more species of conservation concern than younger woodlots)
- level of threat to community

#### **Additional information**

- size of the site and amount and distribution of suitable habitat
- quality of the vegetation community (level of disturbance from human activities such as off-road vehicle use; number of non-native, invasive plant species; agriculture, cattle grazing)
- species diversity and abundance

### **8.5 Evaluation of specialised habitats for wildlife**

Many species have special habitat requirements. Some species have specific requirements for the size of the habitat patch they need. For others, the critical element is the amount of total suitable habitat in the general area that is required to make it suitable for them. Specialised habitats can also refer to special habitat structure, such as cavities for nesting or rotting logs that provide a source of food. It can also refer to unique habitats that provide specialised conditions, such as springs and seepage areas.

Evaluation of some of these habitats is difficult. Many may not have been identified and, in some cases, the planning authority may have to choose the most significant habitats from a number of potential habitats that have been identified in Chapter 5. Table Q-2 in Appendix Q lists criteria that can be used to evaluate specialised habitats. The criteria in Table Q-2 are not prioritised, although it is suggested that the “current representation in the planning area” is probably the most important criterion. The planning authority may choose to prioritise the criteria in Table Q-2 according to needs and priorities for their planning area.

It should be noted that there is overlap between some specialised habitats. For example, old growth or mature forests may also contain interior habitat for area-sensitive species,



areas of high diversity, and seeps and springs. Each of the habitat types is discussed and evaluation criteria provided in Table Q-2 because they are not necessarily found in the same sites and it is important to understand the diversity of ecological functions that a site may possess. Chapter 5 summarises the ecological characteristics of specialised habitats for wildlife.

### **8.5.1 Sites supporting area-sensitive species**

Generally the planning authority can best protect local populations by protecting the largest, unfragmented forests, the largest grasslands (which may include unimproved pasture or early succession fields) and the largest wetlands. In some planning areas, the largest sites that remain may not meet the area requirements of all the area-sensitive species that could potentially use this type of habitat. However, it is still important to protect the best of what remains. These habitats will be used by some species and by protecting them, there may be opportunities to improve these habitats.

The planning authority should have an idea of the structure and composition of the habitat. This can be determined from aerial photograph interpretation and FRI maps for forest stands. Natural forest stands containing a diversity of forest tree species and structure would be more significant than the same sized forest stand composed of a single species.

A number of agencies are actively involved in the monitoring and protection of area-sensitive species especially birds. These include the Canadian Wildlife Service, Ontario Ministry of Natural Resources, Bird Studies Canada, and the Federation of Ontario Naturalists. The information sources listed in Appendix F and the staff at the above agencies should be contacted for advice on the relative importance of habitats, both in the context of the planning area and the greater landscape.

Habitat shape is also an important consideration when determining the significance of a potential habitat. Habitat shapes that maximise the amount of interior habitat, such as circular or square shapes are best.

Some species require larger blocks of habitat than others (see Appendices C and G). Greatest significance should be assigned to those habitats that support species with the largest habitat requirements or that support species of conservation concern (Section 8.6).

**Minimum habitat thresholds** apply to species that require a minimum amount of suitable habitat within the general landscape before they will use that habitat, although their territorial requirements may be much smaller. In order to address minimum habitat thresholds, a landscape approach must be applied. A specific amount of habitat must be protected. This has been addressed somewhat by the recommendations in this guide to maintain good representation of all habitat types in the planning area.

### **8.5.2 Forest stands providing a diversity of habitats**

The most significant stands contain a diversity of features, such as tree cavities, fallen logs, abundant forest structure (in terms of topography as well as species composition and age structure of the forest stand), soil moisture conditions, and food plants for wildlife. Table Q-2 in Appendix Q lists criteria that can be used to evaluate forest stands that provide a diversity of habitats. Following are some general considerations:

- Large, older, undisturbed forest stands provide the most significant habitat. The size of stands can be determined from aerial photographs, topographic maps, and satellite imagery maps. Stand ages and composition can be obtained FRI maps.
- OMNR and conservation authority staff may be knowledgeable of the forest stands in the planning area and may be contacted for advice on the relative importance of stands. It should be stressed that this significance determination is based on the stand's diversity of wildlife habitats and not necessarily on its timber production value. OMNR staff may also be aware of the management history of the stand.
- Stands containing species of conservation concern and a large number of cavity-dependent species (see Appendix G) should be considered significant.
- Stands that contain other specialised habitats for wildlife should also be considered significant. Examples include the presence of candidate old growth stands and the presence of springs and seepage areas. Stands with a variety of vegetation communities of different age classes will support a high diversity of wildlife species.

### **8.5.3 Old growth or mature forest stands**

Since true old growth forest stands in southern Ontario are very rare, the maturest stands in the planning area should be considered most significant. The best stands are those that exhibit the greatest number of old growth characteristics. These stands can be identified by consulting OMNR forestry staff and using FRI maps. Candidate sites should be checked in the field and characteristics of the stand noted. OMNR staff may be able to provide information on management history.

Greatest significance should be placed on the least disturbed forest stands. The closed canopy and moist growing conditions allow some very sensitive species to grow and these are vulnerable to trampling.

Stands that provide habitat for species of conservation concern should be considered significant.

#### **8.5.4 Seeps and springs**

Agencies such as the OMNR, conservation authorities and the Ontario Ministry of Environment (OMOE) may be aware of areas with seeps and springs, particularly those associated with the headwaters of cold water streams and wetlands. No specific ranking system exists for these features. However, staff with these agencies may be contacted for advice about the relative importance of seeps and springs and their value for maintaining cold water habitat for fish. This is also an important consideration.

Planning authorities should ensure they protect a good representation of this type of habitat.

Seeps and springs that are part of a forest or some other natural vegetation community should be assigned greater significance than those that are isolated or in disturbed habitats. Those that are important to other natural heritage resources, such as fish habitat, should be considered significant.

It may be necessary to conduct field investigations of identified seeps and springs. Wildlife species at these sites can be recorded as well as the characteristics. Appendix G provides a list of wildlife species known to use seeps and springs. The permanency of these features can be determined by checking them in the summer. Some dry up in summer and others maintain a moist environment throughout the year. Greatest significance should be assigned to sites that support species of conservation concern and to sites that provide year-round moist conditions.

#### **8.5.5 Woodlands supporting amphibian breeding ponds**

It is unlikely the planning authority will find an expert to provide advice about which woodland ponds are most significant. There may be naturalists in your area that are knowledgeable about amphibians. These people should be contacted for information on species occurrence and abundance. The primary consideration is to ensure there is good representation of this type of habitat in the planning area. Generally, the most significant sites will be associated with large woodlands associated with some type of riparian habitat.

It may be necessary to conduct field investigations in spring, when species using the ponds can be identified. The characteristics of the ponds should also be recorded. This would include such information as a description of the forest stand in which the pond is located (species, size, abundance of rotting logs on the forest floor, etc.), diversity of vegetation in the pond, shoreline vegetation, water quality, and degree of disturbance. The permanency of ponds may also be a consideration. The greatest significance would be assigned to ponds that support a high diversity of species, species of conservation concern, and high numbers of amphibians.

### **8.5.6 Special woodland feeding habitat**

Most special woodland feeding habitats will not be identified and ranked. OMNR forestry staff may be aware of some particularly valuable stands and may be consulted. Some stands may be identified on FRI maps. The planning authority should ensure there is good representation of this type of habitat in the planning area. Large forest stands containing a diversity of mast producing trees would generally be most significant.

Any forest stands that are used consistently year after year should be assigned a higher level of significance. In many cases, this will not be known. The exception is some areas of black bear range, where evidence of bear use, especially in stands of beech trees, is obvious.

It may be necessary to investigate some sites in the field. Field investigations should collect information of the species and age of the trees (vigorous, full-crowned trees are the best producers). Field investigators should also record any signs of use by wildlife.

### **8.5.7 Osprey nesting habitat**

Ospreys may be considered a species of conservation concern (see Sections 6.0 and 8.7). Ospreys are often considered an indicator of good water quality. It is recommended that all known Osprey nests be considered significant.

Nesting records that are not recent should be verified in the field. Sometimes nest trees fall down and the birds use another site close by. It is common for new nesting pairs to nest in the same general area.

In areas where Osprey populations are expanding, some potential habitat should be identified and protected. Sites with the greatest potential are undisturbed shorelines, with large trees close to productive shallow water feeding areas.

### **8.5.8 Turtle nesting habitat**

Few turtle nesting sites have been identified. It is common to see turtles along roadsides attempting to lay eggs in the gravel shoulders of the roads. Obviously, these are not preferred sites. There is considerable risk to females and young as they cross roads. Turtle eggs suffer high mortality due to predation by raccoon and skunk. In some areas, virtually all eggs are lost each year. This problem becomes worse as turtles are forced to concentrate in fewer and fewer sites. Greatest significance should be assigned to sites that are natural, least disturbed and are closest to their habitat. The most significant sites should have safe movement corridors between the nesting and aquatic habitat.

The most significant sites will be those that are used by species of conservation concern and that consistently support the most nesting turtles. To ensure good representation of turtle nesting habitat, some potential habitats should be protected, even if it is not known to what extent they are used.

### **8.5.9 Special moose habitats—aquatic feeding areas, calving sites and mineral licks**

Table Q-2 in Appendix Q lists criteria that can be used to evaluate moose aquatic feeding areas.

The OMNR may be aware of some of these special habitats, especially moose aquatic feeding habitats. They should be consulted for advice on the relative importance of any of these identified special habitats to the planning area. Very few calving sites and mineral licks have been identified. Therefore, any identified sites should be considered significant. The least disturbed aquatic habitats are most significant.

Movement corridors to these special habitats should be identified and protected. Moose are strongly attracted to aquatic feeding areas and mineral licks. New roads constructed near these sites may result in increased mortality to moose and a high risk to people.

Habitat adjacent to any special moose habitats should be identified and described. For example, the loss of the conifer resting cover adjacent to an aquatic feeding area may make it useless for moose.

### **8.5.10 Mink and otter feeding/denning sites; marten and fisher denning sites**

Few of these specialised habitats have been identified. First, it is necessary to know which species occur in the planning area. Then, the planning authority should ensure it identifies and protects a good representation of suitable habitat for those species. This is an example of where a landscape approach to planning would be best. If these species are present in the planning area and large blocks of suitable habitat are represented in the Natural Heritage System, there is a good probability these species will continue to survive.

Natural shoreline habitat should be protected for mink and otter. High quality aquatic habitats are required that produce an abundance of fish, crustaceans and insects. Natural, undisturbed habitats are best.

Large, unfragmented blocks of forest are preferred by marten and fisher. Many of these forest stands will have a number of other values as well, such as interior forest habitat.

Sites that are the most natural and have the least amount of disturbance are the most significant.

### **8.5.11 Areas of high diversity**

Often the most highly diverse sites contain several different vegetation communities and numerous microhabitats. Large, natural sites have a greater likelihood of having more diversity, although this is not always the case. Disturbed sites often have less vegetative structure, sensitive species are frequently missing, and non-native species can reduce the diversity of natural species.

A higher level of significance should be assigned to sites that contain rare species or vegetation communities.

Some potential sites may have been identified from existing reports or from input from local naturalists. It may be necessary to conduct field investigations to verify and update information. This information can be used when applying the evaluation criteria listed in Table Q-2 in Appendix Q. During field investigations information should be collected on species occurrence, vegetation community identification, soils and topography.

### **8.5.12 Cliffs and caves**

Many planning areas do not have cliff or cave habitat. In areas where cliffs have been identified, the planning authority should ensure there is good representation of this habitat.

Greatest significance should be assigned to cliffs that provide habitat for rare species or rare vegetation communities. It may be necessary to conduct field investigations to verify or update information. Information should be recorded on species occurrence and vegetation communities. Physical characteristics of the cliff should also be recorded. This would include height, bedrock type, surrounding landuse, potential for human disturbance, etc. Cliffs that support other significant habitats or functions should be considered significant. Examples include nesting habitat for birds, roosts for turkey vultures, or talus slopes.

Any caves that provide winter habitat for bats should be considered significant. These habitats are rare and any sites are very important.

## **8.6 Evaluation of habitat of species of conservation concern**

Section 6.1 defines species of conservation concern and Section 6.3 describes what species should be considered and an approach that could be used to identify their habitats.

Refer to Table Q-3 in Appendix Q for criteria and guidelines for the evaluation of these habitats, and Appendix G for critical habitat requirements of many of these species.

Many habitats for these species will be under-represented within the planning area and therefore should be considered significant. Habitats that support large populations of a species of concern should be considered significant.

**Key information to know**

- current representation of habitat/species in the planning area
- critical habitat requirements
- member of a species group/guild
- location of habitat (in seasonal concentration area or rare or specialised habitat)
- size of population

**Additional information**

- sensitivity of species to specific environmental conditions, disturbance
- habitat quality

## **8.7 Evaluation of animal movement corridors**

In general, the evaluation of the significance of animal movement corridors is based on an assessment of physical characteristics of a corridor:

- length
- width
- continuity
- habitat structure and type of corridor
- condition of corridor
- distance between the natural areas that the corridor connects
- actual or potential use of the corridor by wildlife
- whether the corridor meets the basic needs of the target species or group of species that reputedly use it

Several criteria and guidelines that can be used to evaluate animal movement corridors are outlined in Table Q-4 in Appendix Q.

Intuition and/or professional judgement, is often required to evaluate animal movement corridors because knowledge about their actual effectiveness and use by wildlife is limited. Also, animal movements may occur quickly, often under certain weather conditions, or at night. However, sometimes their importance can be accurately inferred from existing information. For example, if a rare species of salamander is known to occur in a forested area and there is only one pond near the forest where females can lay their eggs, it is a safe assumption that salamanders use the corridor between the pond and the forested area.

Animal movement corridors must be evaluated within the context of the local landscape; therefore, the local characteristics of the landscape must be considered. In municipalities with little remaining forest cover, relatively narrow and somewhat fragmented hedgerows or small streams with some riparian vegetation may be considered significant. In natural regions, significant animal movement corridors should be of higher quality and provide wider, unfragmented links to important natural areas.

Significant corridors will usually be wider (the wider it is, the fewer edge effects will occur), without roads (to provide safer movement), and structurally and compositionally diverse. Often they will be part of a known wildlife migratory route (deer movement from their winter yard to summer range). Sometimes, significant corridors will link two or more important natural areas within or outside the planning area. In densely populated parts of Ontario, significant corridors may be among the few remaining natural areas. Fence and hedgerows should not be considered significant unless they provide the only animal movement corridors in the planning area.

#### **Key information to know**

- location of important natural areas (forest, undisturbed grassland patches, wetlands)
- location of remnant and disjunct habitats
- location of seasonal concentration habitats and presumed home range habitat for target species
- relative location of roads and potential corridors
- list of species that are dependent on corridors (see wildlife habitat matrices in Appendix G)
- possible hazards facing wildlife moving in potential corridors
- provision of other important wildlife habitats
- presence of species of conservation concern

#### **Additional information**

- description of important corridor characteristics (vegetation structure and composition, approximate width and length, presence of roads across or in corridor, degree of fragmentation and size of gaps in the corridor)
- description of adjacent land uses
- level of human disturbance in and adjacent to the potential corridor
- evidence of use by wildlife
- diversity and abundance of species using the corridor



## 9 Ranking Significant Wildlife Habitat

Ranking habitats is only necessary when several examples of the same type of habitat have been identified and there is a need to assign relative levels of conservation significance to them. Those receiving the highest ranking represent the best examples of the habitat in the planning area and probably address significant wildlife habitat at several levels. Often these habitats will have conservation significance at the larger regional scale.

In many cases, ranking will be unnecessary. For example, all poorly or under-represented habitats, habitats of provincially or regionally rare species of conservation concern, and habitats of obvious importance to many wildlife species might automatically be considered highly significant.

### 9.1 An evaluation of three ranking methods

Three commonly-used comparative evaluation methods that could be used to rank significant wildlife habitats are described and compared below, based on a review of multiple criteria evaluation systems by Smith and Theberge (1987).

#### 1. Minimum standards

The minimum standards evaluation method is useful when criteria are measured on different scales and when different criteria are not comparable, as is the case in evaluating numerous natural areas for several ecological criteria. This method ranks candidate sites based on whether they meet an acceptable minimum standard for at least a few criterion. Therefore, if the minimum standard for species diversity is 20 percent more recorded species than the average for all candidate sites, then all of the candidate sites in Table 9.1 might be considered “significant”, as indicated by the “√”. The minimum standards evaluation method does not overlook sites that are outstanding in one criterion as compared to another evaluation method called additive weighting, where the summed score for candidate sites that have “average” scores for all criteria may be higher.

**Table 9-1. Minimum standards evaluation method example.**

Candidate Site	Diversity	Rarity	Productivity
Site A	0	0	0
Site B	0		
Site C	0	0	

The minimum standards evaluation method is more ecologically and mathematically valid than the other two evaluation methods discussed in this section. For many reasons, the aggregation of criteria measurements into one index (as with the additive weighting and ranking evaluation methods) obscures the complexity of the evaluation process. Aggregating criteria ignores relationships among ecological criteria. Also, not all criteria are applicable to every kind of natural area. For example, rarity may be more applicable to smaller areas while diversity may be more applicable to larger areas.

Evaluators will also find that the minimum standards method is the simplest to explain to non-specialists in government, industry, and the public. Using the minimum standards evaluation method will enhance understanding of why a natural area has been determined significant. For example, a particular woodland may be significant because it meets the minimum size criterion and it is believed that larger woodlands support area-sensitive bird species, are less sensitive to invasion by exotic species, and more likely to have associated woodland ecosystem functions and processes intact.

## 2. Additive weighting

Using the additive weighting evaluation method, candidate sites are scored for several criteria. The criteria may also be weighted in some manner to reflect their relative importance. Scores for each criterion are first multiplied by the weighting for that criterion and then summed for all the criteria to obtain an overall index for each candidate site. This index is used to determine the comparative value of two or more candidate sites.

Scores must therefore be numerical and comparable among criteria. Criteria must be measured using an interval or ratio scale and in comparable units so that a drop in one criterion can be offset by an increase in another. For example, the two hypothetical candidate sites in Table 9.2 have equivalent ecological value.

**Table 9-2. Additive weighting evaluation method example.**

Candidate Site	Rarity Value	Productivity Value	Recreation Value	Sum
Site A	0	3	0	3
Site B	0	3	0	3
Site C	1	1	1	3

Although this evaluation system is simple, it makes a number of false assumptions. For example, it assumes that criteria are independent of each other when in fact ecological

data are highly correlated (e.g., size is positively correlated with diversity [Domon and Bergeron 1987]). The criteria must also be weighted using some reasonable basis for determining the relative importance of each criterion. Weights are often subjective and vary widely. The additive weighting evaluation method may result in the identification of average sites as significant while sites that are outstanding in one criterion are classified as not significant.

### 3. Ranking

The ranking evaluation method is similar to additive weighting except that each candidate site is ranked for each criterion. For example, three candidate sites may be ranked 1, 2, 3 for rarity and 2, 1, 3 for diversity. The criteria are also ranked (e.g., rarity = 1 and diversity = 2, see Table 9.3). Each candidate site's rank for each criterion is then multiplied by the criterion's rank, all these values are summed for each site, and the sums are used to rank the sites.

**Table 9-3. Ranking evaluation method example.**

Candidate Site	Rarity x 1	Diversity x 2	Sum
Site A	1 x 1 = 1	2 x 2 = 4	5
Site B	2 x 1 = 2	1 x 2 = 2	4
Site C	3 x 1 = 3	3 x 2 = 6	9

The ranking evaluation method assumes that each candidate site can be ranked for each criterion (a difficulty if there are many candidate sites), the criteria can be ranked (based on some reasonable basis for relative importance), and the criteria are independent. Moreover, the sums or total scores obtained are the result of mathematically non-permissible numerical operations on ordinal numbers (i.e., the evaluator subjectively ranks each candidate site for each criterion, the criteria are also ranked, and then the two ranks are multiplied).

With this evaluation system, there may be considerable uncertainty in field measurements, variation among people in assigning scores and in the weights given to different criteria, as well as fuzziness in the definitions of the criteria. This is an important consideration for evaluators who want to have a high degree of confidence in the derived scores or ranks in order to defend them and base official plan designations on their accuracy. A Conservation Advisory Committee can help establish criteria and ranking.

## **9.2 Recommended method for ranking similar habitats**

Planning authorities are advised to use the minimum standards evaluation method whenever possible because it provides one of the simplest and most ecologically sound approaches to ranking significant wildlife habitats. Numerous examples of evaluation criteria that can be used with it are listed in the tables in Appendix Q and in Table 8-1. However, only a few key criteria will need to be used to evaluate most candidate sites. These are listed for selected habitats, in Appendix Q. The majority of them are recommended for initial ranking of similar habitats because they can be deduced from available information (maps, aerial photographs, site reports, expert opinion). The effective use of other criteria frequently requires extensive knowledge of each site and/or field investigation.

### **9.2.1 Importance of representation of habitats**

When designing a Natural Heritage System, the most important criterion is “current representation of habitat within the planning area.” If identification of wildlife habitats is conducted in a thorough manner, the application of this criterion to the evaluation of these sites will ensure that the full range of wildlife habitats existing within the planning area is included within the Natural Heritage System.

This criterion has other advantages. It applies to most habitats within the four significant wildlife habitat categories and it is easy to use. Usually, evaluators only need to know the number of examples of a specific habitat in order to determine its conservation significance (all under-represented habitats would be considered very important and worthy of some form of protection, regardless of their ranking according to other criteria). Furthermore, field investigations are less likely to be required when this criterion is used.

### **9.2.2 Establishing minimum standards for representation**

It is suggested that whenever habitats appear to be under-represented according to the established minimum number of examples required for adequate representation of the habitat within the planning area, all existing examples should be ranked highly. For many of them, there will be no need to apply additional evaluation criteria.

To ensure adequate representation of habitats within the planning area, two or three examples of a specific habitat, depending on the habitat type, are suggested as minimum standards for the criterion of current representation. This does not mean that more of these habitats cannot be protected but, as a very minimum, the number identified as a standard should be protected. Generally, habitats for species of conservation concern, species sensitive to human activities and disturbances, and rare vegetation communities should automatically be considered highly significant if they are found at three or fewer

locations. If there are more than three examples, then other criteria, in addition to ‘current representation’ should be used to rank them.

For most habitats of more common or less sensitive species (e.g., white-tailed deer) the value of two examples is presented as a reasonable minimum standard for current representation. It must be stressed that this is a minimum standard; i.e. if there are one or two deer yards, they would be significant based on representation; additional deer yards may be significant based on other criteria. Protection of only one habitat example may not provide enough long-term protection for many species. This is particularly true for species of small habitats, isolated habitats, and habitats located near or in developed or settled parts of the planning area. A possible exception to this approach concerns very extensive habitats. For example, a single, large site may be resilient enough to provide significant habitat for a variety of wildlife species for many years.

### **9.2.3 Minimum standards of other selected evaluation criteria**

The choice of minimum standards for evaluation of some criteria is subjective and can be difficult. For example, how many species should be present on a site in order for it to be recognised as significant because of diversity? What should be the minimum size of a site, to be considered significant? How rare would a habitat or species have to be before it was considered significant? The answers to these questions and others will vary across the province depending on the quality and amount of habitat remaining in different planning areas, as well as the knowledge and aims of the evaluators.

The minimum standards in Appendix Q are presented as guidelines. Planning authorities electing to use values other than those provided are urged to develop minimum standards that do not unnecessarily preclude potentially significant sites from consideration. For example, if an objective of the Natural Heritage System were to protect habitat for area-sensitive birds, a minimum standard of 10 ha of forest interior would eliminate smaller sites from consideration, a potentially serious problem in many parts of southern Ontario where forest cover is limited and heavily fragmented. A minimum standard of 4 ha might result in several sites being considered significant or at least being further assessed using other criteria. The use of more generous or inclusive minimum standards represents a more cautious approach to Natural Heritage System planning and design. Since little is known about the specific habitat requirements of many species and because unforeseen future events can destroy or seriously degrade habitats, it seems reasonable to protect more wildlife habitat whenever possible.

Highest conservation significance might be assigned to habitats meeting the greatest number of minimum standards for the evaluation criteria, although any habitat meeting the minimum standards for only one criterion should be considered sufficiently

significant to merit some form of protection. No candidate habitats should be considered significant unless they meet a certain minimum standard.

#### **9.2.4 Avoiding numerical values for some minimum standards**

There are several reasons why, for some criteria, the use of absolute numerical values for minimum standards has been avoided (e.g., size or numbers of animals occupying a habitat). It is very difficult to develop specific and yet comprehensive minimum standards that can be applied to different landscapes across the province with varying amounts and quality of habitat. What may be considered significant in one area may not be in another. It is hard to assign minimum standards to certain criteria (e.g., level of disturbance, degree of threat, location of habitat). Often these minimum standards are either unknown or poorly understood. For example, spatial area is considered an important criterion when assessing the conservation value of forest stands to area-sensitive bird species. Although most biologists believe that larger, contiguous forests have greater value to these species than smaller patches, they are still learning about the minimum areas required to support local populations and to maintain long-term population viability. A suggested minimum area of 50 ha (a commonly-cited value) could be criticised by some people as being too large or too small. More important, if a forest stand has to be at least 50 ha to be considered significant as habitat for area-sensitive bird species, planning areas with only smaller stands remaining could decide that there is no significant forest habitat for these species in their jurisdiction. However, these smaller patches of forest may have value to some of these birds, as well as local wildlife.

For these reasons, suggested minimum standards for some criteria (e.g., size, diversity) are based on comparisons made between similar habitats. If five sites are to be ranked for diversity, rough estimates of plant and animal diversity for each site can be calculated based on reports about the sites and/or informed opinions from knowledgeable people. A mean diversity value for all five sites can also be easily determined. As a minimum standard for diversity, the diversity of a single site would have to exceed the mean diversity value for all five sites by at least 20 percent.

#### **9.2.5 Explanation of the tables in Appendix Q**

The tables in Appendix Q list important evaluation criteria for seasonal concentration habitats, rare vegetation communities or specialised wildlife habitats, and habitats of species of conservation concern that have been discussed in this guide. By definition, many species of conservation concern are rare, declining, or have a large proportion of their global population in Ontario and urgently need some protection. The criteria in Table Q-3 were selected because they are closely tied to the definition of these species and minimum standards for them are more easily derived than for some criteria (e.g.,

abundance, location of habitat, degree of threat or decline of habitat, ability of habitat to meet species' requirements).

As mentioned earlier, other criteria can be used and the suggested minimum standards are only guidelines. In addition, not all criteria listed in these tables for each habitat need to be used, especially when there are only a few habitats to be ranked. Having several criteria to choose from for each habitat can prove helpful where information for some criteria is unavailable, out-dated, or incomplete. For example, if planning authority staff do not have accurate information about the size of a deer yard or the number of deer it supports, they might rely more on some of the other criteria (current representation, provision of other significant wildlife habitats, provision of suitable habitat or habitat diversity). These criteria are more easily determined from readily available information such as maps, aerial photographs, and from local experts.

Finally, whenever the minimum standard for current representation is met, planning authorities are advised to use at least three evaluation criteria. The highest ranked habitats would meet the minimum standards of the largest number of criteria. Ideally, significant habitats should meet the minimum standards of at least two criteria to reduce the potential for conflict should some people disagree with one of the criteria. There does not need to be a minimum number of habitats that are protected. The number protected should be determined by the number that meet the minimum criteria.

## **10 How Much Habitat to Protect**

After wildlife habitats have been evaluated and ranked to determine the number of habitats to protect, the planning authority may have to decide how much of each individual habitat to protect. When determining specific amounts, the primary guiding principle should be to protect enough habitat to maintain those important functions and conditions of the habitat that enable it to sustain dependent species. For example, a rare plant species might occupy only a few square meters of a forest floor. But in order to adequately protect it, this local population plus some of the surrounding landscape would have to be protected because the adjacent trees help to provide the conditions on which the plants depend (e.g., shade, moisture). A black rat snake hibernaculum is a small (20 square meters or less) but critical component of this species' habitat. However, when the snakes emerge in the spring, they disperse to their summer range, as far as 5 km from the hibernaculum. If a movement corridor and sufficient summer range habitat are not protected, in addition to the hibernaculum, then the snake population will not be sustainable.

Many planning authorities will have situations where they have disparate landscapes within their jurisdiction. This will occur mostly in the south where the landscape is predominantly agricultural or urban, but portions of the planning area may include the Shield, the Niagara Escarpment, or moraines with more extensive natural areas. In addition, some planning authorities may occur in more than one site region. In these instances, it is recommended that different criteria for determining significant wildlife habitat be developed for major physiographic regions and different site regions in the planning area. This avoids having situations where species that are locally at risk in one physiographic area are unprotected, or where onerous conditions for development are imposed because of the presence of an abundant species in a different area.

### **10.1 Difficulties in determining how much habitat to protect**

For several reasons, it is difficult and not always desirable to provide numerical targets for amounts of protected habitats. The specific habitat requirements of many species and the number of individuals of a particular species (each requiring a certain amount of habitat) required to maintain a viable population remains poorly understood. Some individuals within a species show considerable variation in habitat preferences and tolerance to disturbance, even when they are found in the same geographical area.

Often it is difficult to protect sufficient habitat because some species are wide-ranging (e.g. fisher), wandering over many square kilometres; or require several disparate habitats. Habitat quality can influence the amount of required habitat; an animal or population may require a larger area of lower quality habitat to meet its needs. Unfortunately, habitat quality is often hard to assess. In addition, since landscape and



wildlife habitats are dynamic and they change over time, present amounts of protected habitat may prove to be inadequate in future.

Since it is often difficult to place boundaries on some habitats because they are not always clearly defined, it is hard to determine how much to protect. Also the width of what should be considered significant wildlife habitat for the same species or type of habitat can vary, depending on specific site conditions (e.g., hilly topography on one site provides better protection for a species that is sensitive to human intrusion, than a flat, more open site). Frequently the minimum width of a setback required to mitigate negative impacts is unknown because impacts on the habitat are unclear or the species' response to a variety of potential impacts varies or has not been studied.

Designating an exact amount of protected habitat for a species can cause some problems. Some people might assume that once specified amounts of habitat have been protected, remaining land in the planning area should be open to development and other uses that can destroy or degrade wildlife habitats. The protection of small islands of habitats is not very effective in truly protecting these features. This concern has been discussed in Section 2. This could lead to a loss of more important wildlife habitats and accelerate the conversion of natural areas to anthropogenic landscapes.

Furthermore, if a certain habitat exists in a planning area, but is smaller than the recommended minimum size, there is the danger that it could be considered insignificant and then receive no protection at all. However, this habitat may still be important to the species of concern and many other wildlife species. A habitat of this size may have excellent potential for rehabilitation.

## **10.2 Some considerations for determining how much habitat to protect**

The above discussion suggests that assigning specific numerical values is best suited to relatively small habitats with reasonably clear boundaries; sedentary species; and habitats and species that have been quite well studied and for which some guidelines exist. It is also apparent that determination of how much habitat to protect is best conducted site by site based on fieldwork and going through a detailed decision-making process.

For most habitats, it is not possible to give precise amounts that should be protected. However, suggested amounts for selected habitats are listed in Table 10-1 and discussed in Section 10.6. The tables in Appendix Q present some minimum standards that may help to determine the amount of habitat that should be protected.

Three key guidelines should be kept in mind when deciding how much habitat to protect. First, the full range of habitats found in the planning area, should be protected. Second,

protection of several examples of each habitat type is preferable to protection of only one area. This will also provide some insurance against unforeseen habitat losses and potential opportunities for linkage to other similar habitats and colonisation and restoration of them. Third, it is preferable to protect larger blocks of habitat. Larger habitats are more resilient to adverse disturbance, provide better protection against future habitat loss or degradation, can better maintain important ecological processes and their dependent species, and support more species.

The following considerations can be helpful in determining generally how much habitat should be protected.

### **Critical requirements of the species**

The amount of protected habitat depends on the species or group of species that require it. Some species have strict area requirements. Wildlife such as carnivores and birds of prey require much larger habitats than many herbivorous species. In general, it is more challenging to maintain viable populations of these area-sensitive species because more habitat must be set aside for them and the habitat must include all of their critical habitat requirements. However, protection of habitat for these species benefits many other species as well. Fortunately, sites supporting these species can often be managed for both wildlife and human uses.

Some species have small home ranges, but when they must travel outside this area, they require corridors to move safely over the landscape. Often, these are small animals that rely on vegetation cover to survive. For them, protected habitat must include appropriate corridors. Often their habitats and corridors are found within the home ranges of area-sensitive species.

Some species are sensitive to human activities that disrupt the natural landscape. Some are habitat specialists; they have highly specific habitat requirements and cannot tolerate changes. Others have limited ability to move from where they are found (e.g., numerous plants, insects). For these species, habitat protection must not only focus on how much habitat they require, but also on the most critical components of that habitat. Often the habitat for these species is small, but several protected habitats are often needed as a precaution against unforeseen future disturbance that could destroy one or more of them.

### **Habitat characteristics**

The amount of habitat that should be protected depends on the physical and ecological conditions found on the site, as well as its location. The habitats of some species are susceptible to natural changes and disturbance. As a heronry ages, more nest trees fall down. Beach dunes are built up, moved, and eroded. Habitats located on unstable slopes or on flood plains may be short-lived. Rare vegetation communities such as alvars are supported by very shallow soils that are quite easily removed or severely damaged.

Others habitats are found in somewhat more resilient sites (e.g., maple-beech woodlot, old field). In general, habitats that are susceptible to degradation or destruction by natural processes or human activities are in greatest need of protection.

The quality of a habitat can influence how much of it should be protected. High quality habitats (diversity of structure and composition, relatively pristine, free from human disturbance) often support a greater diversity and sometimes abundance of associated wildlife than similar habitats of poorer quality. Consequently, less high quality habitat may have to be protected than similar, but inferior habitat.

Some habitats, such as tall-grass prairie and oak savannah, require disturbance to maintain and/or restore them. Fire, either of natural origin or a prescribed burn, maintains the species composition. In order to allow a disturbance like fire to operate on a natural spatial and temporal scale, larger amounts of these habitats may have to be protected than habitats that are not dependent on widespread disturbance.

Habitats located close to or in residential or recreational areas or near roads have their associated species at higher risk than similar habitats found in areas with no roads and low population density. As residential areas encroach on natural areas, they may disrupt natural processes such as hydrological cycles, remove natural vegetative cover, and increase human disturbance in the area. They can introduce pest species (non-native plants, house cats, urban species). The presence of roads often increases mortality of wildlife in the area (road-kills, increased access for non-native species, fragmentation of habitat) and encourages use of the surrounding landscape by more people. Protection of greater amounts of these habitats as compared with those under less pressure will be required to offset future habitat deterioration and/or loss.

In southern Ontario, many habitats are fragmented. Perhaps the most commonly mentioned examples are the loss of wetlands and forest cover that used to be far more widespread in this region. Some habitats are now disjunct (i.e. greatly isolated from similar habitats). These habitats are high priority for conservation. Several examples of these habitats should be protected because some will undoubtedly be lost. Ultimately, this will mean that larger amounts of the most disjunct habitats should be protected than similar, but better connected habitats.

### **Adjacent lands and land uses**

The type of landscape and land use adjacent to a wildlife habitat can directly affect how much of a habitat should be protected. If a significant wildlife habitat is adjacent to a natural area, it may be possible to protect less area as significant wildlife habitat, than similar habitats surrounded by incompatible land uses.

### **Other factors**

The amount of natural landscape in the planning area can affect the total amount of wildlife habitat that should be protected. In planning areas with few remaining natural areas, the size of remaining habitats will be smaller than similar habitats in planning areas with more extensive natural areas. However, proportionally more of the natural landscape in developed areas should be protected, relative to the total land area, because they have less to start with and are more likely to be lost to development.

The presence of a greater diversity of natural heritage features and areas increases the amount of habitat that should be protected to represent this increased diversity. However, the presence of already existing protected natural areas such as provincial parks, conservation areas, and wildlife refuges can substantially reduce the amount of additional habitat that should be protected.

Demographic and land use trends can help the planning authority determine the total amount of habitat that should be protected. An increasing human population may increase pressure to develop remaining natural areas. At the same time, many of these people may value natural areas close to home for recreational and educational opportunities, particularly if the population is ageing. Protection of more of these areas will be easier and less expensive now than in the future.

The planning authority may also want to consider what their Natural Heritage System should be in the future. There may be existing habitats that are degraded that have potential to be restored in order to achieve better representation of these habitats within the planning area.

Finally, the design of the Natural Heritage System will affect how much total habitat will be protected. A system that includes as broad a representation of habitats as possible will require the protection of more land than a simpler system. But such a system will also better protect the biodiversity and important ecological processes of the planning area, and provide opportunities for people to appreciate and learn more about the natural world.

### **10.3 What to protect?- summary of guidelines**

Since there are no rules governing the exact amount of habitat that should be protected, the following guidelines are presented to help the planning authority with this decision. They are based on the recognition that the most effective and ecologically sound approach to protecting significant wildlife habitat is by protecting large natural areas, consolidating and connecting habitats wherever possible, and encouraging public appreciation of the conservation value of important natural areas (Chapter 2).

### **General principles of habitat protection**

- When there is some doubt as to how much habitat to protect, it is usually prudent to be conservative and protect more rather than less habitat.
- Whenever possible, several protected examples of a specific habitat are preferable to only one, especially when they are small and isolated from one another.
- Protection of habitat for species guilds or associated species found together is often preferable to habitat protection for a single species.
- Where several species of conservation concern occur together, protection of sufficient habitat for those species requiring more space should also protect less demanding species.
- Some potentially suitable but currently unoccupied habitats might be maintained to provide opportunities for future colonisation, especially where they are connected to other natural areas.

### **Guidelines for the protection of corridors**

- There is no optimum width or length for a corridor but longer corridors increase the probability of mortality, unsuccessful dispersal, and barriers to movement.
- Corridors should be designed taking the requirements of the species inhabiting the planning area and specifically the species using the habitat to be connected into account.
- Ideally, corridors should be as wide as possible to minimise edge effects, accommodate the movement of a greater number of species, and provide more habitat for resident species.
- Corridors surrounded by unsuitable habitat need to be wider.
- Large corridors may provide significant wildlife habitat for many small species of birds, mammals, reptiles, amphibians, and insects.
- Locating and then protecting potentially significant corridors, as well as possibly restoring or improving natural landscape connections, may be more important than trying to determine their optimal width.
- Known wildlife migratory routes should be incorporated into corridors.
- Busy roads should not pass through corridors (corridors should be routed across landscapes with the lowest density of roads).
- Work within the existing landscape. Utility rights-of-way and abandoned railway lines may be useful as corridors.

### **Priorities for habitat protection**

- Highest priority for protection should be given to the best examples of seasonal concentration areas, provincially rare (S1-S3) vegetation communities, habitats of provincially or regionally significant species of conservation concern, and large natural areas with diversity of habitats and communities.

- Sites that support several significant wildlife habitats should be protected.

#### **Habitats to include as significant wildlife habitat**

- When identifying and protecting habitat, all critical components of that habitat should be protected. This includes essential adjacent features and functions such as seed sources, groundwater recharge areas, and water quality, as well as all critical parts of a species' habitat. To adequately protect a bird species of concern, its nest site, nesting territory, and foraging habitat should be maintained.
- Many specialised habitats are within larger forested areas (e.g., nesting habitat for area-sensitive species; cavity and supercanopy trees; mast-producing trees; seeps and springs). This implies that protection of larger forested areas should protect many of these specialised habitats associated with it.
- Numerous bird species of conservation concern require relatively large tracts of forest, grassland, or marsh. Protection of these species requires maintenance of large blocks of suitable habitat.
- Corridors that enable animals to move safely over their home range or between critical components of their habitat should be protected. Development should not sever these corridors. A significant wildlife habitat may be rendered useless if animals cannot maintain access to other critical components of their habitat.

#### **Reduce or avoid disturbance**

- Regular disturbance may lead to abandonment of habitats and can be especially serious for seasonal concentration habitats (e.g., heronries and other colonial nesting bird sites, raptor and wild turkey wintering areas, bat hibernacula).
- Detrimental edge effects may extend at least 200 meters into forested lands and affect the functions of habitats in these areas.
- Maintaining natural vegetation around significant wildlife habitats may provide improved protection from detrimental edge effects, predators, and human disturbance.
- The size of the area that should be considered significant wildlife habitat will depend on the quality of the habitat, the adjacent land uses, and the sensitivity of the species.
- Many habitats exhibit a subtle structural complexity that, if altered, may result in habitat abandonment (e.g. interior forest habitat).
- For some habitats (e.g., colonial-nesting birds), seasonal control of human access may be the only protection required.

#### **Protection of sites with high potential**

- Management may be required to maintain and improve some of these habitats (e.g., tall-grass prairie, and savannah).
- Some rare vegetation communities (e.g., tall-grass prairie) can be restored on sites where they once existed.
- Management guidelines to maintain and improve some of these habitats have been developed by the OMNR and other agencies (Appendix R). Silvicultural activities can

be conducted according to guidelines designed to protect and sometimes enhance the distribution and supply of specialised habitats such as cavity trees, down woody debris, pockets of conifer cover, raptor nest trees, and supercanopy trees.

- Some management activities designed to encourage the enhancement of habitats (e.g., snags, and cavity trees, down woody debris, denning sites) are long-term projects conducted over several decades.
- Agencies may be very interested in the management of specific significant wildlife habitats are listed in Chapter 11.

### **Development**

- Where development is inevitable, the negative impacts on some of these habitats can be somewhat mitigated, by directing it away from core areas. See the *Significant Wildlife Habitat Decision Support System* for potential mitigation techniques.

### **Public education**

- A public education campaign may help to protect some habitats, especially if they are near residential areas. It could also lead to less disturbance of wildlife by people.
- Increased public awareness of significant habitats and the principles of why they should be protected may facilitate protection of them.

### **Incentives**

- Grants may be available for restoration projects (see Chapter 11).
- There are agencies that focus on rehabilitation and restoration of degraded habitats (Appendix F).

## **10.4 How much to protect?- summary of factors to consider**

Decisions concerning how much habitat to protect should be based on the most recent research, as well as habitat management guidelines developed by the OMNR and other wildlife conservation agencies. The OMNR can provide guidelines for white-tailed deer, moose, some colonial birds, raptors, and bullfrogs (Appendix R). Many of the guidelines were developed for forest management planning, but the principles on which the recommendations were made are valid for land use planning applications as well.

The following factors will also influence the amount of habitat that should be protected.

- size of the habitat or site
- historical distribution of habitat in the planning area
- amount of currently protected habitat
- amount of potential habitat in the planning area
- presence of rare species and their degree of rarity (i.e., rarer species may require stronger protection which can mean protecting several habitat locations or a larger single habitat that supports them)

- location of habitat can help to determine how much area should be included as significant wildlife habitat and needs to be protected
- if important components of a species' habitat go beyond the identified habitat (e.g., foraging areas, summer range), this will increase the amount of habitat that should be protected
- other areas and features that affect the quality of the habitat or on which the habitat depends (e.g., headwater, groundwater recharge area) may increase the amount of habitat that should be protected
- area requirement of the species (see habitat matrices in Appendix G)
- species' sensitivity to disturbance to help to determine how large a habitat should be protected, and if a corridor is required
- abundance of species at the site
- quality of the habitat, often smaller amounts of higher quality habitats will need to be protected than habitats of lower quality
- incompatible adjacent land uses may require a larger area to be identified as significant wildlife habitat and more stringent protection

### **10.5 How much to protect?- suggested amounts**

Table 10-1 lists some selected habitats and species that might be protected. It is important to note that most of these habitats form just one habitat component among several within the home range of a species. It is necessary to protect all these critical habitats for a species in addition to protecting natural connections to these habitats. The suggested guidelines attempt to address the question of how much total habitat should be protected, and where possible, numerical values are suggested. Also refer to the wildlife habitat matrices in Appendix G for average home ranges for selected species. To improve the probability of providing adequate habitat for a species or guild, the planning authority should try to protect several examples of each habitat, as outlined in Appendix Q.



**Table 10-1. Suggested values for protection of selected wildlife habitats.**

Habitat/Species/ Guild	Suggested Guidelines
<b>10-1-1 Seasonal Concentration Areas</b>	
White-tailed deer winter yard	<ul style="list-style-type: none"> <li>• protect the entire area of the deer yard</li> <li>• core areas in yards less than 10 km<sup>2</sup> should be entirely protected</li> <li>• protect at least 85% of core areas in larger yards</li> <li>• from a landscape perspective, ideally 10-30% of total deer range should be conifer-dominated stands, with a minimum conifer component of 70% and crown closure of 60%</li> <li>• ideally a minimum of 40% of deer range should be second growth or regenerating stands, occurring within 800 m of conifer shelter</li> <li>• as much as 300 m around certain deer yards may have to be protected if disturbance or other factors may affect the functions of the habitat</li> </ul>
Moose late winter habitat	<ul style="list-style-type: none"> <li>• protect the complete area of the site</li> <li>• in addition, protect sufficient conifer forest and patches of conifers within hardwood forests to support number of moose in the planning area based on OMNR biologist estimates</li> <li>• as much as an additional 300 m may need to be protected to ensure maintenance of functions</li> </ul>
Colonial-nesting birds	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect an additional area to protect the birds from disturbance. The width of this area will vary depending on sensitivity of birds, local site conditions, and adjacent land use (see Appendix C and the Decision Support System)</li> </ul>
Raptor wintering areas (hunting, roosting)	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect several large blocks of fields (minimum of 15 ha, preferably much larger)</li> <li>• protect key roosting sites adjacent to these areas</li> <li>• an additional 100 m width adjacent to this habitat may have to be protected to ensure that raptors are not disturbed</li> </ul>
Landbird/shorebird/ butterfly migratory stopover area	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• since the minimum threshold size of this habitat is unknown, existing significant sites should be protected in their entirety and not be reduced in area</li> <li>• protection of undisturbed sites with a diversity of suitable habitats and structure will improve the sustainability of long-term populations</li> <li>• for shorebirds, an additional 100 m may have to be protected to ensure the birds are not disturbed</li> </ul>
Wild turkey winter range	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• this habitat is best protected by protecting as many mature conifer stands and patches of conifers within hardwood stands, as well as springs and seeps, as possible</li> <li>• an additional 100 m or more may need to be protected so that birds are not disturbed</li> </ul>

Turkey vulture summer roost	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• additional areas that should be considered part of the significant wildlife habitat will vary according to local site conditions (e.g., height of cliff, adjacent land use, local topography, how remote the site is)</li> </ul>
Bat/reptile hibernacula	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protection of all bat hibernacula is desirable because this habitat is limited</li> <li>• protect an additional 200 m from the entrance to bat hibernacula, although individual site inspections may find that a smaller protected area will provide adequate protection</li> <li>• this habitat for snakes is best protected by maintaining a variety of protected natural areas (see Chapter 2)</li> </ul>
Bullfrog concentration area	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protection of wetlands and undisturbed shorelines will help to maintain long-term populations and fish habitat</li> </ul>
<b>10-1-2 Rare Vegetation Communities or Specialised Habitat for Wildlife</b>	
Rare vegetation communities	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• the amount of area that should be protected will vary depending on species' sensitivity to disturbance, adjacent land uses, area of community, hydrological conditions</li> </ul>
Marten and fisher denning sites	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect as many large blocks of contiguous mid-aged to mature forest as possible</li> <li>• the area protected may be larger if disturbance becomes a problem (an additional 100 m)</li> </ul>
Mink and otter feeding/denning sites	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect as much wetland and undeveloped, undisturbed shorelines on lakes, rivers, and streams as possible</li> <li>• a large area may need to be protected if disturbance becomes a problem (100 m)</li> </ul>
Moose aquatic feeding areas	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect as much wetland and undeveloped, undisturbed shorelines on lakes and rivers as possible (potential target of 2% of planning area in well distributed aquatic feeding areas)</li> <li>• width of the area that should be protected depends on local site conditions, adjacent land use, importance of site to moose</li> </ul>
Moose calving areas	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect as much undeveloped, undisturbed shorelines on lakes, rivers, and islands as possible</li> <li>• additional area (200 m) may have to be protected if there is potential for disturbance</li> </ul>
Moose mineral lick	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect as many large blocks of contiguous forest as possible</li> <li>• a larger area may be required if site is exposed to disturbance (100-200 m)</li> </ul>
Black bear/other mammal foraging areas	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect as many large blocks of contiguous forest with food species and associated openings as possible</li> <li>• a larger area may be required if site is exposed to disturbance (100-200 m)</li> </ul>
Waterfowl nesting	<ul style="list-style-type: none"> <li>• protect the area of the site (approximately 120 m of upland grassland cover within water)</li> </ul>

habitat	<ul style="list-style-type: none"> <li>• protect as many upland grassland areas adjacent to wetlands and other water bodies</li> <li>• the entire area encompassing several small ponds should be protected</li> </ul>
Waterfowl staging areas	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect large wetlands and shorelines of large water bodies</li> <li>• an additional 100 to 300 m may have to be protected depending on sensitivity of birds, local site conditions, and adjacent land use</li> </ul>
Osprey nesting habitat	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect as much wetland and undeveloped, undisturbed shorelines (and islands) of large lakes and rivers as possible</li> <li>• protect large trees adjacent to wetlands and water bodies</li> <li>• an additional 100 m for Ospreys may be required if the area is subject to disturbance</li> </ul>
Raptor hunting areas	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect as many large (minimum of 10 ha, preferably larger), contiguous blocks of undisturbed grasslands as possible</li> <li>• a larger area may be necessary for sites surrounded by incompatible land uses (e.g., 100 m)</li> </ul>
Sites supporting area-sensitive forest species	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• where they exist, protect blocks of forest of at least 30 ha, and preferably with 50 ha or more</li> <li>• protect forest patches with at least 4 ha forest interior, and preferably larger areas</li> <li>• protection of as much forest as possible, with a variety of age classes, structure, and composition will provide important habitat for many other wildlife species</li> <li>• in areas with little remaining forest cover, but where presettlement forest cover was high, a long-term recovery objective might be to eventually have 30% of planning area in native forest cover (Chapter 11)</li> </ul>
Woodland amphibian breeding ponds	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect as many ponds (including vernal ponds) and adjacent woodlands as possible</li> <li>• the amount of area that requires protection will vary depending on local site conditions such as slope, amount of riparian vegetation, high water mark, height and density of adjacent trees, and groundwater and surface water conditions</li> </ul>
Turtle nesting areas	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect as many undeveloped, undisturbed shorelines with sandy soils</li> <li>• an additional 30 to 100 m may have to be protected depending on local site conditions such as slope, amount of vegetation, adjacent land use, and the amount of nest predation</li> </ul>
Old-growth or mature forest stands	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect as many mature stands as possible</li> </ul>

Forest stands providing a diversity of habitats	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect as much forest with a variety of age classes, structure and composition as possible</li> <li>• maintain at least six cavity trees per ha; one supercanopy tree (tree taller than the remainder of the woodland) per 4 ha; at least seven or eight mast-producing trees of each species per ha</li> </ul>
Areas of high diversity	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect a good representation of these sites</li> <li>• more area may be required, particularly if the site is surrounded by incompatible land use</li> </ul>
Cliffs, caves	<ul style="list-style-type: none"> <li>• protect the area of the site or portion of the site where habitat value appears to be the greatest (e.g., ledge where birds nest or roost) and provide additional area if required</li> <li>• the area protected will vary depending on local site conditions amount of vegetation, amount of disturbance, size of site; a buffer may not be required</li> </ul>
Seeps, springs	<ul style="list-style-type: none"> <li>• protect the area of the site or portion of the site where habitat value appears to be the greatest</li> <li>• size of the habitat protected will vary depending on local site conditions such as slope, amount of vegetation, height and density of adjacent trees, groundwater conditions</li> <li>• protect recharge areas</li> </ul>
<b>10-1-3 Habitat of Species of Conservation Concern</b>	
Raptors	<ul style="list-style-type: none"> <li>• protect the area of the site and an area of at least 200 m around active nests (some species are more tolerant and smaller areas may suffice)</li> <li>• protect the largest and oldest contiguous forests of at least 30 ha (preferably 50 to over 100 ha) or the largest existing forest blocks remaining in the planning area</li> <li>• protect areas around inactive nests as well, as they may be re-used</li> <li>• plan for no reduction in area of existing forest cover in the planning area</li> <li>• plan for no increase in forest fragmentation in the planning area</li> <li>• there should be no activities permitted within 200 m of an active nest during the nesting season (Mar 1- Aug. 1 [Sept. 1 in northern areas])</li> </ul>
Area-sensitive birds	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect large contiguous forests or grasslands with at least 4 ha (preferably at least 10 ha or more) of interior or the remaining forests and grasslands with the largest existing interiors</li> <li>• maintain as much forest cover in the landscape as possible (ideally 30% forest cover)</li> <li>• plan for no reduction in area of existing forest or large grassland</li> <li>• plan for no increase in fragmentation of forest or large grassland cover</li> </ul>
Grassland birds	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect largest contiguous undisturbed grasslands of at least 30 ha (preferably 50 ha or more) or the largest existing expanse of grassland in the planning area</li> <li>• additional area may be required for sites surrounded by incompatible land use (200 m)</li> </ul>

Amphibians	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect best examples of suitable habitat for the species of concern</li> <li>• in general, protect as many wetlands and breeding ponds as possible</li> <li>• additional area may be required around significant breeding ponds</li> </ul>
Reptiles	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect all known hibernacula</li> <li>• protect all known nesting sites</li> <li>• protect best examples of suitable habitat for the species of concern</li> <li>• in general, protect a diversity of natural areas, and protect areas of suitable habitat in areas where specific species are known to occur</li> <li>• buffers may be required around hibernacula and nest sites</li> </ul>
Mammals	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect best examples of suitable habitat for the species of concern</li> <li>• in general, protect a diversity of natural areas</li> <li>• protect as much forest, wetland, undisturbed grassland, and shoreline as possible</li> </ul>
Insects	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• protect several colonies of species' food plant</li> <li>• protect best examples of suitable habitat for the species of concern</li> <li>• in general, protect areas with diversity of plant species</li> </ul>
Plants	<ul style="list-style-type: none"> <li>• protect the area of the site</li> <li>• additional area may be required to protect sensitive species or sites surrounded by incompatible land use</li> <li>• in general, protect a diversity of natural areas</li> </ul>

## 10.6 Some hypothetical examples

The following hypothetical examples are presented to illustrate some of the questions that should be asked when trying to determine how much habitat to protect. The answers are based on the considerations, principles, and factors discussed in Sections 10.2 to 10.4. In this guide, this process is necessarily brief. In reality, sites would usually be more rigorously assessed and might be displayed in a matrix that would make the comparison of sites easier. While there may be no absolute answers regarding the amount of habitat to protect, it is hoped that as much as possible of all types of significant wildlife habitats will be appropriately protected. The purpose of providing these examples is to give those identifying significant wildlife the flexibility to determine those sites with the greatest value to wildlife.

### *Example 1: Seasonal Concentration Area*

#### **1. What is the significant wildlife habitat to be protected?**

waterfowl nesting/breeding habitat

#### **2. Background**

##### **How many sites have been identified?**

6

**Approximate size of the site:**

Hard to estimate, but if we consider breeding habitat as consisting of nest sites and some brood habitat for the young ducklings, then:

Site 1 is at least 50 ha

Site 2 is at least 100 ha

Site 3 is approximately 20 ha

Sites 4 and 5 are both less than 10 ha (areas in a marsh)

Site 6 is 5 ha (creek and adjacent fields).

**Is the site found on private or public land?**

Five of the 6 sites are entirely on private land. Site 1 is largely on a conservation authority property.

**What species use the site?**

Primarily mallards on all sites; blue-winged teal also nest on Sites 1, 2, 3; American black duck on Sites 4, 6; there are records for green-winged teal (*OMNR Wetland Evaluation*) on Site 2 and gadwall on Site 3 (local landowner).

Other species regularly observed on Sites 1 to 3 include American coot, common moorhen, common merganser, pied-billed grebe, Canada goose, wood duck, great blue heron, and green heron. Pied-billed grebe, Canada geese, American bittern, and great blue heron are commonly seen on Sites 4 and 5. Great Blue Herons are seen on Site 6.

**Does the habitat support species of conservation concern?**

Yes. Site 2 has supported a colony of black terns, and green-winged teal have nested there (*OMNR Wetland Evaluation*). Apparently gadwall are nesting regularly on Site 3 (local landowner).

There is an old record (1970) of a spotted turtle on Site 6.

**Are population estimates for the site available?**

No. But aerial photograph interpretation of potentially suitable habitat tends to indicate that Sites 1 to 3 would probably support the largest numbers of breeding waterfowl. Site 6 would appear to support the fewest birds.

**If so, approximately how many individuals use the site?**

Unknown. Perhaps local landowners, others could help conduct a survey once ducks and ducklings are on the water.

**Does the species depend on a corridor?**

Yes.

**Is there a corridor?**

All sites have some sort of corridor that could help ducklings to move safely from the nest to the water. However, on Site 1 a gravel road cuts through a considerable amount of nesting habitat and could threaten ducklings if traffic were heavy (which is unlikely).

**Describe the corridor.**

From aerial photographs, all corridors appear to be brushy fields that should provide sufficient cover. The corridor on Site 1 appears somewhat fragmented by summer mowing of grass in the picnic area and a gravel road.

**Is the corridor continuous or severed? Describe.**

Only on Site 1- severed by a gravel road. However, the road may not be very busy during the nesting season. (Check with CA office. If so, maybe they could place a warning sign on the road).

**Are there existing guidelines for the species or habitat?**

No, but Ducks Unlimited and the local OMNR biologist would probably agree to visit some of the sites to assess them and provide some advice. There is good knowledge of the nesting habitat requirements of all the species.

**Is the habitat part of a larger natural area?**

Sites 1, 2, 4, and 5 are part of larger natural areas. Site 3 was but now the area has been developed with estate housing along the river. Site 6 is the only natural area.

**Habitat description:**

Site 1: fields (ranging from 2 to 10 ha) in varying successional stages along the shore of a river. Shoreline is mainly irregular with lots of cover and aquatic vegetation and invertebrates. Fishing is good, and there are many frogs.

Site 2: fields (ranging from about 2 to 20 ha) and large marsh along a big lake. Part of the lake is very shallow and weedy in the summer. It is also very productive (*OMNR Wetland Evaluation*). There are wooded upland areas extending into the fields along the lake. This is a Provincially Significant Wetland.

Site 3: consists of fields along a river. Some of the fields are very shrubby with numerous small trees. The shoreline is quite regular. Vegetation (both shoreline and aquatic) has been cleared along the stretches where homes front on the river.

Site 4 and 5: are primarily marshes with open water areas.

Site 6: is a meandering narrow creek with varying amounts of aquatic and riparian vegetation. Fields appear to be ideal nesting habitat and they are found on both sides of the creek. However, they are rather narrow (approximately 50 to 150 m wide).

**What is the approximate quality of the habitat for the species?**

Not sure. All sites were selected because their breeding/nesting habitat represents the best in the area. Aerial photograph interpretation indicates that all sites have good nesting habitat, but Sites 1, 2, 4, and 5 also appear to have the best brood habitat (lots of cover and food for young ducklings). Perhaps OMNR Biologist or Ducks Unlimited personnel can help evaluate the habitat.

**Describe the adjacent landscape.**

The adjacent landscape of Sites 1 and 2 is largely natural. There is both forest and open field habitat around Site 1. Much of Site 2 is surrounded by upland forest. Residential housing is scattered. Farming (beef and dairy cattle, corn) is a major land use. Large estate housing dominates landscape adjacent to Site 3. There are lots for sale. Upland forest is found around much of Site 4. Land use is primarily residential housing with some farming (cash crop). Upland forest and agricultural cropland is found adjacent to Site 5. Land use is primarily residential housing. Site 6 is in the middle of cropland (corn and soybeans).

**Are there important features located outside the site that help to maintain the site?**

Need to investigate. Site 1 may be subject to water level fluctuation since flow volume is seasonally controlled through a series of small dams.

Cattle grazing and mowing of hay may be delaying natural succession and maintaining nesting habitat on Sites 2, 4, and 5.

**Is the site disturbed by human activities? If so, what are they?**

Breeding period is from approximately mid April to mid August for late broods.

Site 1: most use of the Conservation Area is during July and August and consists of primarily human foot traffic—hikers, joggers, bathers, and people walking their dogs. Some people launch canoes and boats from the ramp; fishing pressure is relatively light. Disturbance to nesting areas is probably light because most people stay on the nature trails or around the beach. Some of this habitat may be mowed (find out).

Site 2: most use is during July and August by anglers fishing the weedy shoreline for bass. There may be disturbance to some nest sites from haying operations, some disturbance to broods by anglers.

Site 3: human activity occurs year round, but with highest boating disturbance during July and August. Domestic dogs and cats may be a problem in the nesting habitat but there is no information about this.

Sites 4 and 5: mowing is probably the greatest threat to nesting habitat but this may occur sporadically and on only some parts of the sites.

Site 6: No apparent disturbance, but agricultural effluent run-off into creek upstream may be affecting water quality and aquatic organisms that might have effects on waterfowl.

**What are the major concerns about protecting the habitat for this species/guild?**

- disruption of nesting habitat (e.g., loss of grasslands, large cavity trees)
- disruption of brood-rearing habitat (e.g., loss of riparian vegetation and thick cover in the wetland)
- disruption of water levels (i.e., fluctuating water levels can destroy nests)
- water quality
- disturbance during nesting period from haying operations and nest predators



- disruption by roads of movement of broods to the water

**Other concerns:**

- Other values of the habitat (e.g., economic, recreational). Throughout the year, school groups use the Conservation Area for outdoor education, waterfowl watches are a common component of these programs. A small number of residents enjoy duck hunting, although some of them have complained that the hunting is not what it used to be because duck numbers are down.
- what is required to manage this habitat?
- what is the level of public awareness of this habitat?

**3. What sites should be protected?**

**Selected sites for protection:**

Sites with the highest priority for protection are 1, 2, 4, and 6. Table 10-2 summarises the minimum standards for the six sites.

**Table 10-2. Minimum standards for nesting waterfowl for six hypothetical sites.**

Minimum Standard	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Number of waterfowl species	2	3	3	2	1	2
Large numbers of waterfowl	√	√	√			
Good brood habitat	√	√		√	√	
Number of waterfowl species of conservation concern	0	1	1	1	0	0
Number of other species of conservation concern	0	1	0	0	0	1
Other natural heritage features		√				
Long-term sustainability	√	√		√	√	

**Rationale for protecting four sites:**

- Four protected sites would provide better representation of these habitats as well as better long-term protection in case of loss or severe degradation of one or more of these areas.
- More protected habitat will allow for greater diversity of nesting habitat structure/composition, making nesting habitat more attractive to a greater diversity of waterfowl.
- These sites appear to have the best nesting and brood rearing habitat.
- Sites 1 and 2 support a good diversity of wildlife.
- Site 1 is primarily on a conservation authority property where protection of the habitat from human activities should be relatively easy to ensure (e.g., corridor can be improved, nesting habitat can be managed).
- Site 2 is a Provincially Significant Wetland and all of its important habitats should be protected.
- Site 2 has supported species of conservation concern.
- The future of Site 3 appears to be in doubt and the long-term sustainability of this habitat would be difficult to maintain.

- This planning area has a substantial amount of waterfowl nesting/breeding habitat. Site 6 is small and there are other better habitats.

**Is there a minimum area standard for this species?**

Yes: 0

No:

- At least 120 m of nesting habitat adjacent to wetlands and other waterbodies should be protected since over 90 percent of waterfowl nests are likely to occur within 120 m of water.

**4. How much habitat to protect**

**Recommended amount of habitat to protect and rationale:**

- Based on this minimum standard area, a band of nesting habitat adjacent to the water of at least 120 m wide on the most significant sites (Sites 1, 2, 4, 5) should be protected. On Sites 1 and 2, more than this minimum amount could probably be protected without too much difficulty.
- The adjacent riparian vegetation and littoral zone should also be protected as brood-rearing habitat.

**Additional protection:**

- All shoreline within 100 m of the nesting area should be maintained (i.e., vegetation should not be removed, no deposition of fill, creation of beaches).
- Landowners on Sites 4 and 5 should be encouraged to time haying operations to avoid the peak nesting period. They should be encouraged to use “flushing bars” (see Ducks Unlimited for information).
- Conservation authority personnel should be apprised of the nesting habitat and appropriate habitat management measures (e.g., no mowing during the nesting season). The gravel road through the nesting habitat might be closed if such a measure is warranted.
- No current need for buffer zones since disturbance is minimal.

***Example 2: Rare or Specialised Habitat***

**1. What is the significant wildlife habitat to be protected?**

woodland amphibian breeding ponds

**2. Background**

**How many sites have been identified?**

Several. The planning authority lies within two major physiographic regions. Part of the planning area is on the Canadian Shield, while the remainder is on agricultural land south of the Shield. Woodland breeding ponds for amphibians are abundant and too numerous to count on the shield. However, information is not available for many of them. There are three known sites on lands south of the Shield.

**Approximate size of the sites:**

The size of sites on the Shield varies from tiny (a few square metres) to large beaver ponds that are several hectares in area. The sizes of the three off-Shield sites are presented below. In addition to these areas, there are other woodland pools, but they are very ephemeral and do not hold water long enough for larvae or tadpoles to transform into adults. Therefore, they are not viable habitat for breeding amphibians, other than for American toads, which are abundant in the area and use a variety of non-woodland pools for breeding.

Sites south of the Shield:

Site 1 is 10 ha

Site 2 is 2 ha

Site 3 is 0.5 ha

**Is the site found on private or public land?**

All sites are on private land.

**Habitat description:**

Amphibian breeding ponds on the Shield are variable, but generally fall into the following categories:

- small ephemeral pools that dry up by June;
- larger ephemeral pools that usually contain water until near the end of July;
- permanent, isolated ponds that do not contain fish; and
- permanent ponds with fish populations.

Sites 1 and 2 off-Shield are permanent ponds located in deciduous forest. Site 1 is located on a creek that has been dammed by beavers. There is abundant shoreline vegetation and adjacent canopy closure is high. Site 2 is a wetland depression. Shoreline vegetation is limited due to heavy shading that inhibits wetland vegetation growth. The surrounding forest is more open.

Site 3 is an ephemeral pond in a small, mature maple woodlot. There is some shoreline vegetation. Canopy closure is high.

**Is there a diversity of microhabitats (e.g., downed logs, seeps, and cavity trees) in the vicinity of the site? If so, describe them.**

Sites on the Shield are too variable and numerous to describe. The off-Shield sites are described below:

Site 1 has a good diversity of microhabitats attractive to a variety of wildlife. Down woody debris is especially abundant.

Site 2 has few microhabitats.

Site 3 has a few cavity trees and snags.

**Does the habitat support species of conservation concern?**

None are known from any of the sites.

### **What species use the site?**

Extremely variable on the Shield. Very ephemeral ponds are used mostly by spring peepers, but only if there is good vegetation cover and considerable woody cover in the pond. These ponds may also be used by toads, particularly if the ponds are not far from forest edge.

Ponds that dry up, but have water that persists until late July, may support a range of amphibian breeding species. These include mole salamanders (mostly blue-spotted salamanders and rarely spotted salamanders), gray tree frogs, wood frogs, leopard frogs, spring peepers, and toads.

Permanent ponds without fish may support all of the above species plus green frogs and bullfrogs. Red-spotted newts may also be present. Some permanent ponds in the north of the planning area support mink frogs, which are at the southern extent of their range here.

Green frogs and bullfrogs dominate permanent ponds with fish. Small populations of other frog species may be present.

Species breeding in the off-Shield ponds are mostly frogs. Spring peepers, chorus frogs, gray tree frogs, and wood frogs breed on all 3 sites. Blue-spotted salamanders are known from Site 1.

### **What is the approximate abundance of individuals?**

Very variable on the Shield, and no information is available for many sites. General information is provided below under approximate species diversity.

Off the Shield, Sites 1 and 3 appear to be packed with frogs. Spring frog song choruses are said to be very loud on Site 3 (local landowner information).

### **What is approximate species diversity?**

Species diversity on the Shield depends on several factors such as permanence of the pond, how large it is, whether there are fish that may prey on eggs and larvae, proximity of other woodland pools, and the surrounding habitat. Latitude also affects species diversity, with mink frogs only occurring in the north. Generally, ponds that have the following characteristics have the greatest species diversity:

- permanent ponds that can support species such as green frog and bullfrog
- ponds that hold water until at least the end of July
- ponds without fish
- large ponds
- ponds surrounded by natural habitat
- ponds in close proximity to other wetlands.

A system of several small ponds in close proximity will support the greatest number of species. Wood frogs are likely to occur only in ponds within extensively forested areas or in large forest patches. Bullfrogs usually occur only in larger, open ponds with full sunlight. Leopard frogs and toads are more likely to occur in ponds near forest openings or edges.

In the off-Shield ponds, Site 1 probably supports the highest diversity of amphibians. According to knowledgeable sources, the diversity of other wildlife also appears highest at this site (e.g., turtles, waterfowl, herons, beaver).

**Are there existing guidelines for the species or habitat?**

No. However, OMNR forest management guidelines could be used to protect and maintain this habitat.

**Is the site part of a larger natural area?**

The sites on the Shield are part of an extensively forested area that is predominantly natural except for roads and cottage development around lakes. All three off-Shield sites are part of larger natural areas. Site 3 is located within the smallest natural area.

**Is the site isolated?**

Most on-Shield sites are adjacent to natural areas. Off the Shield, Sites 1 and 2 are not isolated; there are other small ponds and wet areas in the vicinity. Site 3 appears to be isolated.

**What is the approximate quality of the habitat? Is there good habitat structure?**

Limited data for the on-Shield sites. Site 1 off-Shield has the best habitat: permanent water, lots of shoreline vegetation and closed canopy forest near the pond. Site 2 appears to have poor habitat and yet there are many frogs. Site 3 has intermediate habitat.

**Describe the adjacent landscape.**

Not defined for most of the Shield sites. Site 1: mature deciduous forest (approximately 120 ha) with a little-used bush road leading to the pond.

Site 2: young, open, mixed-deciduous forest (approximately 30 ha). There are several trails.

Site 3: mature deciduous forest (approximately 20 ha) with numerous openings in the canopy. Fallen logs are common.

**Is there natural cover around the breeding ponds?**

Not described for on-Shield ponds.

Sites 1 and 3 have some surrounding natural habitat.

Site 2 is quite open and has no adjacent natural habitat.

**Are there important features located outside the site that help to maintain the site?**

Not described for on-Shield ponds.

Site 1 may be affected by the creek that flows through it and beaver dams may be affecting water levels and flow rates.

Site 2: unknown

Site 3 is probably highly dependent on the continued existence of the surrounding woodlot. If the trees are removed or thinned substantially, this pond could dry out too much to support breeding amphibians. In addition, the local topography on and perhaps off the site may be largely responsible for the existence of this pond.

**Are population estimates for the site available?**

No.

**If so, approximately how many individuals use the site?**

Unknown, but perhaps local naturalists and school groups could conduct spring counts to provide some of this information and the CAC provides input.

**Does the species depend on a corridor?**

Yes, several of the species do because they spend much of the summer in the adjacent forest, and some, such as the leopard frog and toad, may move to open habitats in summer.

**Is there a corridor?**

Yes for Sites 1 and 3.

**Describe the corridor.**

Site 1 and 3: forested with lush understorey vegetation.

**Is the corridor continuous or severed? Describe.**

Corridors are very short and intact.

**Is the site disturbed by human activities? If so, what are they?**

Disturbance on Sites 1 and 2 is probably low.

Site 3 may be more disturbed. Landowner is removing some of the older trees adjacent to the pond.

**What are the major concerns about protecting this habitat?**

- There should be no disruption of the breeding pond.
- Water quality, riparian vegetation, and adjacent wooded areas must be maintained.
- Canopy closure in adjacent forest must be maintained.
- Amphibians must be able to move safely to summer range

**Other concerns:**

- What is the level of public awareness of this habitat?

**3. What habitats should be protected?**

**Selected sites for protection and rationale:**

Preferably, all three off-Shield sites should be protected in some way. Table 10-3 summarises the minimum standards for them.

**Table 10-3. Minimum standards for three hypothetical off-shield amphibian breeding ponds.**

Minimum Standard	Site 1	Site 2	Site 3
Representation	√	√	√
Permanence	√	√	
Abundance of amphibians	√		√
Large size	√		
Suitable adjacent habitat	√	√	√
Low disturbance	√	√	
Other significant wildlife habitat	√	√	

Rationale for protecting all three sites:

- Three protected sites provide better representation of this habitat and better long-term protection in case of loss or severe degradation of one or more of these sites.
- Site 1 should receive top priority for protection since it is the largest site, has high quality habitat, supports the greatest diversity (and probably abundance) of amphibians and other wildlife, and is part of the largest natural area.
- Amphibians in general are not common in this physiographic region of the planning area. Although the species that do occur are common to abundant in the site region and also in the portion of the planning area that is on the Shield, breeding sites are very limited off-Shield in the planning area. Loss of breeding ponds could result in extirpation of species in the agricultural areas.
- All three sites meet a minimum standard as described in Chapter 9 as demonstrated above.

Decisions on what should be protected on the Shield are more complicated. If development pressure is low, there may be no need to identify any frog-breeding ponds as significant wildlife habitat. Even if this is the case, the best ponds for mink frog breeding might be designated, as this is a locally significant species of conservation concern. Also, minimum standards should be applied. Representation of all types of amphibian breeding ponds should be maintained, and sufficient habitat should be protected to ensure that all of the amphibians that currently occur on the Shield continue to have sufficient breeding habitat.

If there is development activity on the Shield, the most important breeding ponds should be designated significant wildlife habitat. In order to do this, the planning authority should make sure that good breeding ponds have been identified for all species that occur. The general habitat characteristics of these species can be determined by checking the habitat matrices appended to this document (Appendix G), and also by looking at the appropriate indices in the *Significant Wildlife Habitat Decision Support System*. An alternative to identifying individual ponds as significant wildlife habitat would be simply to require that proponents describe the significance of all woodland pools for amphibian breeding in an impact statement. This approach might avoid the potential for overlooking





Globally, nationally, or provincially rare: 0

Regionally rare: 0

Locally rare: 0

Species declining:

Other reason (e.g., species of economic value):

**Is the species a member of a larger group or guild of species with similar habitat requirements?**

Yes. Birds and mammals that require cavities in trees.

**Is the species/guild dependent on or found in seasonal concentrations or rare or specialised habitat?**

specialised habitat: forest with an abundance of cavity trees

seasonal concentration area: during winter months several squirrels may use the same cavity tree

**Are there other species of conservation concern that occur at the site?**

All three sites support rare plants and forest bird species of conservation concern.

**How likely is it that the species occurrence represents a disjunct (isolated) population?**

Unlikely. The planning area has moderate forest cover (approximately 35 percent), much of it affording suitable habitat for this species. This species is hard to detect since it is nocturnal.

**Are there guidelines to protect this species?**

No. However, OMNR silvicultural guidelines can be applied to protect the habitat (specifically maintenance of required density of cavity trees). Silvicultural guidelines may also be used to protect and enhance food species (oak, hickory, beech, etc. – Appendix R).

**Site description:**

Site 1 (approximately 35 ha) and Site 2 (approximately 10 ha) are dry-mesic deciduous stands of primarily red oak, white oak, and some white pine.

Site 3 (approximately 4 ha) is a mesic deciduous stand consisting of mainly sugar maple.

**Describe existing habitat for the species and the quality.**

Site 1 would appear to be good habitat for this species. It is a relatively large and mature forest for the planning area. There are numerous large trees with cavities suitable for nesting and denning by this species. The dominant tree species, oaks and white pine, probably provide abundant mast during most years.

Site 2 appears to have inferior but adequate habitat for this species. The supply of seeds, nuts, and fungi are probably sufficient for several squirrels, large cavity trees are uncommon (approximately 1 to 3/ha).

Site 3 may represent inferior habitat. It is probably too small to support more than a few animals. The shortage of cavity trees appears to be the major limiting factor. Forest size may also be a limiting factor, as well as competition for cavities by the grey squirrel.

Is there additional habitat associated with this habitat?

All sites have a natural buffer of forest.

**Describe the adjacent landscape.**

The landscape adjacent to all sites is agricultural land with numerous roads and houses.

There are a few small woodlots (approximately 5 ha) within 1 to 2 km of Site 3.

**Are there important features located outside the site that help to maintain the site?**

Unknown.

**Is the site disturbed by human activities? If so, what are they?**

All sites have been disturbed by logging. Landowners are removing dead, dying, and hazardous trees that are often cavity trees.

**What are the major concerns about protecting the habitat for this species/guild?**

- Maintenance of cavity trees and forage (e.g., mast trees)
- Disruption of nesting and rearing activities
- No disturbance to animals in winter from timber operations
- Predators (e.g. domestic cats)

**Other concerns:**

- What management is required to protect its habitat?
- What is the level of public awareness of this species and its conservation status?
- What management is required to ensure a continued food supply?

**3. What sites should be protected?**

**Selected sites for protection and rationale:**

All 3 sites should be protected in their entirety. Table 10-3 summarises the minimum standards for the three sites.



- Further loss of forest cover should be minimised.
- Local naturalist groups might be interested in monitoring the population.

**Additional comments:**

The southern flying squirrel is a very difficult to detect species. Over time, it is likely that additional sites for it will be discovered in the planning area. In this event, new and old sites should be re-evaluated. Because of the small size of Site 3, it may not be capable to sustaining a long-term population. If better sites were found, there may be less need to protect Site 3 for southern flying squirrels, although it still may be protected to maintain populations of the other species of conservation concern that it supports. Local groups may want to enhance this site through tree planting or other management techniques.

**10.7 General habitat requirements of species of conservation concern**

The broad habitat requirements of many species of wildlife are quite well understood. Some of these are summarised below in Tables 10.5 to 10.7 in an attempt to demonstrate the overlap in wildlife habitats. The important point is that an effective Natural Heritage System can be constructed by protecting substantial amounts of those habitats that appear repeatedly in these tables.

**10.7.1 Seasonal concentration areas**

Table 10.5 provides an overview of where seasonal concentration areas are most likely to be found. Forests, shorelines, and wetlands provide much of this very important habitat. More specifically, older forests and in southern Ontario, some coniferous forests, are especially significant because of the larger trees and the variety of habitat they afford wildlife. The most important shorelines appear to be those adjacent to forests or wetlands, with weedy shallows. Large fields with abundant vegetation and scattered trees and shrubs are important open country habitat. Important wetlands are likely to be large and obviously productive.

**Table 10-5. Primary locations of seasonal concentrations of wildlife.**

Type of Seasonal Concentration	Primary Location of Habitat	Notes/Key Requirements
Bat hibernacula	<ul style="list-style-type: none"> <li>• specific site—cave, mine</li> </ul>	<ul style="list-style-type: none"> <li>• often in forested area</li> <li>• undisturbed habitat is essential</li> </ul>
White-tailed deer winter yard	<ul style="list-style-type: none"> <li>• forests with at least 60 % canopy closure</li> </ul>	<ul style="list-style-type: none"> <li>• conifer cover (white cedar, hemlock) particularly important in southern Ontario</li> <li>• corridor required; undisturbed habitat is important</li> </ul>
Moose late winter habitat	<ul style="list-style-type: none"> <li>• coniferous forests</li> </ul>	<ul style="list-style-type: none"> <li>• corridor required</li> </ul>

Type of Seasonal Concentration	Primary Location of Habitat	Notes/Key Requirements
Reptile hibernacula	<ul style="list-style-type: none"> <li>site specific</li> </ul>	<ul style="list-style-type: none"> <li>often in large forested areas, depending on species</li> <li>rocky outcrops, talus slopes</li> <li>corridor required</li> </ul>
Amphibian summer habitat	<ul style="list-style-type: none"> <li>wetlands, shorelines, other riparian areas</li> </ul>	<ul style="list-style-type: none"> <li>corridor required</li> </ul>
Bullfrog concentration areas	<ul style="list-style-type: none"> <li>permanent wetlands, shorelines, other riparian areas</li> </ul>	<ul style="list-style-type: none"> <li>permanent water</li> </ul>
Raptor wintering areas	<ul style="list-style-type: none"> <li>undisturbed fields for hunting small mammals (mice, voles)</li> </ul>	<ul style="list-style-type: none"> <li>adjacent forests for roosting of some species; undisturbed habitat is important</li> </ul>
Wild turkey winter range	<ul style="list-style-type: none"> <li>coniferous forests</li> <li>spring and seeps</li> </ul>	<ul style="list-style-type: none"> <li>pockets of conifers may suffice</li> <li>nearby food source</li> </ul>
Turkey vulture summer roost	<ul style="list-style-type: none"> <li>specific site</li> </ul>	<ul style="list-style-type: none"> <li>undisturbed habitat is important</li> </ul>
Waterfowl breeding/staging/areas	<ul style="list-style-type: none"> <li>wetlands</li> <li>shorelines of water bodies with emergent vegetation</li> </ul>	<ul style="list-style-type: none"> <li>larger wetlands preferred for staging and moulting</li> <li>grassy/shrubby areas for nesting</li> </ul>
Colonial bird nesting sites (gulls, terns, double-crested cormorants)	<ul style="list-style-type: none"> <li>islands, shoals, peninsulas, and some shorelines</li> </ul>	<ul style="list-style-type: none"> <li>undisturbed habitat during nesting season is essential</li> <li>treed swamps</li> </ul>
Heronries	<ul style="list-style-type: none"> <li>wetlands (swamps)</li> <li>lake and river shorelines</li> <li>forests</li> </ul>	<ul style="list-style-type: none"> <li>undisturbed habitat during nesting season is essential</li> </ul>
Colonial bird nesting sites (heronries, marsh birds)	<ul style="list-style-type: none"> <li>wetlands</li> </ul>	<ul style="list-style-type: none"> <li>undisturbed habitat during nesting season is essential</li> </ul>
Landbird migratory stopover area	<ul style="list-style-type: none"> <li>open water shorelines with adjacent mature forests, old-fields and grasslands</li> <li>forest cover along watercourses, forested ravines</li> </ul>	<ul style="list-style-type: none"> <li>Great Lakes shorelines and adjacent lands within 5 km (especially Lake Erie &amp; Lake Ontario) are very important</li> </ul>
Shorebird migratory stopover areas	<ul style="list-style-type: none"> <li>shorelines of water bodies (rivers, large lakes), marshes</li> </ul>	<ul style="list-style-type: none"> <li>key is undisturbed shorelines</li> <li>Great Lakes shorelines (especially Lake Erie &amp; Lake Ontario) are very important</li> </ul>
Butterfly migratory stopover areas	<ul style="list-style-type: none"> <li>shorelines of large lakes</li> <li>forest, old field, and undisturbed open lands</li> </ul>	<ul style="list-style-type: none"> <li>Great Lakes shorelines and adjacent lands within 5 km (especially Lake Ontario &amp; Lake Erie) are very important</li> <li>Fields with milkweed very important habitat for monarch butterflies</li> </ul>

### 10.7.2 Rare or specialised habitats

Table 10-6 provides an overview of where rare or specialised habitats are most likely to be found. Closer examination of this table reveals considerable repetition in habitats for different wildlife. In particular, it shows how important forests, wetlands, and shorelines are to many species; more specifically, large, mature, relatively unfragmented forests and shorelines adjacent to forested areas. In addition, many species require undisturbed areas and corridors permitting safe movement throughout their home ranges.

This table helps to emphasise the importance of protecting adequate representation of these habitats within a Natural Heritage System. Also, cooperation among adjacent planning authorities can contribute greatly to the long-term protection of wide-ranging, area-sensitive species.

**Table 10-6. Primary locations of rare or specialised habitats.**

Type of Habitat	Primary Location of Habitat	Notes/Key Requirements
Marten and fisher denning sites	<ul style="list-style-type: none"> <li>large forests, especially mature and unfragmented</li> </ul>	<ul style="list-style-type: none"> <li>area-sensitive species</li> <li>corridor required</li> <li>large undisturbed areas are important</li> </ul>
Moose aquatic feeding area	<ul style="list-style-type: none"> <li>weedy shorelines and bays with adjacent forest cover</li> <li>wetlands</li> </ul>	<ul style="list-style-type: none"> <li>requires forested corridor</li> <li>undisturbed areas are important</li> </ul>
Moose calving sites	<ul style="list-style-type: none"> <li>forested islands</li> <li>shorelines, especially peninsulas</li> </ul>	<ul style="list-style-type: none"> <li>requires forested corridor</li> <li>undisturbed areas are essential</li> </ul>
Moose mineral lick	<ul style="list-style-type: none"> <li>forest openings with adjacent forest</li> </ul>	<ul style="list-style-type: none"> <li>specific site that is very hard to find</li> <li>forested corridor required</li> <li>undisturbed areas are important</li> </ul>
Black bear/mammal foraging area	<ul style="list-style-type: none"> <li>specific sites with abundance of berries, grasses, mast-producing trees</li> <li>relatively mature, undisturbed forests</li> </ul>	<ul style="list-style-type: none"> <li>forested corridor required</li> </ul>
Osprey nesting habitat	<ul style="list-style-type: none"> <li>forested shorelines (often along large lakes)</li> <li>wetlands</li> <li>islands</li> </ul>	<ul style="list-style-type: none"> <li>undisturbed areas are important</li> <li>shallow-water feeding areas</li> </ul>

Type of Habitat	Primary Location of Habitat	Notes/Key Requirements
Woodlands supporting amphibian breeding ponds	<ul style="list-style-type: none"> <li>forests; often associated with wetlands, but may be in upland forests</li> </ul>	<ul style="list-style-type: none"> <li>corridor required</li> </ul>
Old-growth or mature forest stands	<ul style="list-style-type: none"> <li>forests</li> </ul>	<ul style="list-style-type: none"> <li>exceedingly rare, therefore the oldest forests in the planning area are usually the best candidates</li> </ul>
Sites supporting area-sensitive species	<ul style="list-style-type: none"> <li>largest areas of unfragmented forests, grasslands, wetlands</li> </ul>	<ul style="list-style-type: none"> <li>mature, closed canopy forests with multiple vegetation strata preferred by many species of forest birds</li> <li>minimum size of these areas may be at least 30 ha, but may be larger than 100 ha</li> </ul>
Waterfowl nesting, staging habitat	<ul style="list-style-type: none"> <li>wetlands, water bodies, and adjacent grasslands within 120 m of water</li> </ul>	<ul style="list-style-type: none"> <li>undisturbed habitat during nesting season is important</li> </ul>
Mink and otter feeding/denning sites	<ul style="list-style-type: none"> <li>shoreslines of lakes, rivers, creeks (riparian areas)</li> <li>wetlands</li> </ul>	<ul style="list-style-type: none"> <li>corridor required</li> <li>undisturbed habitat may be required</li> </ul>
Turtle nesting areas	<ul style="list-style-type: none"> <li>shoreslines (sand/gravel), wetlands</li> </ul>	<ul style="list-style-type: none"> <li>corridor required</li> <li>undisturbed nesting habitat is preferred</li> </ul>
Raptor hunting areas	<ul style="list-style-type: none"> <li>undisturbed open fields</li> </ul>	<ul style="list-style-type: none"> <li>minimum of 15 ha, preferably larger than 30 to 50 ha</li> </ul>
Areas of high diversity	<ul style="list-style-type: none"> <li>often forested areas</li> <li>often larger natural areas with diversity of habitats including wetlands</li> </ul>	<ul style="list-style-type: none"> <li>sites may have remarkable diversity of just one group (e.g., plants, insects), several groups (e.g., plants, birds, reptiles, amphibians), or several community types (e.g., forest, wetland)</li> </ul>
Cliffs	<ul style="list-style-type: none"> <li>anywhere – associated with geological features such as the Niagara Escarpment</li> </ul>	<ul style="list-style-type: none"> <li>cliffs in undisturbed natural areas may have value to more wildlife species</li> </ul>
Caves	<ul style="list-style-type: none"> <li>anywhere – associated with specific geological features</li> </ul>	<ul style="list-style-type: none"> <li>larger, natural caves are more common in areas of limestone</li> </ul>
Seeps and springs	<ul style="list-style-type: none"> <li>often in forested land with slopes</li> <li>headwater areas</li> </ul>	<ul style="list-style-type: none"> <li>usually hard to find, specific sites with several natural heritage values</li> </ul>

### 10.7.3 Habitat of species of conservation concern

Biologists, for various reasons, consider some wildlife to be species of conservation concern. Sometimes this is because Ontario supports a large proportion of their total global population. Often they are rare and/or their numbers in Ontario are declining. Current low numbers of a few species may be due to exploitation (bullfrogs and some waterfowl) or persecution (snakes). Some species may not compete well with other species that share their range (e.g., southern flying squirrel, red-shouldered hawk) while others may never have been very common in the province (Fowler’s toad).

Table 10-7 provides an overview of the broader habitat requirements of some of these species and is organised around the major ecosystems: forests, wetlands, grasslands, and shorelines. Many species are found in several habitats. Refer to Appendix G (wildlife habitat matrices) for a more extensive list with their specific habitat requirements and geographic location. Often they have specialised habitat requirements, and many are sensitive to human disturbance.

Most species will be protected if sufficient amounts of these four ecosystems are placed within a natural heritage system of protected areas (see Chapter 2). Cooperation among adjacent planning authorities and landowners can do much to protect wide-ranging species. For example, they might agree to jointly protect significant conservation areas that cross township or county boundaries, and make their joint cooperation known to the residents through signs and interpretative trails stressing the importance of larger, unfragmented natural areas to a variety of wildlife.

**Table 10-7. General habitat requirements of selected species of conservation concern.**

Species/Guild of Conservation Concern	Forest	Wetland	Grassland	Shoreline
Five-lined skink	<ul style="list-style-type: none"> <li>Abundant down woody debris, other ground structure (e.g., rocks)</li> </ul>			<ul style="list-style-type: none"> <li>ground debris</li> </ul>
Eastern Massasauga rattlesnake	<ul style="list-style-type: none"> <li>larger forests with abundant down woody debris, rocky openings</li> </ul>	<ul style="list-style-type: none"> <li>hibernates in karst habitat wetlands</li> </ul>	<ul style="list-style-type: none"> <li>hunts in wet meadows</li> </ul>	<ul style="list-style-type: none"> <li>may feed in riparian habitat</li> </ul>



Species/Guild of Conservation Concern	Forest	Wetland	Grassland	Shoreline
Eastern hognose snake	<ul style="list-style-type: none"> <li>larger forests with abundant down woody debris</li> </ul>			<ul style="list-style-type: none"> <li>sandy soil, with toad and other amphibian prey, adjacent to larger forests</li> </ul>
Black rat snake	<ul style="list-style-type: none"> <li>larger forests with abundant down woody debris</li> </ul>			
Wood turtle	<ul style="list-style-type: none"> <li>river flood plains, flowing water</li> </ul>			
Eastern spiny softshell turtle		<ul style="list-style-type: none"> <li>abundant aquatic vegetation and moderately deep water</li> </ul>		<ul style="list-style-type: none"> <li>abundant aquatic vegetation</li> </ul>
Spotted turtle		<ul style="list-style-type: none"> <li>aquatic vegetation</li> </ul>		
Amphibians	<ul style="list-style-type: none"> <li>woodland breeding ponds</li> </ul>			
Fowler's toad				<ul style="list-style-type: none"> <li>sandy areas</li> </ul>
Bullfrogs				<ul style="list-style-type: none"> <li>aquatic vegetation</li> <li>permanent water</li> </ul>
Area –sensitive birds (See habitat matrices– Appendix G)	<ul style="list-style-type: none"> <li>large unfragmented forests with diversity of vertical structure</li> </ul>	<ul style="list-style-type: none"> <li>large swamps, marshes, bogs, or fens</li> </ul>	<ul style="list-style-type: none"> <li>large, unfragmented areas of grassland</li> </ul>	
Southern flying squirrel	<ul style="list-style-type: none"> <li>mature deciduous woods</li> </ul>			
West Virginia white butterfly	<ul style="list-style-type: none"> <li>moist mature deciduous forest with riparian features</li> <li>toothwort</li> </ul>			

<b>Species/Guild of Conservation Concern</b>	<b>Forest</b>	<b>Wetland</b>	<b>Grassland</b>	<b>Shoreline</b>
Karner blue butterfly			<ul style="list-style-type: none"> <li>• grasslands with lupines</li> </ul>	<ul style="list-style-type: none"> <li>• lupine</li> <li>• beach dunes</li> </ul>
Frosted elfin butterfly			<ul style="list-style-type: none"> <li>• prefers pine-oak savannah</li> </ul>	<ul style="list-style-type: none"> <li>• beach dunes</li> </ul>
Numerous other butterflies (e.g., monarch)			<ul style="list-style-type: none"> <li>• grasslands for food and host plants</li> </ul>	

Again the importance of forest ecosystems is clear, especially larger, more mature forests with some water and abundant down woody debris. Shorelines are very important habitats for many species of conservation concern, especially those with sandy soils and adjacent water with abundant emergent and submergent vegetation. Many species of conservation concern are dependent on healthy, relatively undisturbed wetlands.

## 11 Assessment of the Natural Heritage System

The first ten chapters of this technical document focus on identifying and prioritising significant wildlife habitat. There are, however, six other types of natural heritage features identified in the Natural Heritage Component of the Provincial Policy Statement. To be ecologically functional, the best examples of all of the natural heritage features should be identified and protected. The mosaic of natural heritage features on the landscape and the connections among them is known as a Natural Heritage System (OMNR 1999).

The other natural heritage features (in addition to significant wildlife habitat) are significant wetlands, the significant portions of the habitat of endangered and threatened species, significant woodlands, significant valleylands, significant ANSI's, and fish habitat. Methods for identifying and protecting these features are presented in the *Natural Heritage Reference Manual* (OMNR 1999) and supporting technical documents, where available.

Once all natural heritage features have been identified, they should be mapped. This map then should be closely examined to see if a functional natural heritage system has been put in place. Key questions to ask:

*Are there examples of all seven types of natural heritage features on the map?* Note that there may be no examples of some of these in certain planning authority's jurisdictions. For instance, there may be no endangered or threatened species, significant wetlands, or ANSI's in some municipalities. Significant woodlands and valleylands are not designated on the Canadian Shield. Conceivably, planning authorities that straddle the Shield could have significant woodlands or valleylands in part of their jurisdiction, but not on the Shield. If not all types of natural heritage features are represented in the municipality, the planning authority should confirm that they do not exist and have not been overlooked.

*Is all fish habitat adequately protected by the natural heritage system?* Unlike the other six types of natural heritage features, where the best examples are protected, all fish habitat is considered equal under the federal Fisheries Act. If development is allowed to proceed that have negative impacts on fish habitat, the proponent and possibly even the planning authority may be in contravention of the Fisheries Act.

*Are there good connections among natural areas?* If there are isolated areas, thought should be given to connecting them to the remainder of the natural heritage system. This may not need to be a corridor per se, but it could be a series of smaller natural areas that could act as stepping stones for species travelling across the landscape. Some of the evaluated natural heritage features (i.e. non significant wetlands or wildlife habitat) that did not stand out as best examples might be included in the natural heritage system if they fulfil a linkage function.

## **11.1 Gap analysis**

A gap analysis is the process of determining what is unrepresented or under represented from a planning area. The OMNR techniques for undertaking a gap analysis are presented in Appendix E. It should be referred to for more detail, but a brief overview is provided below.

After the natural heritage system has been mapped and examined in the above broad fashion, it should be looked at in more detail. The first step, if it were not undertaken during initial phases, should be to break the planning area into physiographic units. This could be done at a variety of scales:

- Site region. Some planning areas will be in more than one site region.
- Site district. Many planning areas will be in more than one site district.
- Physiographic area. Most planning areas will have more than one physiographic unit within their boundaries, as defined by Chapman and Putnam (1984).
- Soil types. All planning areas will contain more than one soil type.

All of these units (where applicable) should be indicated on the natural heritage system map. Then each of the types of natural heritage features should be re-examined to see if they are adequately represented in each physiographic unit.

This analysis may reveal large disparities within the natural heritage system. For instance, all of the significant woodlands may be in one physiographic unit, and unrepresented in others. If most of the municipality were on a forested moraine, it may have been decided that significant woodlands should be 30 ha in size. By applying this criterion to the entire municipality, none of the woodlands on till plains may have met the size criterion. Once the planning area is subdivided into physiographic units, it may be obvious that there is a need for more than one set of criteria. In this example, woodlands as small as 4 ha or even 2 ha might be significant on the till plain although the 30 ha criteria may remain in place on the forested moraine.

Wetlands are another good example. Using the same scenario, the moraine may have several significant wetlands as well as many other wetlands that did not achieve provincial significance. On the till plain, there may be no significant wetlands according to the wetland evaluation system and the PPS. Wetlands in general may be small and rare on this physiographic unit, so the planning authority may wish to protect the best examples of these wetlands.

At the broad scale, the natural heritage system should be evaluated for distribution of natural areas and features within the physiographic units that the planning authority has decided to use. Once this has been completed and criteria adjusted as necessary to ensure as complete a representation as possible within each unit, it is time to look at it at a finer scale. Failure to look holistically at natural heritage features at least within major physiographic units may result in certain significant features being overlooked, subsequently lost, and possibly unnecessary challenges of the natural heritage system at the Ontario Municipal Board.

### **11.1.1 Gap analysis of vegetation communities**

As part of the process of identifying significant woodlands, wetlands, and wildlife habitat, it is likely that planning authorities will have a good idea of what vegetation communities occur within their jurisdiction. Examination of FRI maps, air photos, watershed studies, and other information will help confirm vegetation community types. The distribution of vegetation communities should be examined within the entire municipality and within the different physiographic units.

This is frequently a very enlightening process. It may become apparent that there are certain rare habitats throughout the planning area. In this case, they could be considered significant wildlife habitat for the entire municipality. What is often surprising is that some of the most common vegetation communities in the planning area may be rare or unrepresented in some physiographic units. For example, upland white cedar coniferous forest may be common to abundant on the portion of the planning area that is on the Shield, but rare in the agricultural portion of the area. Disparities in the distribution of vegetation communities may be even more profound if the planning authority is examined at the soil-type level.

Certain planning areas may contain small portions of a different forest region. For example, some may have Carolinian and Great-Lakes St. Lawrence forest regions, or Great-Lakes St. Lawrence and Boreal forest regions. It is essential that good representation of each type be maintained.

As in the case of looking at the broad scale of distribution of the major types of natural heritage features, it may be necessary to have different criteria for vegetation communities by physiographic unit to ensure good representation within the planning area.

There may have been vegetation communities within the planning area that no longer exist. Prairies and savannahs are classic examples, with less than one percent of the original coverage of these habitats remaining. Many wetlands have also been lost (about 70 percent in the south), so that certain types of wetlands may have been lost entirely from the planning area, or wetlands may have disappeared from certain physiographic units.

One source of information for determining historical vegetation community distribution is the notes of the original land surveyors. They were commissioned to survey the land before extensive land clearing. This information has been mapped and is available from the Ministry of Citizenship, Culture, and Recreation, and from the Natural Heritage Information Centre. The quality of this information varies, depending on the interest and identification skills of the surveyor. However, these maps may be invaluable in identifying areas where there were prairies, savannahs, specific forest types and wetlands.

Another technique for identifying where wetlands previously occurred, is to examine older topographical and soil maps. Areas on old topographical maps where there are wetland symbols or organic soils indicated on soil maps were likely previous wetlands. A series of wetland approximation maps has been prepared using this information. The maps are available from Environment Canada.

The current distribution of vegetation communities within the planning authority's jurisdiction compared to historical times may give a very good indication of which communities are currently poorly represented and, if rehabilitation is planned, where it can be focused.

### **11.1.2 Gap analysis of species**

At the finest level of gap analysis, planning authorities should look at the distribution of species within their jurisdiction. This, of course, requires a more intimate knowledge of the ecology of the area than looking at vegetation communities.

Initially, this might be done at a guild level, by lumping species with similar broad habitat characteristics together. For instance, by examining the various atlases, it may become apparent that area-sensitive bird species and amphibians are well distributed in the portion of the planning area that is on the Niagara Escarpment, but rare to absent on the clay plain below it. Again, different criteria for the maintenance of habitat for these species should be derived for different physiographic units. This analysis will also demonstrate which species are lacking habitat in certain portions of the planning area.

A gap analysis for individual species may also be undertaken. This may be done at the physiographic unit level within the planning area, or species that are lacking from the planning area entirely may be identified. This may be done by consulting the various atlases, knowledgeable individuals, and a CAC, if the planning authority has one.

Some species appear to be shifting their ranges southward, such as ravens, black bears, and fishers. Planning authorities that are currently near the range of these species (where they still do not occur) should consider if there is a need to provide habitat for them. In certain cases, it may be necessary to consider whether these species are desirable in the planning area before attempting to rehabilitate habitat for them. For instance, in a planning area that

is experiencing significant human population growth, it may not be desirable to encourage black bears.

By examining the atlases, particularly, the breeding bird atlas, it may become apparent that certain species occur adjacent, or even all around, the planning area, but are absent within it. In these instances, these species may be targets for restoration work to provide habitat for them.

## **11.2 Restoration and rehabilitation opportunities**

Gap analysis will have identified what natural heritage features, vegetation communities, species and functions are absent from all or a portion of the planning area, and also what features are degraded and would benefit from rehabilitation.

Many organisations and local clubs are actively involved in habitat and species restoration. A small number of examples are listed in Appendix F. The gap analysis described above may provide a starting point for restoration efforts within a planning area.

Several excellent documents deal with habitat restoration and rehabilitation. Planning authorities as well as private organisations that wish to improve their natural environment are urged to consult them.

Riley and Mohr (1994) summarise the ecological principals behind establishing a natural heritage system, and identify municipalities that were deficient in forest cover.

Noss (1995) provides valuable information on using physiographic units as the basis for ecological frameworks.

A manual prepared by Environment Canada, OMNR, and the Ministry of the Environment (1998) identifies targets for habitat restoration for aquatic and terrestrial habitats, and indicates which species might be expected at lower thresholds of restoration.

The Waterfront Regeneration Trust (1995) have a book on restoring natural habitats. This is a practical manual that gives advice on how to decide what to restore, and then how to do it.

*The Temperate Wetland Restoration Guidelines* (OMNR, Canadian Wildlife Service, and Ducks Unlimited Canada, 1998) describe the ecology of wetlands and provide step-by-step details on how to create or restore a wetland. This manual goes through the entire process from initial planning to as-built drawings and monitoring requirements.

It is recommended that before habitat restoration and rehabilitation efforts be considered the proponent should consult the aforementioned publications. Some of them define the

philosophy and rationale for conducting restoration; some provide targets, while others are how-to manuals.

Several sources of funding may be available to those wishing to undertake habitat restoration. Many of these funds are channelled through government agencies and nationally or provincially based private organisations. Funding sources and partnerships change depending on agency priorities. It is recommended that the agencies listed in Appendix F be contacted to inquire about available programs and partnership opportunities. Some specific programs and suggestions are provided below:

- The Community Fisheries/Wildlife Involvement Program (CFWIP) is sponsored by OMNR. Projects that involve habitat improvements for fisheries and/or wildlife may be funded. Generally, OMNR will fund materials necessary for habitat rehabilitation work if labour required to conduct the work is volunteered by a group or landowner.
- The Eastern Joint Habitat Venture (EJHV) encourages conservation and restoration of wildlife habitat, particularly if it benefits waterfowl and contributes to achieving the goals of the North American Waterfowl Management Plan. Grants are given to landowners and stakeholders that improve habitats, especially wetlands.
- Ducks Unlimited Canada will provide assessments of habitat restoration and creation on private and public land if it has the potential to improve habitat for waterfowl. If there will be positive benefits, Ducks Unlimited will do the necessary habitat management provided that the landowner enters into a long-term agreement to protect the habitat. Management undertaken by Ducks Unlimited and also those projects funded by the Eastern Joint Habitat Venture may assist planning authorities in achieving their targets for certain habitat types and species. Wetlands created for waterfowl also benefit all other groups of wildlife and contribute to biodiversity.
- The planning authority should check to see if it is in a Great Lakes Area of Concern (AOC). The International Joint Commission has identified these areas as having significantly degraded water quality. Sixteen of these sites occur in Ontario, and the objective is to improve habitat in all of them so that they can be de-listed. Rehabilitation plans are in place for all sixteen sites. If restoration plans of the municipality are likely to contribute to the rehabilitation programs identified for the AOC, the Great Lakes Cleanup Fund may assist with funding.
- Local conservation authorities may have programs for private landowners that help defray costs of habitat restoration, such as for tree planting. Co-ordination with the conservation authority may help to target landowners where a high priority for habitat management has been identified.



- If there are highly significant habitats within the municipality, such as Carolinian forests, prairies, or savannahs, groups such as Carolinian Canada, the Nature Conservancy, the World Wildlife Fund, Wildlife Habitat Canada and Wetlands International may be interested in assisting with habitat restoration.
- Consider setting up a foundation that raises funds from the public. This has been a proven success at many natural areas (e.g. Second Marsh). This needs a dedicated core of individuals who can effectively communicate goals, needs, and results to the public.

## **12 References**

### **12.1 Literature Cited**

- Bakowsky, W.D. 1996. Natural heritage resources of Ontario: S-ranks for communities in site regions 6 and 7. Ontario Ministry of Natural Resources, Natural Heritage Information Centre, Peterborough. Draft.
- Beechey, T.J. 1980. A framework for the conservation of Ontario's biological heritage. Ontario Ministry of Natural Resources. Parks and Recreational Areas Branch, Toronto, ON.
- Brownell, V.R. and B.M.H. Larson. 1995. An evaluation framework for natural areas in the regional municipality of Ottawa-Carleton: Volume 1. Regional Municipality of Ottawa-Carleton, Ottawa. 120 p.
- Catling, P.M. and V.R. Brownell. 1995. A review of the alvars of the Great Lakes region. Distribution, floristic composition, biogeography and protection. *Can. Field-Naturalist*. 109:143-171.
- Chapman, L.J., and D.F. Putnam. 1984. The Physiography of Southern Ontario; Ontario Geological Survey, Special Volume 2, 270p
- Crins, W.J. and P.S. Kor. 1999. Natural heritage gap analysis methodologies used by the Ontario Ministry of Natural Resources. Ontario Ministry of Natural Resources, Natural Heritage Section. Draft
- Domon, G. and Y. Bergeron. 1987. Development of synthetic criteria for the ecological evaluation of woodlots and woodlot units. *Environmental Management* 11:667-673.
- Environment Canada, Ontario Ministry of Natural Resources and the Ontario Ministry of the Environment. 1998. A framework for guiding habitat rehabilitation in Great Lakes Area of Concern. Canada-Ontario Remedial Action Plan Steering Committee.
- Farrar, J.L. 1995. Trees in Canada. Canadian Forest Service, Fitzhenry & Whiteside Limited, Markham, ON.
- Geomatics International Inc. 1991. Environmentally Sensitive Area Study. Addendum report,. Regional Municipality of Halton Planning and Development Department. 2 volumes.

- Hills, G.A. 1959. A ready reference to the description of the land of Ontario and its productivity. Ontario Department of Lands and Forests, Research Division Preliminary Report, 141 p.
- Lee, H., W. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological Land Classification for Southern Ontario First approximation and its application. Ontario Ministry of Natural Resource, Southcentral Sciences Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.
- NCASI. 1996. The National Gap Analysis Program: Ecological assumptions and sensitivity to uncertainty. National Council of the Paper Industry for Air and Stream Improvement, Inc. Technical Bulletin No. 270. North Carolina, U.S.A.
- Noss, R.F. 1995. Maintaining ecological integrity in representative reserve networks. A World Wildlife Fund Canada/World Wildlife Fund-United States Discussion Paper. 77p.
- Noss, R.F. and A.Y. Cooperrider. 1994. Saving nature's legacy: protecting and restoring biodiversity. Island Press, Washington, DC. 416 p.
- OMNR 1999. Natural Heritage Reference Manual for Policy 2.3 of the Provincial Policy Statement. Ontario Ministry of Natural Resources. 127 p
- OMNR, CWS and Ducks Unlimited. 1998. The Temperate Wetland Restoration Guidelines.
- Ontario Wildlife Working Group. 1991. Looking ahead: a wild life strategy for Ontario. Ontario Ministry of Natural Resources, Queens Printers, Toronto. 172 p.
- Riley, J.L. and P. Mohr. 1994. The natural heritage of southern Ontario's settled landscapes. A review of conservation and restoration ecology for land-use and landscape planning. Ontario Ministry of Natural Resources, Southern Region, Aurora, Science and Technology Transfer, Technical Report TR-001. 78pp.
- Smith, P.G.R and J.A.Theberge 1986. A review of criteria for evaluating natural areas. *Environmental Management* 10: 715-734
- Villard, M.-A., K. Freemark and G. Merriam. 1992. Metapopulation theory and neotropical migrant birds in temperate forests: an equilibrium investigation. Pp. 474–482, *in*, J.M. Hagan and D.W. Johnson (eds.) *Ecology and Conservation of Neotropical Landbirds* Smithsonian Institution Press. 609 pp.

Waterfront Regeneration Trust. 1995 Restoring natural habitats. A manual for habitat restoration in the Greater Toronto Bioregion. Waterfront Regeneration Trust, Toronto. 179 pp.

## **12.2 Glossary**

Alvar - naturally open areas of thin soils over essentially flat limestone, dolostone or marble rock, supporting sparse vegetation cover of shrub and herbs.

Aquatic feeding area – sites, generally marsh habitat, that contain aquatic vegetation rich in sodium (pondweeds, water milfoil, and yellow water lily) with sufficient shoreline cover that is frequented by moose to replenish sodium supplies.

Biodiversity – the variability among organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species and ecosystems.

Bog – nutrient-poor, acidic wetlands comprised primarily of peat-covered areas with a high water table.

Calving site – an isolated area providing cover and escape paths from predators that moose utilize on an annual basis to give birth. Generally, these are elevated areas on peninsulas or islands.

Colonial nesting – species that nest in colonies, large groups.

Corridor – the naturally vegetated or potential re-vegetated areas that link or border natural areas and provide ecological functions such as habitat, passage, hydrological flow, connection or buffering from adjacent impacts. They can occur across or along uplands, lowlands or slopes. Ravine, valley, river and stream corridors are further defined as landform depressions, usually with water flowing through or standing in them for some period of the year.

Cumulative impacts – the sum of all individual impacts occurring over space and time, including those of the foreseeable future.

Ecological site district – a subdivision of a site region based on characteristic pattern of physiographic features which set apart fairly large areas from one another.

Ecological site region – an area of land within which the resource of vegetation to the features of the landform follows a consistent pattern. Each specific type of land (defined in terms of relief, texture and petrography of geologic materials, depth of bedrock and drainage conditions) within a specific region has its characteristic plant succession. Since an ecological site region is the integration of all the landscape features within a prescribed area, it can best be defined as a region of potential biological productivity.

Ecosystem – any area with a boundary through which the input or output of energy and materials can be measured and related to some unifying factor, and includes the living and non-living environment together with the non-living components of their environment, related ecological process and humans.

Ecosystem Land Classification (ELC) – the Canadian classification of lands from an ecological perspective: an approach to identify ecologically similar areas.

Endangered - any native species that, on the basis of the best available scientific evidence, is at risk of extinction or extirpation throughout all or a significant portion of its Ontario range if the limiting factors are not reversed.

Endemic – a species or taxon naturally occurring only in a particular geographical area/range.

Exotic species – a non-indigenous species introduced into an area.

Extinct - any species formally native to Ontario that no longer exists.

Extirpated - any native species no longer existing in the wild in Ontario, but existing elsewhere in the wild.

Fen – peatlands characterized by surface layers of poorly to moderately decomposed peat, often with well-decomposed peat near the base. Sedge species form the dominant vegetation of fens; mosses may be present or absent.

Forbs – a broad leaf herbaceous (non-woody) plant

FRI (Forest Resource Inventory) – a resource inventory of Ontario forests based on an interpretation of aerial photography. Photo-interpreters use field data of sample plots (such as tree species, basal area, age and height) and aerial photography to delineate forest stand boundaries and describe forest stands. Descriptions are then transferred to Ontario Base Maps, FRI is designed to provide a snap-shot picture of existing forest conditions and a data base for decision-making and planning for a variety of resource managers.

Guilds – species which are grouped together because of common strategies and/or use of areas for life cycle stages.

Hibernacula – a protected area with stable non-freezing temperatures, such as a cave, where bats survive the winter, or a burrow where snakes do the same.

Indigenous – species which have originate naturally in a particular region or environment

Mineral lick – an area of upwelling groundwater rich in sodium, generally surrounded by forest cover that is visited by moose in spring to replenish sodium supplies.

Moraine – a knobby ridge either of (a) boulder clay built by a thrust of a glacier or of (b) gravel and sand deposited at the edge of glacier by escaping meltwater.

Natural heritage features and areas – means features and areas, such as significant wetlands, fish habitat, significant woodlands south and east of the Canadian Shield, significant valleylands south and east of the Canadian Shield, significant portions of habitat of endangered and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscapes of an area.

Patch – in a landscape, a non-linear surface differing in appearance from its surroundings.

Significant wildlife habitat – ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system.

Talus – a sloping mass of rock fragments at the base of a cliff.

Threatened -any native species that, on the basis of the best available scientific evidence, is at risk of becoming endangered throughout all or a significant portion of its Ontario range if limiting factors are not reversed.

Vulnerable - any native species that, on the basis of the best available scientific evidence, is a species of special concern in Ontario, but is not a threatened or endangered species.