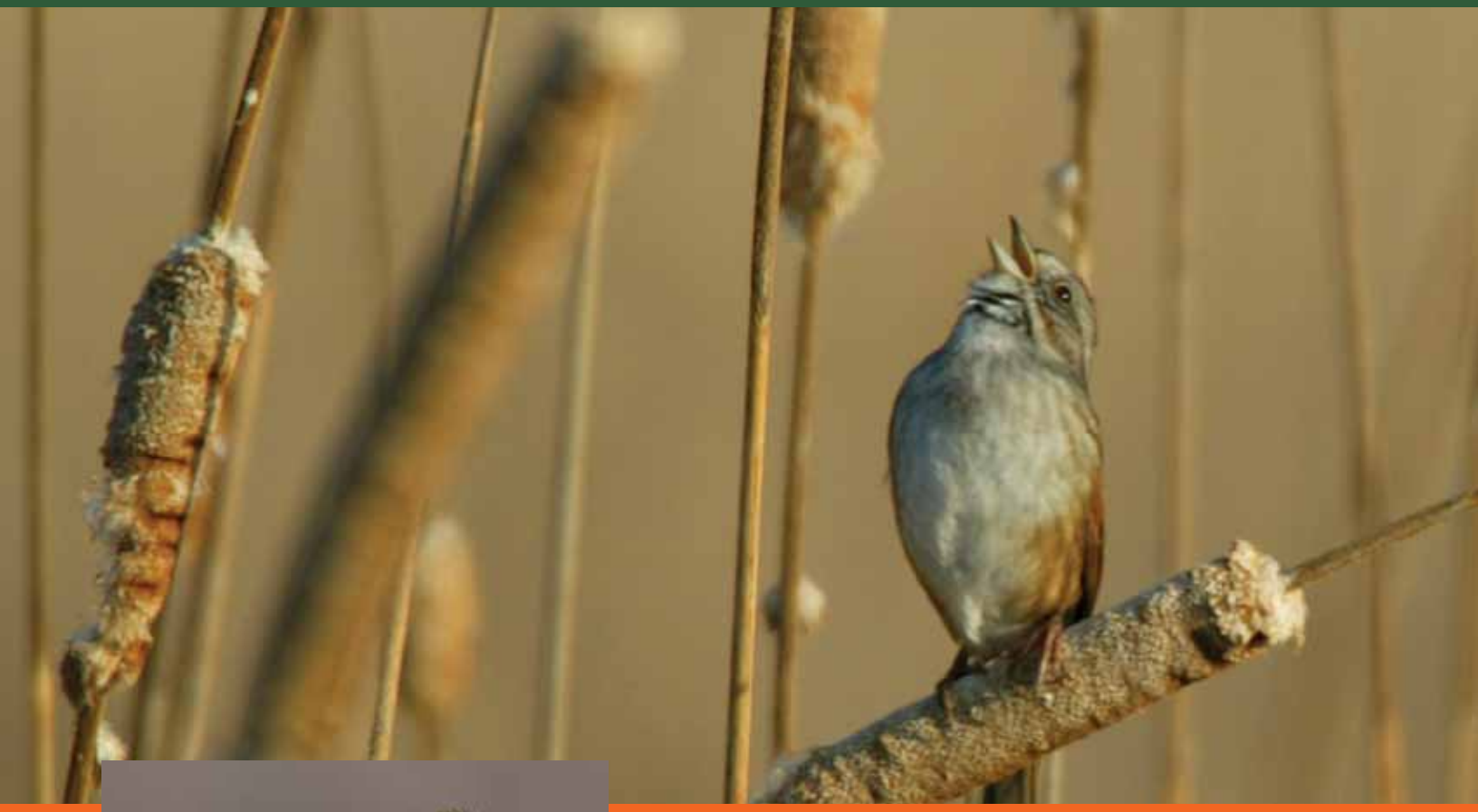
Ontario Landbird Conservation Plan



BOREAL SOFTWOOD SHIELD

North American Bird Conservation Region 8

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Ontario Landbird Conservation Plan:
Boreal Softwood Shield
North American Bird Conservation Region 8

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Acronyms

ANSI – Area of Natural and Scientific Interest
BBA – Ontario Breeding Bird Atlas projects
BBA1 – Ontario Breeding Bird Atlas, 1981-85
BBA2 – Ontario Breeding Bird Atlas, 2001-05
BBS – Breeding Bird Survey
BCR – Bird Conservation Region
BFBP – Boreal Forest Bird Program
BMP – Best Management Practice
BSC – Bird Studies Canada
CAR – Census of Agricultural Regions
CBC – Christmas Bird Count
CCA – Canadian Census of Agriculture
CMMN – Canadian Migration Monitoring Network
COSARRO – Committee on the Status of Species at Risk in Ontario
COSEWIC – Committee on the Status of Endangered Species in Canada
CWS – Canadian Wildlife Service
dbh – diameter at breast height
EC – Environment Canada
EHJV – Eastern Habitat Joint Venture
ELC – Ecological Land Classification
ERNV – Estimated Range of Natural Variation
FBMP – Forest Bird Monitoring Program
FRI – Forest Resource Inventory
HMANA – Hawk Migration Association of North America
IBA – Important Bird Area
MAPS – Monitoring Avian Productivity and Survivorship
NABCI – North American Bird Conservation Initiative
NHIC – Natural Heritage Information Centre
NWA – National Wildlife Area
OLC – Ontario Land Cover mapping
OMMAH – Ontario Ministry of Municipal Affairs and Housing
OMNR – Ontario Ministry of Natural Resources
ONRS – Ontario Nest Records Scheme
OnTAP – Ontario Terrestrial Assessment Program
PFW – Project FeederWatch
PIF – Partners in Flight
PPS – Provincial Policy Statement on Natural Heritage
PSW – Provincially Significant Wetland
SAR – Species at Risk
SARA – *Species at Risk Act*
SARO – Species at Risk in Ontario

Executive Summary

The Boreal Softwood Shield region in northern Ontario is an important part of the Canadian boreal forest "bird nursery," an area of vital importance to North America's avifauna. The purpose of this plan is to guide landbird conservation efforts to ensure that the distribution, diversity and abundance of birds across this region are sustained within the range of natural variability for this dynamic forest ecosystem.

The Planning Area

The plan covers Ontario's share of the Boreal Softwood Shield, Bird Conservation Region 8 (ON BCR 8) of the North American Bird Conservation Initiative (NABCI). The planning area encompasses much of the Boreal Forest Region in Ontario. This plan is intended as advice to all parties in this region, including government.

This is the third of four landbird plans being developed by Ontario Partners in Flight (PIF). Each plan focuses on the Ontario portion of a Bird Conservation Region (BCR). Together these four plans will contribute to continentwide efforts by PIF and NABCI to sustain the distribution, diversity and abundance of all North American landbirds. Read Chapter 1 to learn more about the scope and objectives of this plan and how it fits into continental conservation initiatives for birds. Chapter 2 provides a detailed look at this region, including an overview of its geography, vegetation, avifauna, current land cover and land use patterns.

Most of the plan – Chapters 3 through 10 – is devoted to three topics:

- Identifying priority landbird species and habitats;
- Setting measurable objectives for the conservation of priority species; and
- Recommending conservation actions to achieve these objectives.

Landbird Conservation Priorities

Thirty-seven (27%) of the 138 species of landbirds that regularly breed or winter in ON BCR 8 are identified as priority species (see Table 3). The PIF species assessment approach is outlined in Chapter 3 (see also Appendices C and E). Bird monitoring data are available for only a small portion of this large region (Appendix B), and the accuracy of information on population size and trend is generally poor for most landbirds (Appendix G). Improving bird population monitoring capability is a high-priority need in ON BCR 8.

Most of the priority species are common boreal forest landbirds for which this region has a particularly high conservation responsibility. Some priority species are of high conservation concern due to a combination of population declines, high vulnerability and high regional responsibility (Bay-breasted Warbler, Canada Warbler, Olive-sided Flycatcher and Rusty Blackbird). Six landbird Species at Risk (SAR) occur within this region, including large numbers of Bald Eagle, widely distributed populations of Rusty Blackbird, and small local populations of Peregrine Falcon, Short-eared Owl and Golden Eagle.

Twenty-eight priority species are forest species, associated with one of the following general forest types, each of which is considered a priority habitat for attention:

- *Coniferous forest* – 15 priority species (see Chapter 5);
- *Deciduous forest* – 6 priority species (see Chapter 6); and
- *Successional forest* – 7 priority species (see Chapter 7).

Nine priority species are more closely associated with non-forested habitats, including:

- *Wetland/riparian* – 7 priority species and a priority habitat category (see Chapter 8 for details); and
- *Non-forested upland* – Some landbird species in this region, including two priority species (Peregrine Falcon and Golden Eagle), are not closely associated with forest or wetland habitats and need open upland habitats such as rock cliffs, rock barrens, agricultural grasslands or developed areas (see Chapter 9).

One additional group of landbirds identified in this plan as a priority for attention is the *aerial-foraging insectivores* – birds that feed on flying insects captured while "on the wing" (see Chapter 10). This group includes swallows, swifts and nighthawks. All seven aerial-foraging insectivores that breed regularly in ON BCR 8 are showing signs of decline, although none is identified individually as a priority species.

Landbird Conservation Objectives

Overall objectives are set for each priority species to give general guidance to conservation efforts. For the two Endangered or Threatened species (Golden Eagle and Peregrine Falcon), the overall objective is *recovery,* as determined by the SAR recovery strategy for that species. For six other species that are poorly monitored in this region, the immediate objective is to *assess status* periodically.

Objectives for most forest priority landbirds are consistent with current forest management objectives that aim to ensure that the supply of forest habitat types across the landscape is maintained within the estimated range of natural variability (ERNV). For most forest species, a habitat-based objective is set as *maintain the supply of suitable habitat within the ERNV.* A coarse filter approach to measuring habitat supply is considered sufficient for most forest species, but fine filter objectives are needed for species with more specialized habitat needs.

Population objectives are set for a limited number of species, particular those that have experienced population declines that do not appear to be linked to the supply of breeding habitat. For two wetland species of high concern (Olive-sided Flycatcher and Rusty Blackbird), the population objective is to *reverse* declines. For four other declining species (Canada Warbler, Connecticut Warbler, Purple Finch and Belted Kingfisher), a population objective is set to at least *maintain current* levels. Abundance indices from the North American Breeding Bird Survey (BBS) and distribution levels recorded during the two Breeding Bird Atlas projects (BBA) for two subregions of ON BCR 8 are used to set population objectives.

The specific objectives set for each priority species are summarized in Chapters 4 through 9 and in the priority species accounts (Appendix F). Population abundance and distribution objectives for the aerial-foraging insectivore guild are provided in Chapter 10.

Conservation Actions

The plan proposes a range of actions for the conservation of landbirds in ON BCR 8 including actions related to monitoring, research and evaluation, planning and policy, outreach and education, and applied conservation. General actions that apply to many groups of landbirds are found in Chapter 4, actions specific to habitat and foraging guilds are listed in Chapters 5 to 10, and actions specific to each priority species are contained in the priority species accounts (Appendix F), which also contain details of species status, reasons for concern, ecology and objectives.

The proposed actions are expected to be implemented by a range of conservation partners in coordination with other bird conservation initiatives under the NABCI umbrella. Coordination with provincial Crown forest management planning is particularly important, as extensive forest harvesting is the major land use affecting landbird habitat in ON BCR 8. Conservation actions outside Ontario may also be necessary to

contribute to the objectives set in this plan, as most of the priority landbird species in ON BCR 8 are migratory.

Résumé

La région du Bouclier de résineux boréal du nord de l'Ontario constitue une partie importante de la « crèche d'oiseaux » de la forêt boréale canadienne, une région d'une importance capitale pour l'avifaune de l'Amérique du Nord. Le plan a comme objectif d'orienter les efforts déployés en matière de conservation des oiseaux terrestres afin de s'assurer que la répartition, la diversité et l'abondance des oiseaux dans cette région sont maintenues selon l'aire de distribution de variabilité naturelle caractéristique de cet écosystème forestier dynamique.

La zone d'aménagement

Le Plan couvre la région ontarienne du Bouclier de résineux boréal, soit la Région de conservation des oiseaux 8 (RCO 8 de l'Ontario) définie dans le cadre de l'Initiative de conservation des oiseaux de l'Amérique du Nord (ICOAN). La zone d'aménagement englobe une bonne partie de la forêt boréale de l'Ontario. Le Plan est élaboré en vue de conseiller l'ensemble des parties de la région, y compris le gouvernement.

Il s'agit du troisième de quatre plans de conservation des oiseaux élaborés par les Partenaires d'envol-Ontario. Chaque plan est axé sur la portion ontarienne d'une région de conservation des oiseaux (RCO). Ensemble, ces quatre plans appuieront les efforts déployés par les Partenaires d'envol-Ontario et l'ICOAN à l'échelle du continent en vue d'assurer le maintien de la répartition, de la diversité et de l'abondance des oiseaux terrestres de l'Amérique du Nord. Il faut lire le chapitre 1 pour en apprendre davantage sur la portée et les objectifs du Plan et sur la façon dont il cadre avec les initiatives de conservation des oiseaux à l'échelle du continent. Le chapitre 2 donne un tour d'horizon détaillé de cette région, notamment un aperçu de sa géographie, de sa végétation, de son avifaune, de sa couverture terrestre actuelle et des habitudes d'utilisation des terres qui lui sont propres.

La majeure partie du Plan, soit les chapitres 3 à 10, aborde trois sujets :

- La détermination des espèces d'oiseaux terrestres prioritaires et de leurs habitats;
- L'établissement d'objectifs mesurables pour assurer la conservation des espèces prioritaires;
- La recommandation de mesures de conservation pour l'atteinte de ces objectifs.

Priorités relatives à la conservation des oiseaux terrestres

Trente-sept (27 %) des 138 espèces d'oiseaux terrestres qui nichent ou passent l'hiver régulièrement dans la RCO 8 de l'Ontario sont classées comme des espèces prioritaires (se reporter au tableau 3). L'approche d'évaluation des espèces que préconisent les Partenaires d'envol-Ontario est brièvement décrite au chapitre 3 (se reporter également aux annexes C et E). Les données de surveillance des oiseaux ne sont disponibles que pour une petite portion de cette grande région (annexe B), et les renseignements relatifs à la taille et aux tendances des populations de la plupart des oiseaux terrestres ne sont généralement pas très exacts (annexe G). Il est prioritaire d'accroître la capacité de surveillance des populations d'oiseaux dans la RCO 8 de l'Ontario.

La plupart des espèces prioritaires sont des oiseaux terrestres rencontrés fréquemment dans la forêt boréale, envers lesquels la région précitée a une responsabilité particulièrement élevée en matière de conservation. La conservation de certaines espèces prioritaires est très préoccupante en raison d'une combinaison de facteurs tels le déclin des populations, leur grande vulnérabilité et une responsabilité élevée de la région à leur égard (Paruline à poitrine baie, Paruline du Canada, Moucherolle à côtés olive et Quiscale rouilleux). On retrouve six espèces d'oiseaux terrestres en péril dans cette région, notamment un grand nombre de Pygargues à tête blanche, des populations d'espèces telles que le Quiscale rouilleux dont

l'aire de distribution géographique est étendue, et de petites populations locales de Faucons pèlerins, de Hiboux des marais et d'Aigles royaux.

Vingt-huit espèces prioritaires sont des espèces forestières associées à l'un des types de forêt généraux suivants, lesquels sont tous considérés comme des habitats prioritaires auxquels il faut porter une attention :

- *Forêt de conifères* – 15 espèces prioritaires (se reporter au chapitre 5);
- *Forêt de feuillus* – 6 espèces prioritaires (se reporter au chapitre 6);
- *Forêt de succession* – 7 espèces prioritaires (se reporter au chapitre 7).

Neuf espèces prioritaires sont davantage associées à des habitats non forestiers, y compris :

- *Habitat palustre/riverain* – 7 espèces prioritaires et une catégorie d'habitat prioritaire (se reporter au chapitre 8 pour obtenir plus de détails);
- *Milieu sec non boisé* – Certaines espèces d'oiseaux terrestres de cette région, y compris deux espèces prioritaires (Faucon pèlerin et Pygargue à tête blanche), ne sont pas typiquement associées aux habitats forestiers ou palustres et recherchent plutôt des clairières sèches comme des falaises ou des landes rocheuses, des pâturages agricoles ou des zones aménagées (se reporter au chapitre 9).

Un autre groupe d'oiseaux terrestres défini comme prioritaire et auquel il faut porter une attention dans le cadre de ce plan, les *oiseaux insectivores en vol*, sont des oiseaux qui se nourrissent d'insectes volants capturés en « planant » (se reporter au chapitre 10). Ce groupe comprend les hirondelles, les martinets et les engoulevents. Les populations des sept espèces insectivores en vol qui nichent régulièrement dans la RCO 8 de l'Ontario sont en déclin, même si aucune n'est définie individuellement comme une espèce prioritaire.

Objectifs relatifs à la conservation des oiseaux terrestres

Des objectifs généraux sont établis pour chaque espèce prioritaire afin d'orienter de manière générale les efforts de conservation. En ce qui concerne les deux espèces menacées ou en voie de disparition (Pygargue à tête blanche et Faucon pèlerin), l'objectif général est le *rétablissement* des populations, tel qu'il est déterminé par la stratégie de rétablissement des espèces en péril relative à ces espèces. Pour six autres espèces qui sont mal surveillées dans la région, l'objectif immédiat est d'*évaluer régulièrement l'état* des populations.

Les objectifs définis pour la plupart des oiseaux terrestres forestiers prioritaires sont compatibles avec les objectifs actuels en matière de gestion forestière visant à faire en sorte que la disponibilité des types d'habitats forestiers sur le territoire soit maintenue selon l'aire de distribution de variabilité naturelle estimée. Pour la plupart des espèces forestières, un objectif axé sur l'habitat est défini comme le *maintien de la disponibilité d'habitats appropriés au sein de l'aire de distribution de variabilité naturelle estimée.* Une approche du filtre brut est suffisante pour mesurer la disponibilité des habitats pour la plupart des espèces forestières, mais des objectifs plus ciblés sont nécessaires pour les espèces qui requièrent des habitats plus spécialisés.

Des objectifs liés aux populations sont établis pour un nombre restreint d'espèces, particulièrement celles dont le déclin des populations ne semble pas lié à la disponibilité des habitats de reproduction. Pour deux espèces de milieux humides très préoccupantes (Moucherolle à côtés olive et Quiscale rouilleux), l'objectif lié aux populations est de *renverser* le déclin. Pour quatre autres espèces en déclin (Paruline du Canada, Paruline à gorge grise, Roselin pourpré et Martin-pêcheur d'Amérique), un objectif lié à la population est établi en vue de tout au moins *maintenir les niveaux actuels*. Les indices d'abondance tirés du Relevé des oiseaux nicheurs (BBS) de l'Amérique du Nord et les niveaux de répartition consignés dans

le cadre de deux projets de l'Atlas des oiseaux nicheurs pour deux sous-régions de la RCO 8 de l'Ontario servent à établir des objectifs liés aux populations.

Les objectifs précis fixés pour chaque espèce prioritaire sont résumés aux chapitres 4 à 9 et dans les relevés des espèces prioritaires (annexe F). Les objectifs liés à l'abondance et à la répartition des populations de la guilde des oiseaux insectivores en vol sont présentés au chapitre 10.

Mesures de conservation

Le Plan propose une panoplie de mesures de conservation destinées aux oiseaux terrestres de la RCO 8 de l'Ontario, y compris des mesures en matière de surveillance, de recherche, d'évaluation, de planification, de politiques, de sensibilisation, d'éducation et de conservation appliquée. Des mesures générales qui s'appliquent à beaucoup de groupes d'oiseaux terrestres sont présentées au chapitre 4, des mesures s'adressant aux guildes d'espèces partageant le même habitat et le même régime alimentaire sont présentées aux chapitres 5 à 10, et des mesures propres à chaque espèce prioritaire sont énumérées dans les relevés des espèces prioritaires (annexe F) qui renferment également des données sur l'état des espèces, les raisons pour lesquelles elles sont préoccupantes, l'écologie et les objectifs.

Les mesures proposées devraient être mises en œuvre par un ensemble de partenaires voués à la conservation des oiseaux en coordination avec d'autres initiatives de conservation des oiseaux générales de l'ICOAN. Des mesures coordonnées avec la planification de l'aménagement des forêts publiques provinciales sont particulièrement importantes, car l'exploitation forestière extensive est la principale utilisation des terres ayant une incidence sur l'habitat des oiseaux terrestres de la RCO 8 de l'Ontario. Il serait également peut-être nécessaire de mettre en œuvre des mesures de conservation à l'extérieur de la province qui appuient les objectifs fixés dans le Plan puisque la plupart des espèces d'oiseaux terrestres prioritaires de la RCO 8 de l'Ontario sont des oiseaux migrateurs.

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1. Introduction

1.1 Purpose

The purpose of this plan is to guide landbird conservation efforts in those parts of Ontario that lie within the Boreal Softwood Shield region, also known as Bird Conservation Region (BCR) 8. This is one of four such plans being developed to cover the four BCRs within Ontario (Figure 1).

The conservation goals of this plan are twofold:

- To sustain the distribution, diversity and abundance of native landbirds and their habitats in Ontario portions of BCR 8 (ON BCR 8); and
- To contribute to continentwide efforts to sustain the distribution, diversity and abundance of all North American landbirds.

This is a biological plan, aimed chiefly at:

- Identifying priority landbird species and habitats;
- Setting measurable and attainable objectives for the conservation of these priority species; and
- Recommending conservation actions to help achieve those objectives.

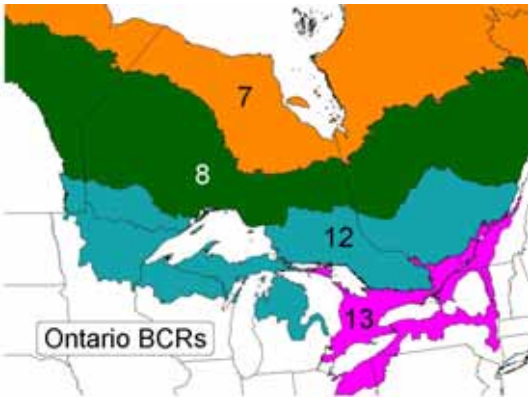
The plan is complementary to, and does not duplicate or replace, current recovery strategies and actions for those landbird species that have been officially designated as Endangered or Threatened, according to federal or provincial Species at Risk (SAR) legislation.

To be successful, this plan should be used to guide the actions of a diversity of partners, including:

- Conservation planners at federal, provincial and municipal levels;
- Public and private land owners and managers;
- Project proponents, consultants and environmental assessment practitioners;
- Scientists and volunteers involved in wildlife research and monitoring; and
- Individuals and organizations interested in making a difference for landbirds in their communities.

These partners are the primary audience for this plan, as their actions will influence the fate of Ontario's landbirds. Many of these partners have been directly or indirectly involved in the development of this plan.

Figure 1: Bird Conservation Regions (BCRs) that fall within Ontario.



BLACK-THROATED GREEN WARBLER © *Michael Butler*

Landbirds include a broad variety of species that rely primarily on terrestrial habitats throughout the year, including: vultures, eagles, hawks, falcons, grouse, quail, doves, cuckoos, owls, nightjars, swifts, hummingbirds, kingfishers, woodpeckers and passerines (songbirds).

1.2 Plan Objectives

The specific objectives of this plan are to use existing data, information and expert knowledge to:

- Identify priority landbird species by following a comprehensive, objective, science-based assessment process;
- Provide concise summaries of relevant information on the status, ecology, management and conservation needs of priority landbird species;
- Describe the various habitats of importance to different guilds of priority species, and summarize key issues affecting these priority habitats and the associated landbird guild;
- Establish realistic measurable objectives for the conservation of priority landbirds in this region;
- Recommend conservation actions that will assist in achieving these objectives, including:
    - Monitoring;
    - Research and evaluation;
    - Planning and policy;
    - Outreach initiatives; and
    - Applied conservation actions; and
- Ensure that the information and recommendations are presented in a format that will foster integration with other regional and international conservation efforts.

The information in this plan is designed to guide the conservation of landbirds in ON BCR 8 with the intent that the recommended actions will be implemented in coordination with other bird conservation efforts, including:

- Efforts directed at conserving waterfowl, waterbird and shorebird populations in Ontario;
- "All bird" conservation efforts across the entire extent of BCR 8; and
- Continental-scale Partners in Flight (PIF, Box 1) and North American Bird Conservation Initiative (NABCI,
- Box 2) programs.

Coordination with provincial forest management programs is also of particular importance in this BCR.

Box 1: Partners in Flight (PIF).

In 1990, Partners In Flight (PIF) was launched in the United States in response to growing concerns about declines in the populations of neotropical migrant landbirds (www.partnersinflight.org). Later, PIF expanded to include all landbirds, and PIF initiatives began in Canada and Latin America.

At its broadest level, PIF is a coalition of countries, government agencies, conservation groups, academic institutions, industry and concerned citizens who share a common vision*: to maintain the health of landbird populations and their habitats.*

In Canada, PIF activities are coordinated by a National Working Group, composed of representatives from several national organizations and regional PIF groups. Activities and products of this group include the Framework for Landbird Conservation in Canada (PIF Canada 1996) and the Canadian Landbird Monitoring Strategy (Downes et al. 2000). (See www.cws-scf.ec.gc.ca/birds/lb_ot_e.cfm).

Landbirds are one of the four pillars under the North American Bird Conservation Initiative (NACBI) framework (the other pillars are: waterfowl, shorebirds, and waterbirds). The landbird pillar is implemented chiefly through PIF activities which support the conservation of migratory and resident landbirds throughout their yearly ranges.

PIF Mission

To sustain the distribution, diversity and abundance of landbirds in their natural numbers and natural habitats, throughout their natural geographic ranges.

1) **Keeping common birds common**. Native birds, both resident and migratory, must be retained in healthy numbers throughout their natural ranges.

2) **Helping species at risk.** Species must be conserved before they become imperiled: allowing species to become threatened or endangered results in long-term and costly recovery efforts whose success is far from guaranteed.

3) Working in partnerships for birds, habitats and people. Conservation of landbirds and their habitats cannot be undertaken alone.

1.3 The Importance of Landbird Conservation

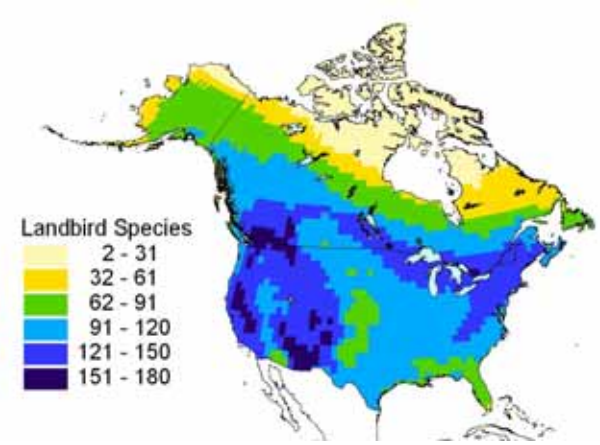
Birds are the most familiar and widely enjoyed forms of wildlife in North America, with more people watching and feeding birds than ever before. Birds bring beauty, song and joy into the lives of many people. Birds fill critical roles in ecological systems: through seed dispersal, pollination, control of pest species, and as prey for other wildlife. They also serve as a valuable early warning system for the health of the environment, as demonstrated by declines in populations of Peregrine Falcon, Osprey and other birds in the DDT era. Birds are also used as indicators of the health and biodiversity of forest ecosystems.

BCR 8 encompasses the heart of the northern boreal forests of North America and supports a rich assemblage of breeding birds, including more than 120 species of landbirds per latitude–longitude block (Figure 2).

This BCR supports a substantial proportion of the global population of several landbird species, and therefore has a high stewardship responsibility for ensuring their long-term conservation. In addition, populations of some common landbirds found in this region have undergone long-term declines for reasons that are complex and not always well understood.

As a first step in addressing concerns regarding declining landbird populations and ensuring the long-term stewardship of all landbirds, PIF promoted the development of regional landbird conservation plans. PIF also produced a major North American landbird conservation plan, establishing continental-scale priorities (Rich et al. 2004).

Figure 2: Map of species richness of breeding landbirds in each lat–long block in Canada and the United States, from an overlay of range maps.



Source: Rich et al. 2004.

Box 2: The North American Bird Conservation Initiative (www.nabci.net).

The North American Bird Conservation Initiative (NABCI) is a tri-national initiative involving Canada, the United States and Mexico. It was launched in 1999 by the Commission for Environmental Cooperation (an international organization created by Canada, Mexico and the United States under the North American Agreement on Environmental Cooperation) to address the need for coordinated bird conservation efforts that benefit "all birds in all habitats." In 2005, the governments of Canada, the United States and Mexico signed a NABCI Declaration of Intent to cooperate to conserve North American birds throughout their ranges and habitats (www.nabci-us.org/aboutnabci/NABCIFINALDOI.pdf).

NABCI advocates an approach to bird conservation that is regionally based, biologically driven and landscape oriented. It draws together the major bird conservation plans already in existence for waterbirds, shorebirds, waterfowl and landbirds (i.e., Partners in Flight plans such as this one), fills in knowledge gaps and builds a coalition of groups and agencies to execute the plans.

In Ontario, NABCI activities are coordinated through the Ontario Eastern Habitat Joint Venture (OEHJV). It is anticipated that conservation plans for landbirds and other birds will be implemented through the OEHJV and other partnership initiatives.

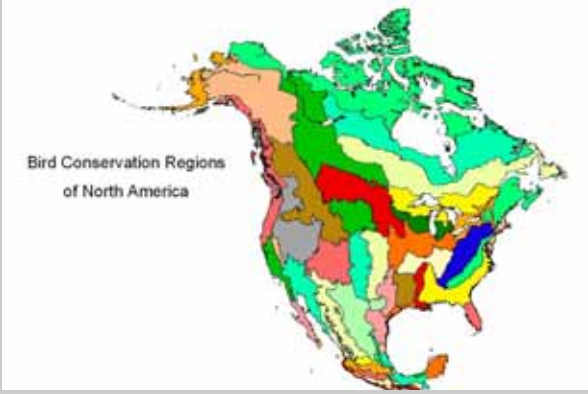
Box 3: North American Bird Conservation Regions (BCRs).

A shared concept of geography and landscapes is critical to effective planning. To that end, participants in the North American Bird Conservation Initiative (NABCI) have adopted a map of North America (Figure 3) that delineates a set of 66 geographic areas called Bird Conservation Regions (BCRs) (US NABCI Committee 2000). Each BCR encompasses landscapes having similar bird communities, habitats and resource issues. The BCR framework is now widely used for PIF planning and by other initiatives under the NABCI umbrella.

Twelve BCRs are entirely or partly in Canada. The province of Ontario encompasses parts of four BCRs (Figure 1).

Like birds, BCRs cross political borders: the success of current North American all-birds conservation efforts will ultimately depend on cooperation among jurisdictions. Regional plans, such as this one, are intended to facilitate multi-jurisdictional and multi-species conservation efforts.

Figure 3: North American Bird Conservation Regions (BCRs).



Source: www.bsc-eoc.org/international/bcrmain.html

1.4 The PIF North American Landbird Conservation Plan

The first iteration of the PIF North American Landbird Conservation Plan was completed in 2004 (Rich et al. 2004). This landmark document established a vision and planning framework for the conservation of all North American landbirds. A total of 195 Species of Continental Importance are identified in the continental plan, including:

- *PIF Watch List species:* species characterized by a high level of vulnerability and concern; and
- *PIF Stewardship species:* species for which a region has high responsibility because a large percentage of its global population occurs in a single biome.

Key links between the North American PIF Plan and this ON BCR 8 plan include:

- Priority species list – Ontario's BCR 8 list includes Species of Continental Importance identified in the PIF North American Plan (Rich et al. 2004), as well as species of regional importance or interest;
- Population objectives – This plan highlights opportunities for this region to contribute directly to achieving North America-wide population objectives for Species of Continental Importance that occur in significant numbers in ON BCR 8.

1.5 PIF in Ontario

In 1995, a partnership of government and non-governmental agencies produced a bird conservation plan for Ontario, published in 1997 as the Ontario Flight Plan (Cheskey 1995; Lounds et al. 1997). This plan builds on earlier efforts and puts them within the NABCI BCR planning framework. The priority species list, objectives and recommended actions in this plan will be used to facilitate and evaluate landbird conservation efforts in ON BCR 8.

The current Ontario Partners in Flight planning initiative is being led by Environment Canada – Ontario Region and the Ontario Ministry of Natural Resources, in partnership with Bird Studies Canada. This regional partnership is in keeping with PIF's grassroots approach, in which regions develop their own goals and strategies towards achieving the overall goal of *keeping common birds common.*

2. Overview of the Boreal Softwood Shield Region (BCR 8) in Ontario

2.1 Description

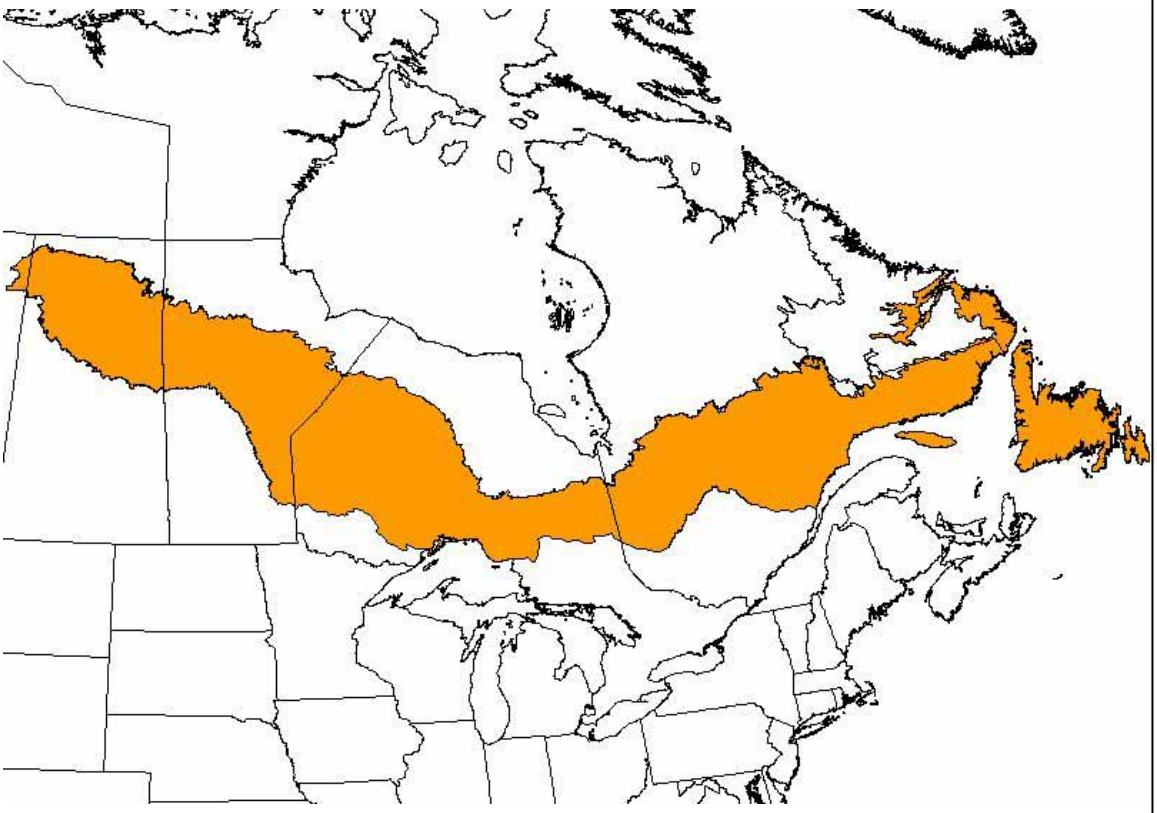
The Boreal Softwood Shield Bird Conservation Region, BCR 8, encompasses 1 470 000 km^2 of mostly forested lands on the Canadian Shield, extending from the east coast of Newfoundland to the northeast corner of Alberta (Figure 4).

BCR 8 lies entirely within Canada and includes parts of six provinces. The Ontario portion comprises 29% of the total BCR. The Quebec portion (32%) is slightly larger; smaller portions lie within Manitoba (16%), Saskatchewan (12%) and Newfoundland (11%) and a tiny piece in Alberta (0.3%).

The Ontario portion of BCR 8 (ON BCR 8) encompasses 429 300 km^2, or 44% of the total area of Ontario. This planning region forms a broad east–west belt extending across northern Ontario between the north shore of Lake Superior and the Hudson Bay lowlands (Figure 5).

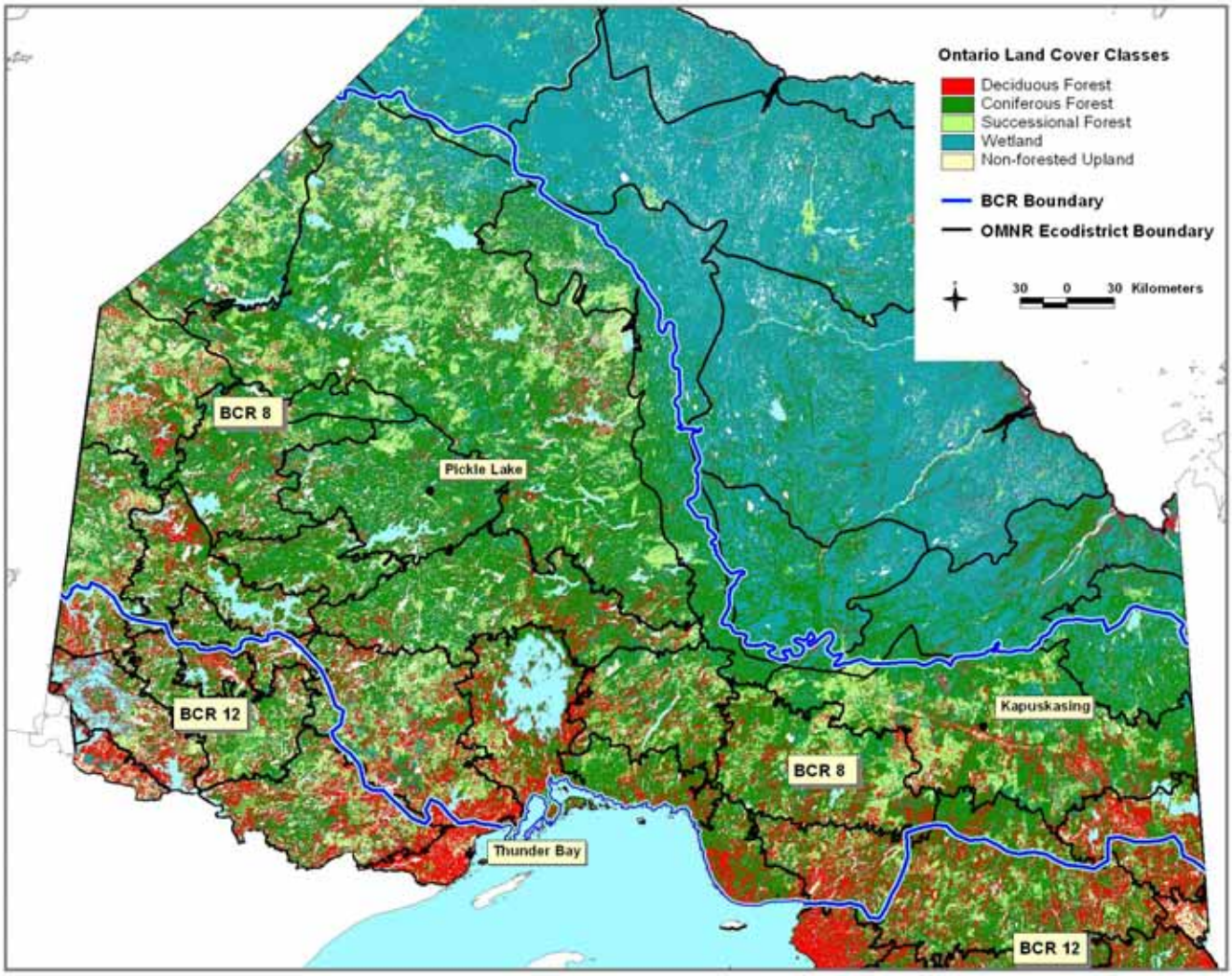
The Boreal Softwood Shield BCR corresponds generally to the northern portions of Environment Canada's Boreal Plain Ecozone (Wiken 1986; Marshall and Schutt 1999; www.ccea.org/ecozones/index.html) and OMNR's Ontario Shield Ecozone (Crins 2002). The BCR boundaries are consistent with the national ecoregion boundaries (Ecological Stratification Working Group 1995) but not with all of the OMNR's ecoregion boundaries (Hills 1959; Crins 2002). ON BCR 8 encompasses all or part of five ecoregions: 2W (Big Trout Lake), 3S (Cat Lake), 3W (Lake Nipigon), 4S (Lake Wabigoon) and 3E (Lake Abitibi) (Figure 6).

Figure 4: Boreal Softwood Shield Bird Conservation Region (BCR 8).



Source: **www.bsc-eoc.org/international/bcrmain.html**

Figure 5: Location map of the Ontario portion of BCR 8 showing BCR boundaries, ecoregion boundaries and general land cover.



Source: OLC 1990s edition; Crins 2002.

The southern half of Ecoregion 4S (Lake Wabigoon) and the southern third of Ecoregion 3E (Lake Abitibi) fall within BCR 12, the Boreal Hardwood Transition Bird Conservation Region.

2.2 Subregions of Ontario BCR 8

ON BCR 8 has been divided into two subregions for purposes of this plan (Figure 6). The larger West (W) subregion includes 76% of ON BCR 8 and encompasses all or part of four ecoregions (2W, 3S, 3W, 4S). The East (E) subregion corresponds fairly closely with the northern two-thirds of Ecoregion 3E.

The subregion and ecoregion units are used in various parts of this plan to highlight regional differences of importance to landbird conservation, such as differences in forest composition (2.4.1) and land cover (2.5). The two subregions are used to describe landbird distribution patterns and define distribution objectives for some priority species.

2.3 Physiography

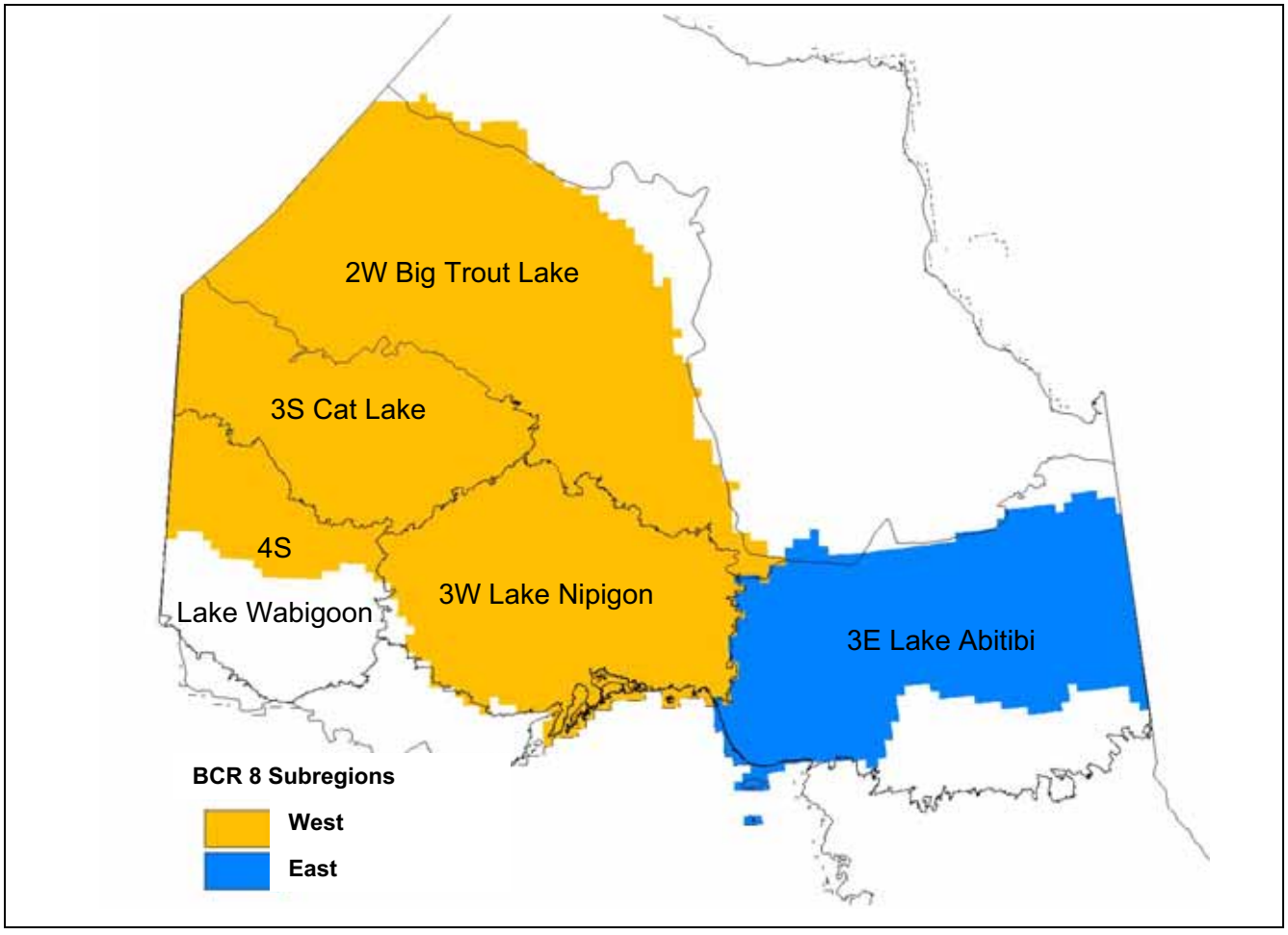
The physiographic features of this region influence the distribution and abundance of landbirds and their habitats.

Topography

The topography of ON BCR 8 varies from rugged, rocky sections with local topography exceeding 100 m, to rolling hills interspersed with lowland areas and numerous small lakes, to extensive flat-lying, poorly drained sections.

In general, topography in the northern portion of the region is more subdued than in the southern section. Elevations range from 200 m along the northern edge of the region to highs in excess of 500 m along the height of land in the southern part of ON BCR 8, which marks the watershed between the Lake Superior and Hudson Bay drainage basins.

Figure 6: Ontario BCR 8 subregions, overlaid on OMNR ecoregions.



Bedrock Geology
The entire area is underlain by Precambrian bedrock of the Superior Province of the Canadian Shield. The bedrock is dominated by acidic granitic rocks with belts of metavolcanic rocks and diabase intrusions (Baldwin et al. 2000). Differences in bedrock influence topography, soils and vegetation patterns.

Bedrock exposures are common throughout much of the region. Extensive areas of exposed bedrock are present in the northwestern section of ON BCR 8 near the Manitoba border (OLC data in OMNR 2002).

Surficial Features
Glacial ice sheets, which covered this entire region as recently as 10 000 years ago, scraped soil from the higher areas and deposited till and sediments in low-lying areas (Baldwin et al. 2000). Thin glacial till is the most widespread surficial material in the region. Extensive post-glacial lakes covered large parts of the region following the retreat of the ice sheets. The sediments of the Clay Belt were deposited in Lake Barlow–Ojibwa, created along the south side of the retreating ice sheet (Baldwin et al. 2000). Bedrock, clay plains and coarse sand and gravel deposits are present locally.

Glaciation also resulted in a disrupted drainage pattern. The entire region is interspersed with lakes and ponds. Inland waters comprise 14% of the total area of ON BCR 8, including 16% of the West and 7.6% of the East subregion.

The soils in the West subregion are mostly very well drained to excessively well drained brunisols and podzols (Baldwin et al. 2000). Soils in the East subregion are highly variable, ranging from excessively well drained podzols in the South to poorly drained luvisols and gleysols in the Claybelt area (Baldwin et al. 2000).

This region has a humid continental climate. Winter temperatures show a strong north–south gradient (Baldwin et al. 2000). The cold waters of Lake Superior exert a strong moderating effect on summer temperatures in the south-central part of the region. Annual precipitation ranges from 550–1000 mm, with the West being drier overall than the East subregion (Baldwin et al. 2000).

2.4 Vegetation

This region lies within the Boreal Forest Region (Rowe 1972), which is characterized by coniferous and mixed forests. Tree diversity in the boreal forest is much lower than in the Great Lakes forest, with only seven abundant tree species (Black Spruce, Jack Pine, Tamarack, Balsam Fir, Trembling Aspen, Balsam Poplar, White Birch) and another 17 less frequent species (Thompson 2000).

Common tree associations in the boreal forest region (Thompson 2000) include:
- Jack Pine and Black Spruce;
- Jack Pine and Black Spruce mixed with White Birch and Trembling Aspen;
- Trembling Aspen and Balsam Fir; and
- Black Spruce and Balsam Fir.

Extensive stands of Black Spruce are present in the Claybelt. Wetter sites support Black Spruce and Black Spruce with Tamarack or White Cedar.

2.4.1 Natural Vegetation

The natural landscape of this region is a mosaic of coniferous and mixed forest stands of varying ages (OMNR 2002). Small patches of non-forested habitats, including open wetlands and riparian meadows, as well as numerous lakes and streams, are scattered within the forest matrix.

The major natural disturbance in the boreal forest is fire, along with local and widespread insect outbreaks and blow-down events (Thompson 2000; Fleming et al. 2000). Fire return times vary across the region, being shorter in the drier parts of the West subregion, away from lakes Superior and Nipigon. Without fire suppression, Jack Pine and Black Spruce stands in western Ontario burn, on average, every 50 years versus about every 100 years in northeastern Ontario (Thompson 2000). Owing to the frequency of large fires, boreal forests tend to be dominated by even-aged stands (Thompson 2000). Patches of uneven-aged, old-growth forest that have escaped fire are estimated to comprise 5–10% of the landscape in boreal forests (Voigt et al. 2000).

2.4.2 Human Influences on Vegetation

Anthropogenic disturbance by aboriginal peoples in this region, including burning and harvesting of forest materials, had a localized impact on vegetation (Li 2000). The impact of European cultures began to affect the natural landscape of parts of this region some 150 years ago, as the logging and mining industries expanded into this region following the signing of treaties with the First Nations of Lake Superior (Epp 2000). The intensity and scale of logging in northern Ontario gradually increased as a result of improved access and increasing mechanization. Over the past century, the northern limit of forest harvesting has expanded. The total area

harvested has doubled every decade since the 1950s (Perera and Baldwin 2000).

Fire suppression patterns have followed a similar pattern to forest harvesting patterns: active fire suppression became more widespread and more effective in the 1950s. Natural fire disturbances are still frequent only in the northwestern parts of ON BCR 8, which are also beyond the current limit of extensive forest harvesting. Elsewhere, forest harvesting affects a much higher percentage of the landscape than fire or insect outbreaks (Perera and Baldwin 2000; Perera et al. 2004).

Compared to the natural disturbance regime, the historic combination of logging and fire suppression has favoured the succession of fire-sensitive tree species relative to fire-dependent, shade-intolerant conifers (Carleton 2000). The landscape configuration of forest patches has also changed as a result of extensive clear-cut harvesting (Perera and Baldwin 2000).

A major shift in forest management policies in Ontario occurred in late 20th century in conjunction an environmental assessment of OMNR forest management activities and passage of the *Crown Forest Sustainability Act (1994)* (Euler and Epp 2000). The large-scale effects of the resulting changes in forest management direction, such as ensuring that logging more closely emulates natural disturbances patterns, will become more apparent over the next several decades.

While logging and fire suppression have had the most widespread impact on forests in this region, other significant local human influences on the vegetation in this region include agricultural land clearing in the Claybelt area, road and railway construction, pipeline and utility corridors, settlements and hydro-electric power developments. Climate change, atmospheric pollution and ozone depletion may also be causing insidious changes to the boreal forest ecosystem.

2.5 Land Cover

The Ontario Land Cover (OLC) spatial database provides a coarse-resolution but comprehensive snapshot of the extent and distribution of landbird habitats in this region (White 2002). The OLC database is a land cover classification derived from Landsat^{TM} satellite images acquired during the early 1990s. The provincial-scale database uses 28 land cover classes, including vegetated (dense deciduous forest, open fens) and non-vegetated (bedrock outcrops and quarries, developed land) cover types.

In this plan, the land cover classes that occur in this region have been combined into nine general land cover categories and five landbird habitat categories (Table 1). The distribution of the landbird habitat land cover categories in ON BCR 8 is shown in Figure 5.

Overall, 96% of the land cover in ON BCR 8 is classified in the OLC as forested, including 56% coniferous and mixed coniferous forest, 14% deciduous and mixed deciduous forest, 15% regenerating successional forests created by clear-cuts and burns, and 11% treed wetlands (Table 2). Almost a quarter (22%) of the total land cover is classified as sparse forest, which includes a mix of trees, stunted trees and open areas. Open non-forested habitats comprise less than 5% of the land cover, consisting mostly of open wetlands (primarily bogs and fens) with some rock barrens, as well as agricultural lands and other developed lands.

Total forest cover is similar in each subregion of ON BCR 8; but the West subregion has a higher proportion of coniferous forest cover, whereas the East subregion has a high proportion of mixed coniferous, mixed deciduous and deciduous forest cover (Table 2; Figure 7). Although both subregions have similar proportions of successional forest, in the East subregion almost all these regenerating forests are the result of forest harvesting, whereas in the West subregion more than half are the result of forest fires (particularly in the northern section) (OLC 1990s edition data). Open and treed wetlands are fairly evenly distributed across the region. Developed areas comprise less than 1% of either subregion.

Open inland waters are not included as land cover in Table 2 or Figure 7, but comprise 16% of the total areas of the West versus 8% of the East subregion.

Table 1: Relationship of the Ontario land cover classes with the general land cover categories and landbird habitat categories used in the ON BCR 8 plan.

Ontario Land Cover Classes	General Land Cover Category	Landbird Habitat Guild
• Dense Coniferous Forest • Sparse Coniferous Forest	Coniferous Forest	Coniferous Forest
• Mixed Forest, Mainly Coniferous	Mixed Coniferous	
• Dense Deciduous Forest • Sparse Deciduous Forest	Deciduous Forest	Deciduous Forest
• Mixed Forest, Mainly Deciduous	Mixed Deciduous	
• Recent Cutover • Recent Burns • Older Cuts and Burns	Cuts and Burns	Successional Forest
• Treed Bog • Treed Fen	Treed Wetlands	WetlandRiparian
• Open Bog • Open Fen • Freshwater Marsh	Open Wetlands	
• Rock	Rock	Non-forested Upland
• Developed Areas • Fields	Developed	

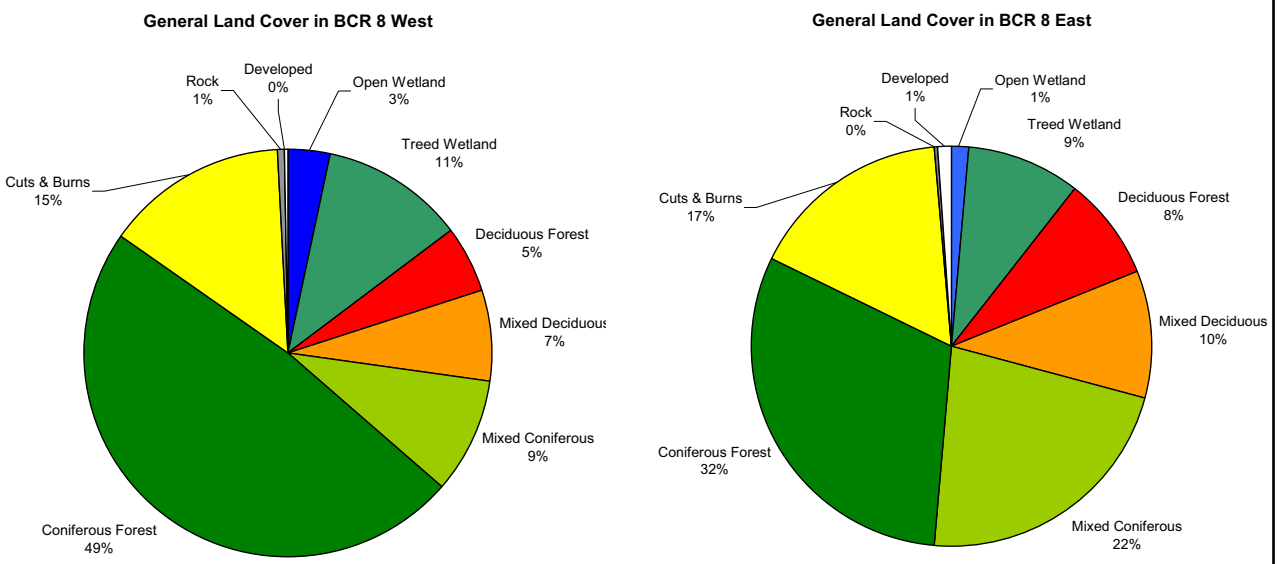
Source: OLC satellite data, 1990s edition.

Table 2: General land cover (c. early 1990s) in Ontario BCR 8 and subregions.

General Land Cover Category	ON BCR 8	Subregion		Landbird Habitat Guild
		West	East	
Coniferous Forest	43.8%	48.3%	30.7%	Coniferous Forest
Mixed Coniferous	12.5%	9.2%	22.2%	
Deciduous Forest	6.1%	5.3%	8.4%	Deciduous Forest
Mixed Deciduous	7.8%	7.0%	10.2%	
Cuts and Burns	15.1%	14.6%	16.5%	Successional Forest
Treed Wetlands	10.9%	11.5%	9.2%	Wetland/Riparian
Open Wetlands	2.9%	3.3%	1.5%	
Rock	0.5%	0.6%	0.2%	Non-forested Upland
Developed	0.4%	0.2%	1.1%	

Source: OLC database, 1990s edition.

Figure 7: Distribution of general land cover in ON BCR 8 by subregion.



Source: OLC database, 1990s edition.

2.6 Avifauna

ON BCR 8 is an important part of the boreal forest region of North America, a huge ecological region that has been dubbed North America's bird nursery because of its vital role in sustaining North America's avifauna (Blancher 2003; Blancher and Wells 2005). Relative to more southern parts of Ontario, the ecosystems and bird populations in ON BCR 8 are in a relatively natural state.

The breeding birds in this planning region are largely migratory. Winter bird diversity is much lower than in the summer. Bird conservation efforts cannot be limited to actions in Ontario, but must also recognize the vital link to wintering grounds in other countries.

ON BCR 8 supports 10% or more of the global breeding population of some 20 landbirds, including an estimated 44% of all Bay-breasted Warbler, 24% of Black-throated Green Warbler and 22% of Mourning Warbler (PIF Continental Database). In addition, ON BCR 8 provides important breeding habitat for many species of waterfowl, waterbirds and shorebirds such as American Black Duck, Ring-necked Duck, Sora, Bonaparte's Gull, Solitary Sandpiper and Wilson's Snipe.

Four bird species breeding in ON BCR 8 (Peregrine Falcon, Rusty Blackbird, Short-eared Owl and Yellow Rail) are currently designated as Species at Risk (SAR) in Canada (SARA Public Registry 2007; COSEWIC 2007a). These and four additional species (American White Pelican, Bald Eagle, Black Tern and Golden Eagle) are on the Ontario Species at Risk (SARO) list (OMNR 2006a). One species, Passenger Pigeon, formerly bred in this region is now extinct (Kirk 1985).

A few non-native species have become established in ON BCR 8, but are largely restricted to developed settings.

The avifauna of this region has undergone many major adjustments in the past, in response to radical changes in the biological environment during the past 10 000 years since the last glaciation. The present distribution of forest regions in Ontario appears to have become established around 3000 years ago (Thompson 2000). The avifauna in this region is adapted to the dynamic nature of the boreal forest ecosystem, and many landbird species are adapted to natural disturbance regimes such as forest fires and insect outbreaks.

Bird population monitoring programs, such as the Breeding Bird Survey (BBS) (Downes and Collins 2003) and Breeding Bird Atlas (BBA) projects (Cadman et al. 1987), provide quantitative measures of the direction and rate of change of bird populations in this region in recent decades (see Appendix B for a description of avian data sets used in this plan). In particular, the first and second BBAs have documented changes in the distribution of the avifauna of this BCR over the past two decades

(www.birdsontario.org). BBS coverage in ON BCR 8 is very limited (see Appendix H). Additional bird monitoring data are collected by OMNR as part of its Ontario Terrestrial Assessment Program (OnTAP) (e.g., Ontario Nocturnal Owl Survey, Crewe and Badzinski 2006).

2.7 Human Population

ON BCR 8 is sparsely populated, with a current total population of less than 250 000 people (Ontario Ministry of Finance 2005) living in numerous towns spread out along the road network and in isolated First Nations communities. The overall population of Northern Ontario is expected to decline over the next 25 years (Ontario Ministry of Finance 2005).

2.8 Land Ownership and Management

The State of the Forest reports (OMNR 2002, in prep. a) present information on land ownership for the OMNR ecoregions overlapping with ON BCR 8 (including parts of ecoregions 4S and 3E outside this region). Across this larger area, approximately 81% of the land in ON BCR 8 is Crown land, managed by the provincial government. An additional 14% consists of publicly owned conservation lands, including national parks, provincial parks and conservation reserves. The remaining 5% of land includes private lands and reserves. Private lands are concentrated along the highway corridors and around some of the larger lakeshores (Figure 1.3 in OMNR 2002).

Forestry is the predominant land use across ON BCR 8 except for the largely undeveloped northwestern portion. Almost all forested lands are Crown forests, managed by the OMNR under the *Crown Forest Sustainability Act* according to the principles of sustainable forest management. Conserving biodiversity is one aspect of forest sustainability (OMNR 2002). Considering the habitat needs of forest landbirds in the forest management planning process (whether individually or as components of the larger ecosystem) is an important step in ensuring the overall conservation of landbirds in this region. To facilitate coordination with the provincial forest management planning process, various aspects of this plan are intended to align with the approach used in new forest management guides at the landscape and site/stand levels (OMNR In prep. A,b) being developed by OMNR to conserve wildlife habitat and biodiversity.

2.9 Landbird Conservation Planning in ON BCR 8

Managing Ontario's Crown forests to conserve biodiversity is necessary to ensure adequate conservation of landbirds in ON BCR 8. However, efforts to do so may be confounded for several reasons:

- Most forest landbirds in this region are migratory and are affected by conditions on their wintering grounds and migration routes outside ON BCR 8.
- Forest management planning focuses on productive forests that do not encompass the breeding habitat needs of all landbirds, particularly those that require non-forest habitats (e.g., open wetlands, rock barrens) or non-productive forest habitats (treed bogs).
- Parks and other protected areas in ON BCR 8 also provide important landbird habitat.

Sustaining all landbirds in this region requires a broader landscape approach to conservation planning that encompasses the entire land base and recognizes the dynamic nature of the boreal forest ecosystem. While the emphasis in this regional plan is on conservation action within ON BCR 8, it also recognizes that the conservation of some species may require action on migration routes and wintering grounds in other countries.

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3. The PIF Ontario Planning Approach

3.1 Plan Development

This regional PIF plan focuses attention on the landbird species and habitats in ON BCR 8 that are most in need of conservation attention. Priority species include Species of Continental Importance (Rich et al. 2004) for which this BCR has a high responsibility, Species of Regional Importance, designated Species at Risk and Additional Species of Regional Management Interest (Box 4).

This document was developed through a multi-stage process designed to be objective, build consensus and develop support for landbird conservation in Ontario (Figure 8). In keeping with the overall PIF approach, this plan was developed using the best available science, data and regional expertise.

This planning initiative was led by Environment Canada Ontario Region (EC) and the Ontario Ministry of Natural Resources (OMNR) in partnership with Bird Studies Canada (BSC). Members of the Ontario BCR 8 Landbird Technical Advisory Committee (Appendix A) shared their knowledge and expertise at a technical workshop and reviewed the draft plan. Wildlife Habitat Canada (WHC) acted as the central banker for this project.

3.2 Sources of Information

3.2.1 Avian Data Sets

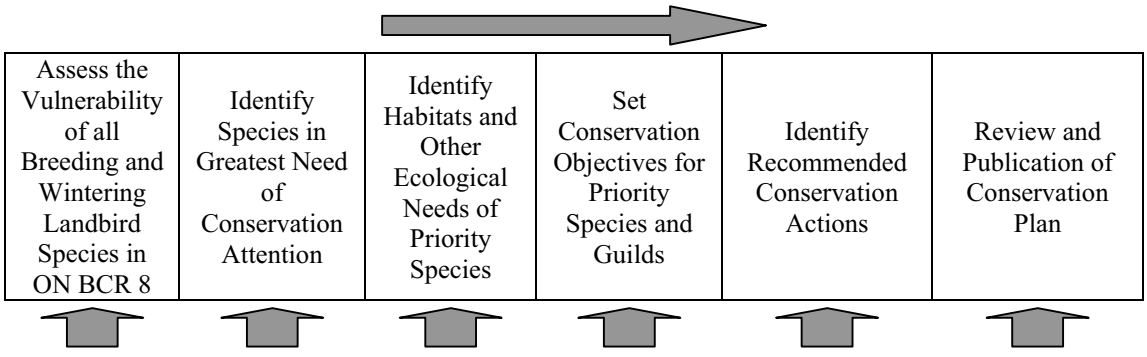
Information on the distribution, abundance and trends of landbirds breeding in the Ontario portion of BCR 8 is generally fair to poor. Wintering season data sets are poor, as few monitoring programs collect standardized data on the distribution and abundance of wintering landbirds in this region. Standardized migration monitoring data sets are not available, but several hawk watch and passerine monitoring stations located across south-central Canada and in the Great Lakes states track birds migrating to and from ON BCR 8.

The avian data sets used in preparing this plan include:

- North American Breeding Bird Survey (BBS);
- First (BBA1) and second (BBA2) Ontario Breeding Bird Atlases; and
- Christmas Bird Count (CBC).

These data sets, and the analyses done in support of this plan, are outlined in Appendix B. While no specific analyses of other relevant data sets, such as the Ontario Nocturnal Owl Survey data (Crewe and Bazinski 2006), were undertaken, results of these surveys were reviewed and taken into consideration. An evaluation of current monitoring coverage in ON BCR 8 is presented in Appendix H.

Figure 8: Ontario BCR 8 Landbird Conservation Plan development process.



3.2.2 Habitat Data Sets

The primary habitat data sets covering this region are the OLC spatial database (see section 2.5) and the Forest Resource Inventory (FRI) spatial database (OMNR 2002). The FRI contains detailed, current information on the configuration, composition, structure and age of forest habitats for most parts of this region. However, the FRI does not include comparable information on non-forested habitat types (e.g., wetlands, agricultural areas). Also, neither the OLC nor the FRI contain information on forest understorey floristics or forest structure (shrubs, snags, downed woody debris), features that are extremely important to bird-habitat associations.

3.3 Assessing Species Vulnerability

PIF species assessment methods (Panjabi et al. 2005; Rich et al. 2004) were used to identify those landbird species most in need of conservation attention. The PIF methods use a standardized approach that combines the best available data and expert knowledge for six biological factors to objectively assess the status and vulnerability of each species. The assessment methods used in this regional plan are described in Appendix C and are consistent with current continental PIF methods.

All landbirds with breeding or wintering ranges overlapping with any part of BCR 8 were initially assessed. Species that do not regularly breed or winter in the Ontario portion of BCR 8 were screened off the species list. The list of 138 landbird species that regularly breed (130 species) and/or winter (44 species) in ON BCR 8 is presented in Appendix D. Species assessment scores for all 138 breeding and wintering species are presented in Appendix E. The status of species passing through this region on migration was not assessed.

Box 4: Categories used for including species in PIF Regional Priority Species Lists.

(See Appendix C for further details of the species assessment and prioritization methods.)

Species of Continental Importance:

- ***Continental Concern Species:*** Species on the PIF Continental Watch List (Rich et al. 2004) for which the BCR has some conservation responsibility.
- ***Continental Stewardship Species:*** Species identified in Rich et al. (2004) as PIF Stewardship Species for which the BCR has high stewardship responsibility.

Species of Regional Importance:

- ***Regional Concern:*** Species of regional concern in this BCR owing to a combination of regional population decline and high threat score.
- ***Regional Stewardship Responsibility:*** Species of regional stewardship responsibility in this BCR because of high regional density score and/or because the BCR contains a high proportion of the global population.

Species at Risk:

- ***National Species at Risk:*** Species at Risk as identified by COSEWIC and/or listed under the Canadian *Species at Risk Act* (SARA).
- ***Provincial Species at Risk:*** Species at Risk as identified by OMNR and/or regulated under Ontario's *Endangered Species Act* (ESA), also protected by other provincial legislation.

Additional Species of Regional Management Interest:

- Species (or subspecies/populations) not included above that are of regional management interest or importance for any of a variety of reasons. Species were included in this category if there was evidence of substantial local (Ontario BCR 8) declines in abundance or distribution, combined with elevated threats to future conditions.

3.4 Identifying Priority Species

Species were initially identified as priority species in BCR 8 if they met the PIF criteria for Species of Continental or Regional Importance, because of high conservation concern or vulnerability and/or high stewardship responsibility scores (Box 4; see Appendix C for details of assessment methodology). The results of this initial BCR-wide assessment were then reviewed by the Technical Advisory Committee (TAC) in an ON BCR 8 context. One BCR 8 priority species (Bicknell's Thrush) was screened out by the TAC because it does not occur regularly in Ontario.

Other species were added as priority species because they are listed under federal or provincial Species at Risk (SAR) legislation (Bald Eagle, Golden Eagle, Great Gray Owl*, Peregrine Falcon). SAR species are included in this plan to ensure that actions taken on behalf of all priority landbirds are coordinated with ongoing SAR recovery actions.

Additional species experiencing declines in ON BCR 8, or with other specific regional concerns, were reviewed as potential species of regional management interest.

PIF priority species include species of high conservation responsibility as well as species of high concern, including Species at Risk with significant population in the region. Not all priority species require immediate conservation attention. For some, ongoing monitoring and periodic assessments are sufficient to ensure that populations remain stable. Other priority species require more direct conservation action to identify and remedy factors causing population declines or limiting population growth.

3.5 Identifying Priority Habitats and Ecological Guilds

In this plan, various *guilds* of priority species that share habitats or other ecological needs are identified. These ecological guilds serve to focus attention on priority habitats used by multiple priority landbirds, and to draw attention to conservation issues or ecological factors that may be adversely affecting many priority species. In addition, these guilds make it easier to identify conservation actions that will benefit multiple species, thereby increasing efficiency of implementation.

As in other BCR plans, habitat is used as the primary basis for structuring the contents of this plan. Habitat provides a useful and appropriate means of integrating the conservation needs of landbirds with those of the other bird groups and other wildlife.

3.6 Setting Objectives

This plan establishes conservation objectives for each priority species in ON BCR 8. These objectives will be used to focus conservation actions and evaluate progress towards the goal of sustaining the distribution, diversity and abundance of native landbirds and their habitats in this region of Ontario.

3.6.1 General Approach

In Ontario, as elsewhere, landbirds occupy a wide variety of habitat types, each species showing preferences for different combinations of habitats (see Holloway et al. 2004). On a finite land base, increasing the supply of habitat for one species could therefore result in a decline for another. A logical, objective benchmark is needed to balance potentially conflicting habitat supplies for ON BCR 8

On the advice of the ON BCR 8 Technical Advisory Committee, the general approach used in this plan to set conservation objectives for priority landbirds is based on the estimated range of natural variation (ERNV) recommended for Crown forest management planning in Ontario (Box 5) (. The estimated range in natural variation in landbird populations and habitats, based on the best available information and science, is used as the point of reference for setting population and/or habitat objectives for most priority landbirds.

This approach is similar to that used in the ON BCR 12 (Boreal Hardwood Transition) plan, but different from that used in the Landbird Conservation Plan for southern Ontario (ON BCR 13), where current conditions or conditions in the late 1960s were considered the primary points of reference for landbird populations and habitat (Ontario Partners in Flight 2008 In prep.). The ERNV approach also differs from that used in the PIF North American landbird plan (Rich et al. 2004) and other regional BCR plans, which take the late 1960s (beginning of the BBS survey) as the point of reference for landbird conservation.

*Note: When priority species were chosen and analysed for this plan, Great Grey Owl was listed as a species of Special Concern in Ontario (as of June 30th, 2008 it has been downlisted).

The ERNV approach is considered appropriate because of the dynamic nature of the boreal forest ecosystem, in which forest habitats and bird populations vary spatially and temporally owing to frequent natural disturbances and extensive forest harvesting that seeks to emulate patterns of natural disturbance. Landbirds in this ecosystem are adapted to these natural disturbance patterns and undergo frequent population shifts and fluctuations in response to habitat change (Niemi et al. 1998; Perera and Baldwin 2000).

OMNR is currently developing habitat models that will set the upper and lower bounds of the range of natural variability in forest habitats. This ERNV will be used to assess forest management scenarios, with the goal of ensuring that habitat supply is maintained within the ERNV limits. OMNR is also developing and refining landbird habitat models that will be used to predict bird population response to habitat availability.

3.6.2 Overall Objectives

In keeping with the general approach used in this plan, the overall objective for most priority landbirds is to maintain populations within the ERNV, with the goal of ensuring that the species' population and habitat supply in ON BCR 8 are sustained within the ERNV.

Natural variability is not considered an appropriate objective for all priority species. Four other overall objectives are used in the following situations:

- For priority species that are designated as Endangered or Threatened under federal or provincial SAR legislation, the overall objective is *recovery,* as specified in current or future SAR recovery strategies (see www.sararegistry.gc.ca/sar/recovery/recovery_e.cfm).
- For other rare and uncommon species (including Special Concern species) that are not monitored by general bird population surveys, the immediate objective is to periodically *assess status.*
- For priority species that have experienced severe population declines in this planning region to the point where the current population may fall below the lower threshold of natural variation, the overall objective is to *reverse declines,* with the time-frame equivalent to the duration of the decline (20 to 30 years).
- For other priority species that have experienced recent population declines but where it is not considered necessary or reasonable to reverse these declines (e.g., where decline may be a temporary population fluctuation within the range of natural variability), the overall objective is to *maintain current* populations within the range of natural variability.

BLACK-BACKED WOODPECKER © *Simon Dodsworth*

Box 5: Explanation of key forest wildlife management concepts used in this plan.

Several of the concepts and terminology in this landbird conservation plan are based on current directions in forest wildlife management planning for Crown forests in Ontario (OMNR in prep. a,b).

Coarse and Fine Filter Direction: The OMNR uses a combination of coarse and fine filter approaches in developing forest management guidelines. Coarse filter direction (e.g., natural disturbance pattern guide, OMNR 2001) provides the requirements of a broad array of species by maintaining a broad array of forest conditions and supporting ecosystem processes. Fine filter direction is used for species with particular, specialized requirements that may not be provided through the coarse filter.

Landscape, Stand and Site Scales*:* Both the coarse and fine filter can operate at a variety of spatial scales, including the landscape, stand and site levels (see Glossary). For example, coarse filter guidelines for residual trees, snags and downed woody debris (site-level features) could provide for the ongoing needs of terrestrial salamanders and benefit a variety of other species. Fine filters are needed for Species at Risk (e.g., protecting Bald Eagle nests at specific sites) and for species with specific habitat needs, such as species considered "featured species" (e.g., Pileated Woodpecker habitat supply at landscape level).

Emulating Natural Disturbances and Natural Variability: For more than a decade, OMNR has been using the emulation of natural disturbances concept as a coarse filter guide for setting objectives for biodiversity conservation in managed forests (OMNR 1996, 2001). This approach was legislated by the *Crown Forest Sustainability Act* (1994).

Estimated Range of Natural Variation (ERNV): The concept of emulating natural disturbance patterns is now being broadly applied to the management of Ontario's Crown forests, including a wide range of major forest parameters (e.g., forest composition, age class distribution and landscape pattern) (OMNR 2001). The general ecological foundation underlying this approach is the concept of natural variability in ecosystem processes and features. Two underlying assumptions are that disturbance-driven temporal and spatial variability are essential attributes of Ontario's forest ecosystems, and that past conditions and processes provide an appropriate benchmark for managing forest ecosystems today (Landres et al. 1999).

Long-term simulation models developed by OMNR based on the best available science, technical expertise and historical information (e.g., survey records) are used to estimate the amount of natural variation in major forest parameters. Forest management plans assess whether predicted future forest conditions will remain with the ERNV, by modelling the effects of alternative forest harvesting scenarios. Wildlife habitat models are used to estimate the amount of habitat available for particular wildlife species and to evaluate the extent of estimated future habitat availability. A major constraint to this approach is our limited understanding of past and current forest ecosystem conditions and processes, which affects our ability to develop reliable models for estimating and predicting natural variability in Ontario's forest ecosystems, including landbird habitat and populations. Limited understanding of the long-term effects of landscape-scale forest management practices on landbird populations is also a major constraint to the precision of available wildlife habitat models.

3.6.3 Monitoring Objectives

Our ability to set and evaluate quantitative conservation objectives is dependent on comprehensive monitoring efforts for birds and their habitats. Therefore, this plan also proposes several monitoring objectives (Box 6).

3.6.4 Conservation Objectives

Measurable conservation objectives are set for many of the priority species identified in this plan (Box 7). For most forest species, populations are assumed to be linked to habitat availability, and ERNV-based habitat objectives are proposed that may be used to set quantitative objectives once results of OMNR habitat modelling work are completed and available. A coarse filter, landscape-scale habitat objective (see Box 5) is considered adequate for most priority species associated with forest habitats. Fine filter ERNV habitat objectives will be set for priority forest landbirds with spatial or other specific habitat requirements.

ERNV-based population objectives (Box 7) are proposed for wetland/riparian priority species, as quantitative habitat information is not available for wetland and riparian habitats. Regional population objectives are set for those priority species where the overall objective is to *maintain current* populations or to *reverse declines.* Regional population objectives are also set for some PIF Watch List species when this region has a particular responsibility for contributing to PIF continental population objectives.

The explicit conservation objectives set in this plan should help coordinate actions for landbirds with other conservation efforts in this region, particularly with forest management planning.

3.7 Identifying Factors Affecting Landbirds and Conservation Action Needs

Various methods were used to identify the general and specific factors affecting landbird populations and habitats in ON BCR 8 and to develop a list of the recommended conservation actions needed to address population-limiting factors and achieve the objectives set out in this plan, namely:

- The Technical Advisory Committee provided input on key conservation issues affecting landbirds in ON BCRs 12 and 8 at the initial technical workshop held in October 2004 (Appendix A).
- BCR-wide threat scores for all landbirds in BCR 8 were reviewed by the Technical Advisory Committee at the technical workshop to determine whether threats in Ontario portions of the BCR were higher or lower than other parts of BCR 8;
- A review of relevant species accounts, species management summaries, forest habitat management documents and best management practice documents was conducted to identify potential threats and recommended conservation actions.
- Input on limiting factors and action needs was solicited from technical reviewers during their review of the draft plan.

Box 6: Landbird monitoring objectives for Ontario BCR 8.

(See Appendix H for additional details.)

Trend Monitoring Objectives:

- ***Monitoring Objective 1:*** Maintain adequate monitoring coverage (ability to detect severe population decline) for at least 80% of landbirds breeding regularly in ON BCR 8 (Relative Density >1; see Appendices C and E).

- ***Monitoring Objective 2:*** Maintain current precision of BBS population abundance indices for all priority species that are tracked by BBS.

- ***Monitoring Objective 3:*** Periodic status assessments (at least every five years) for all other priority species not currently tracked by BBS [includes several listed Species at Risk, and a few other uncommon species].

Distribution Monitoring Objective:

- ***Monitoring Objective 4:*** Maintain ability to detect moderate changes in breeding distribution for at least 80% of landbirds breeding in ON BCR 8 (Relative Density >1), and an ability to detect a severe decrease in size of breeding range for all priority species, including those with Relative Density =1 (rare in ON BCR 8).

Demographic Monitoring Objective:

This plan does not set any demographic monitoring objectives.

Habitat Monitoring Objective:

- ***Monitoring Objective 5:*** Measure and report changes in general land cover and forest habitat availability for the entire planning area at regular intervals (approx. 10 years for land cover and five years for forest habitats), ensuring that data are directly comparable among time periods.

Box 7: Conservation objectives for priority species and guilds in Ontario BCR 8.

Measurable conservation objectives are proposed for many of the priority species identified in this plan. Progress in achieving these objectives can be measured, provided that comparable monitoring information is available in the future.

Habitat Objectives
Habitat rather than population objectives are proposed for most priority species associated with forest habitats. OMNR forest habitat simulation models (currently under development) will be used to determine estimated range of natural variation (ERNV) in habitat supply within each forest management unit and ecoregion. This habitat supply modelling will be sufficient to set coarse filter, landscape-scale habitat objectives for many of the priority forest landbirds. For some species, finer-scale and/or fine filter habitat objectives will be needed, including spatial habitat suitability modelling for some species. Quantitative habitat objectives will be developed at an appropriate scale (ecoregion and/or forest management unit) at a later date, once the results of habitat and wildlife habitat models are available).

Population Objectives
Data from the Breeding Bird Survey (BBS) and Ontario Breeding Bird Atlas projects (BBA1 and BBA2) are used to establish quantitative population abundance and distribution objectives for priority species of particular concern due to regional or rangewide population declines (these data sets are described in Appendix B). BBS coverage in this region is limited, and BBS data are available only for the southeast portion of ON BCR 8 (Appendix B, Appendix G).

Measures used to set and measure species abundance objectives include:
- **Current population levels:** Average BBS species abundance indices in 2000 to 2004.
- **Past population levels:** Average BBS species abundance indices during the 1970s.
- **ERNV population abundance threshold:** A preliminary ERNV population threshold for non-forest species is set at 20% below the average BBS species abundance indices for the 1970–2004 period.
- **Future population levels:** Annual BBS indices will provide an indication of short-term progress. In the longer term, the next BBA could provide a finer-scale measure of changes in abundance, by comparing point counts with those collected in the current atlas.

Species abundance indices have been converted to population estimates to show the magnitude of population change needed to reach population abundance objectives, using methods described in Appendix B of the PIF continental plan (Rich et al. 2004). An evaluation of the accuracy of population estimates for priority species in ON BCR 8 is presented in Appendix G.

Measures used to set and measure species distribution objectives include:
- **Current distribution levels:** The proportion of atlas squares (10 x 10 km) reporting breeding evidence during BBA2 in each subregion of ON BCR 8.
- **Past distribution levels:** The proportion of atlas squares in each subregion reporting breeding evidence during BBA1, 1981–85.
- **ERNV population distribution threshold:** A preliminary ERNV distribution threshold for non-forest species is set as 5% below the lower distribution level reported in BBA1 or BBA2.
- **Future distribution levels:** A third BBA, proposed for 2021–25, will measure changes in bird distribution over the next 20 years. In the interim, BBS trends will indicate the extent of progress being made on distribution goals.

4. Landbird Conservation Priorities in ON BCR 8

4.1 Priority Species

Thirty-seven landbirds have been identified as priority species in ON BCR 8 (Table 3). These represent 27% of the 138 landbird species that regularly breed or winter in this region (Appendix D).

The reasons for considering these 37 species priorities, and the overall conservation objectives set forth in this plan, are summarized in Table 3 and discussed below. Additional details are provided in subsequent chapters and in the individual priority species accounts (Appendix F).

4.1.1 Residency Status

All 37 of the priority species occur in ON BCR 8 during the breeding season. Only seven priority species are also present in winter, including four permanent residents (Black-backed Woodpecker, Boreal Owl, Great Gray Owl, Ruffed Grouse); two nomadic finch species (Purple Finch, Evening Grosbeak), whose residency status is considered erratic in that they may be present locally at any time of year if there is an adequate cone crop; and Golden Eagle, which is a very rare breeder and only slightly more frequent as a wintering species in ON BCR 8. Most of the priority species in ON BCR 8 spend the winter in the United States or neotropical countries, highlighting the need for coordinated international conservation efforts.

4.1.2 Reasons for Priority Status

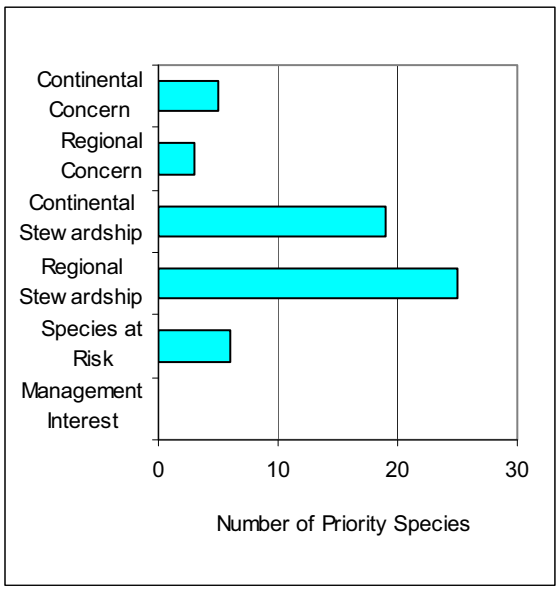
All the priority species fit in one or more of priority categories described in Appendix C (Figure 9). The majority of priority species in this BCR are of high stewardship responsibility at the regional (25 species) or continental (19 species) level (Table 3, Figure 9). Only a few species on the priority list are Watch List species, identified as species of conservation concern at the regional (three species) or continental (five species) level (Table 3, Figure 9).

Three of the priority species (Peregrine Falcon, Short-eared Owl, Rusty Blackbird) are currently designated Species at Risk (SAR) in Canada (COSEWIC 2007a). Peregrine Falcon, Short-eared Owl and three additional species (Bald Eagle, Golden Eagle, Great Gray Owl*) are listed as Species at Risk in Ontario (OMNR 2006a). No additional species in ON BCR 8 were identified as of regional management interest due to regional declines or to other concerns. The aerial-foraging insectivore guild was identified as a priority foraging guild because most species in this guild have experienced severe regional population declines for unknown reasons (see Chapter 10).

This plan identifies a range of conservation objectives for priority landbird species in ON BCR 8, including a descriptive "overall objective" and one or more quantitative population and/or habitat objectives for most species. Population monitoring objectives are set for all priority species, as monitoring is needed to evaluate whether the goal of this plan is being achieved.

The overall objective for each priority species is included in Table 3. The five overall objectives used in this plan are described in section 3.6 and discussed further below (see Figure 10. Additional details are presented in the individual priority species accounts (Appendix F) and Chapters 5 to 10.

Figure 9: Distribution of priority species in ON BCR 8, by reasons for priority status.



Note: Some species are priorities for multiple reasons.

*Note: When priority species were chosen and analysed for this plan, Great Grey Owl was listed as a species of Special Concern in Ontario (as of June 30th, 2008 it has been downlisted).

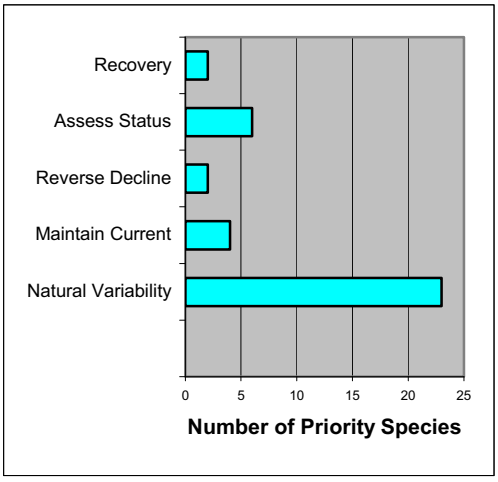
Table 3: Priority species in Ontario BCR 8 showing reasons for priority status, seasonality, overall objective and habitat guild.

Priority Species	Reason(s) for Priority Status								Overall Objective	Habitat Guild
	Season(s)	Continental Concern	Regional Concern	Continental Stewardship	Regional Stewardship	At Risk – Canada	At Risk – Ontario	Added – Mgmt Concern		
Olive-sided Flycatcher	B	Y	Y			UR			Reverse Decline	Wetland/Riparian
Bay-breasted Warbler	B	Y		Y	Y				Natural Variability	Coniferous Forest
Canada Warbler	B	Y		Y	Y	UR			Maintain Current	Deciduous Forest
Rusty Blackbird	B	Y				SC			Reverse Decline	Wetland/Riparian
Short-eared Owl	B	Y				SC	SC		Assess Status	Wetland/Riparian
Connecticut Warbler	B		Y	Y	Y				Maintain Current	Coniferous Forest
Purple Finch	BW		Y		Y				Maintain Current	Coniferous Forest
Alder Flycatcher	B			Y	Y				Natural Variability	Wetland/Riparian
Black-backed Woodpecker	BW			Y	Y				Assess Status	Coniferous Forest
Black-throated Green Warbler	B			Y	Y				Natural Variability	Coniferous Forest
Cape May Warbler	B			Y	Y				Natural Variability	Coniferous Forest
Chestnut-sided Warbler	B			Y	Y				Natural Variability	Successional Forest
Mourning Warbler	B			Y	Y				Natural Variability	Successional Forest
Nashville Warbler	B			Y	Y				Natural Variability	Successional Forest
Philadelphia Vireo	B			Y	Y				Natural Variability	Successional Forest
Swamp Sparrow	B			Y	Y				Natural Variability	Wetland/Riparian
Yellow-bellied Flycatcher	B			Y	Y				Natural Variability	Coniferous Forest
Yellow-bellied Sapsucker	B			Y	Y				Natural Variability	Deciduous Forest
Blackburnian Warbler	B			Y					Natural Variability	Coniferous Forest
Magnolia Warbler	B			Y					Natural Variability	Successional Forest
White-throated Sparrow	B			Y					Natural Variability	Successional Forest
Tennessee Warbler	B			Y					Natural Variability	Successional Forest
Blue-headed Vireo	B			Y					Natural Variability	Coniferous Forest
Belted Kingfisher	B				Y				Maintain Current	Wetland/Riparian
Black-and-white Warbler	B				Y				Natural Variability	Deciduous Forest
Boreal Owl	BW				Y				Assess Status	Coniferous Forest
Evening Grosbeak	BW				Y				Natural Variability	Coniferous Forest
Northern Flicker	B				Y				Natural Variability	Deciduous Forest
Ovenbird	B				Y				Natural Variability	Deciduous Forest
Ruby-crowned Kinglet	B				Y				Natural Variability	Coniferous Forest
Ruffed Grouse	BW				Y				Natural Variability	Deciduous Forest
Sharp-shinned Hawk	B				Y				Assess Status	Coniferous Forest
Winter Wren	B				Y				Natural Variability	Coniferous Forest

Priority Species	Reason(s) for Priority Status								Overall Objective	Habitat Guild
	Season(s)	Continental Concern	Regional Concern	Continental Stewardship	Regional Stewardship	At Risk – Canada	At Risk – Ontario	Added – Mgmt Concern		
Peregrine Falcon	B					TH	TH		Recovery	Non-forested Upland
Golden Eagle	BW						EN		Recovery	Non-forested Upland
Bald Eagle	B						SC		Assess Status	Wetland/Riparian
Great Gray Owl*	BW						SC		Assess Status	Coniferous Forest

Notes: Species ate sorted in order of reason for priority status. **Seasons: B** = Breeding; **W** = Winter. **Priority Reasons:** See Box 4 and Appendix C for an explanation of the priority reasons categories. **At Risk – Canada:** Federal Species at Risk status (SARA Public Registry 2006; COSEWIC 2007a). **At Risk – Ontario:** Provincial Species at Risk status (OMNR 2006). **EN:** Endangered; **TH**: Threatened; **SC**: Special Concern; **UR**: Status under review by COSEWIC (COSEWIC 2007b). **Overall Objective:** Overall conservation objective for the species as established by this plan; see Chapters 5 to 9 for additional information. **Habitat Guild:** Breeding habitat guild; see sections 0 and 0, and Chapters 5 to 9, for additional information. ***** When priority species were chosen and analysed for this plan, Great Grey Owl was listed as a species of Special Concern in Ontario (as of June 30th, 2008 it has been downlistd).

Figure 10: Distribution of priority species in ON BCR 8 by conservation objective.



Recovery
For the two landbirds in this region that are currently designated as Endangered (Golden Eagle) or Threatened (Peregrine Falcon), this plan adopts an overall objective of recovery, as defined in current federal or provincial SAR recovery strategies for these species (see www.sararegistry.gc.ca/sar/recovery/recovery_e.cfm).

Assess Status
Several of the priority species in this region that are not designated Endangered or Threatened are not adequately monitored by general breeding bird population surveys (Appendix H). The overall objective for six of these poorly monitored species is to assess the status of their population in ON BCR 8 periodically (preferably every five years). Species with this objective include the three Species of Special Concern (Bald Eagle, Short-eared Owl and Great Gray Owl [Special Concern at time of writing plan]) and three other species that are difficult to monitor (Black-backed Woodpecker, Boreal Owl, Sharp-shinned Hawk).

Natural Variability
For 23 (62%) of the priority landbirds in this BCR (Table 3), the overall objective is set as maintaining their population within the ERNV, that is, within the expected range of normal fluctuations resulting from natural ecosystem processes (fire, insect and disease outbreaks, climate variability, etc.). For most landbirds in this region, it is assumed that population size is linked to the supply of available habitat. For forest species, the ERNV in habitat is used as a measure of the ERNV in population size. Estimates of the ERNV are not available for wetland habitats, and therefore available population data are used to set preliminary estimates of the ERNV for wetland landbirds (Alder Flycatcher and Swamp Sparrow).

Reverse Decline
Populations of at least two priority species (Olive-sided Flycatcher and Rusty Blackbird) have undergone severe rangewide and regional population declines in the past few decades that do not appear to be directly related to breeding habitat availability. An overall objective of reversing observed declines is established for these species because there is reason to suspect that current populations are below the ERNV, and this region has a high responsibility for contributing to the PIF continental objective of increasing the North American population of these Watch List species.

Maintain Current
An overall objective of maintaining current populations is set for four additional species with evidence of a BCR-wide population decline but where the regional population trend is uncertain. These species are Belted Kingfisher, Canada Warbler, Connecticut Warbler and Purple Finch.

4.2 Priority Habitats

Each priority species was assigned to an ecological *guild* based on habitat associations**.** Twenty-eight (76%) of the priority landbird species (Tables 3 and 4) are associated with one of three broad forest habitat categories:

- Coniferous forest (15 species);
- Deciduous forest (6 species); and
- Successional forest (7 species).

The other nine (24%) priority species are associated with non-forested habitats. including:

- Wetland and riparian habitats (7 species); and
- Non-forested upland habitats, specifically cliff faces (2 species).

The three broad forest habitat guilds, the wetland/riparian habitat guild and the non-forested upland guild are identified as *priority habitats* for landbird conservation in ON BCR 8. The conservation of the priority species and other landbirds associated with each of these five habitat guilds is the subject of a chapter in this plan (Chapters 5 to 9).

4.3 Aerial-foraging Insectivore Guild

One additional group of landbirds is highlighted in this plan: aerial-foraging insectivores. This ecological guild is based on a shared foraging strategy rather than a habitat association. Aerial-foraging insectivores share a common feeding strategy of capturing and eating flying insects while in continuous flight. This particular guild of landbirds has recently been recognized as one of high conservation concern in Ontario because of widespread declines (Heagy and McCracken 2004). While the overall guild is considered a conservation priority, none of the five species in this foraging guild are considered priority species in ON BCR 8. The conservation of aerial-foraging insectivorous landbirds is the focus of Chapter 10.

4.4 Monitoring and Evaluation

Ongoing monitoring and evaluation are essential elements of any conservation plan. Local monitoring is needed to determine the outcomes of individual conservation actions. Broad-scale monitoring is needed to track the status of the conservation objectives for priority species that are presented in the individual priority species accounts (Appendix F) and the guild chapters (Chapters 5 to 10). The results of monitoring must be regularly evaluated to determine whether conservation objectives are being achieved and whether conservation actions need to be modified.

An evaluation of current BBS landbird monitoring coverage in ON BCR 8 was undertaken to determine the status of the monitoring objectives proposed in section 3.6.4 (Box 6). The results of this evaluation are presented in Appendix H along with a comprehensive list of proposed actions related to monitoring. An evaluation of the accuracy and precision of the population abundance objectives and estimated population size for priority species is presented in Appendix G.

Table 4: Priority species guilds used in the ON BCR 8 plan.

Ecological Basis for the Grouping	Habitat Guilds	Number of Priority Landbird Species	% of Priority Species (N=37)
Habitat Association	Coniferous Forest	15	41%
	Deciduous Forest	6	16%
	Successional Forest	7	19%
	Wetland/Riparian	7	19%
	Non-forested Upland	2	5%
Foraging Strategy	Aerial-foraging Insectivore	0	0%

4.5 Factors Affecting Landbirds in ON BCR 8

As indicated in Table 5, landbird populations and habitats in ON BCR 8 are potentially affected, directly or indirectly, by a wide range of anthropogenic factors, including activities occurring outside this region. In many instances, these factors will result in habitats that are more favourable for some species but less suitable for others. Natural processes such as fire and insect outbreaks, and human activities that emulate these natural processes, also have a major effect on landbird habitats and populations, but their net effect is considered neutral in terms of maintaining habitats and populations within the ERNV. Additional details of factors affecting particular habitats and species are presented in Chapters 5 to 9 and the priority species accounts (Appendix F), respectively.

While forest harvesting activities are critically important because of the extent of landbird habitat affected, most harvesting in this region occurs on Crown lands as part of a comprehensive forest management planning process governed by the *Crown Forest Sustainability Act* and related policies, manuals and guidelines that ensure landbird populations and other wildlife values are protected (see http://ontariosforests.mnr.gov.on.ca).

4.6 Recommended Conservation Actions

Conservation actions that apply to *all* priority landbirds in ON BCR 8 are summarized here. Additional conservation actions specific to the various habitat and foraging guilds are presented in subsequent chapters. Species-specific conservation actions are included in the individual species accounts (Appendix F).

Table 5: Anthropogenic factors affecting landbirds in ON BCR 8.

Factor or Activity	Examples of Outcomes Affecting Landbirds and Habitats in this Region
Past forest harvesting practices	• Increase in amount of forest-edge habitats due to forest harvest patterns • Decrease in forest structure due to past logging practices • Loss of spruce forests following logging • Increase in poplar in regenerating forests
Suppression of natural disturbances	• Loss or alteration of habitats due to fire suppression, particularly fire-dependent habitats such as recent burns, Jack Pine stands and open rock barrens • Control of insect outbreaks
Land use change	• Expansion of the extent of forest harvesting • Increasing number of roads and utility corridors • Potential impact of proposed new wind and hydro-electric developments on habitat
Spread of exotic and invasive species	• Impact of invasive and exotic species (e.g., birds, insects, plants, fungi, vertebrates) on natural habitats and food supply • Emerging avian diseases (e.g., West Nile virus, avian malaria)
Environmental contaminants	• Bioaccumulation of toxins (e.g., mercury, organochlorine compounds) leading to reduced productivity and longevity • Indirect impact of toxins and environmental contaminants on food supply (pesticides reduce availability of insect and weed seeds); atmospheric pollution, including acid precipitation and smog, that have direct effect on forest health and indirect effects on bird populations (e.g., leaching of base cations affecting availability of calcium-dependent molluscs)
Climate change	• Predicted changes in the pattern of temperature (hotter summers), precipitation (decrease), number of extreme weather events (increase) and frequency and severity of droughts (increase) affect habitat and food supply • Predicted increased stress to vegetation could lead to increase in insect outbreaks and disease • Potential long-term (hundreds of years) shift in vegetation communities could affect the distribution of associated bird communities
Conditions on migration routes and wintering grounds	• Loss and alteration of habitat at migration stopover sites • Increase in buildings, towers and other tall structures on migration routes • Loss and alteration of wintering habitat in United States and the neotropics

4.6.1 Monitoring

Landbird monitoring coverage in ON BCR 8 is considered fair to poor (see evaluation presented in Appendix H).

Proposed general monitoring actions for all landbirds in ON BCR 8 include:

- Increase number and frequency of BBS routes being surveyed in ON BCR 8.
- Measure bias in landscape/habitat coverage by BBS routes across BCR 8.
- Continue to repeat Breeding Bird Atlases at 20-year intervals, aiming to increase coverage of boreal atlas squares in subsequent atlases.
- Implement a new borealwide breeding season bird monitoring survey, together with neighbouring jurisdictions, as a high continental priority that addresses monitoring needs for many species.
- Continue to track migrants breeding in central and northern Ontario at southern Ontario migration monitoring stations and report regularly on their status.
- Evaluate the statistical power of migration monitoring (passerine and hawk watches) to detect long-term trends (i.e., 50% change over 20 years) for breeding species not well monitored by breeding surveys in the boreal region.
- Assess ability of the Ontario Nocturnal Owl Survey to track breeding populations of owl species in ON BCR 8.
- Ensure that all priority species not adequately monitored by the BBS are assessed regularly (at least every five years), using all available information to track changes in population status as well as threats.
- Monitor changes in the availability of landbird forest habitats using information collected by OMNR.
- Continue existing programs to track the frequency and extent of natural and anthropogenic disturbances affecting forest habitats, especially fire, insect outbreaks and forest harvesting.
- Continue to track and report on the current and forecast availability of landbird forest habitats using Forest Resource Inventory data and output from OMNR forest supply models.
- Develop monitoring capability to detect changes in non-forested habitats, such as wetlands and riparian areas.
- Develop habitat monitoring programs to set and measure progress towards habitat objectives for wetland and riparian priority species.

4.6.2 Research and Evaluation

Information on general habitat requirements and habitat supply is available for most forest landbirds but lacking for non-forest species. Demographic information is available only for a few Endangered/Threatened species and from site-specific projects that often look at a limited number of species, habitats and/or a short time period.

Proposed research and evaluation actions:

- Conduct demographic research to identify factors causing declines and/or limits to population growth in the aerial-foraging insectivore guild and the six priority species with population objectives.
- Encourage long-term species- and site-specific studies that can be used to understand and assess species response to fluctuating or long-term changes in environmental conditions (habitat, food supply, climate, etc.).
- Encourage research on the response of landbirds to landscape-scale effects of forest harvest patterns, road development and habitat fragmentation on breeding and wintering grounds.
- Ongoing validation, evaluation and refinement of the habitat models being used to predict response of landbird populations to habitat availability.
- Evaluation of the habitat-based ERNV approach as a proxy for maintaining forest landbird populations within acceptable bounds.

4.6.3 Policy and Planning

Provincial forest management policy has a major influence on the landbird habitats in this region. Current forest management policy direction is consistent with this plan in attempting to ensure that forest management activities emulate natural disturbances and maintain wildlife habitat within the ERNV, specifically:

- Ensure linkages with forest management planning and policies.
- Improve linkages between landbird conservation needs and forest management guides.

- Set coarse and/or fine filter quantitative habitat objectives as needed for priority forest species, using information from OMNR forest habitat models currently under development.
- Encourage all levels of government to include all-birds values in future land use plans and policies.
- Coordinate implementation of this regional landbird conservation plan with national and international PIF and NABCI planning processes and with national and provincial SAR planning processes.

4.6.4 Outreach and Education

- Work with partners to develop and deliver information for the forest industry to help companies identify and protect species, habitats, areas and processes of importance to landbird conservation.
- Use existing communication tools and strategies to deliver key landbird conservation messages (keeping common birds common, links between breeding and wintering areas).
- Work with partners to ensure that the needs of landbirds, including priority species and their habitats, are incorporated into relevant BMP documents (agricultural, silvicultural, pit and quarry, right-of-way guidelines).
- Facilitate communications between researchers/conservation organizations and land owners/managers to promote the transfer of new scientific knowledge and foster an adaptive management approach.
- Promote landbird monitoring and support the development of new birders to maintain a trained corps of volunteer participants in bird monitoring programs.

4.6.5 Applied Conservation

- Identify and protect areas of importance to landbird conservation including breeding, wintering and stopover habitat for regionally and continentally important priority species.
- Promote the following practices throughout the landscape of ON BCR 8:
    - Maintain, restore or emulate natural processes and disturbance regimes that are important to priority landbirds and their habitats;
    - Encourage the retention of snags, downed woody debris and leaf litter;
    - Prevent and control the spread of invasive and exotic species; and
    - Minimize the use of chemical pesticides.

SHARP_SHINNED HAWK © *Ethan Meleg*

5. Conservation of Coniferous Forest Landbirds

5.1 Coniferous Forest Landbirds

Many of the common landbirds in this region are associated with the coniferous and mixed coniferous forests that are characteristic of the Boreal Softwood Shield (BCR 8). Most coniferous forest landbirds are present during the breeding season but migrate to warmer areas for the winter months. A few coniferous forest landbirds, such as Spruce Grouse, Black-backed Woodpecker and Boreal Chickadee, are permanent residents of this BCR. Two finch species, Common Redpoll and Hoary Redpoll, breed farther north and occur in coniferous forests in BCR 8 during the non-breeding season only.

Global population estimates for boreal-breeding landbirds are based on incomplete information, as abundance data are available for only some parts of their total breeding ranges. Nonetheless, it is evident from available abundance data and range maps that this BCR is critically important to many coniferous forest landbirds.

BCR 8 comprises a core breeding range for 23 coniferous forest landbird species that occur at very high relative densities in this region (RD=5) and/or have 10% of more of their total population in BCR 8 (Table 6). About three-quarters of all Yellow-bellied Flycatcher and Bay-breasted Warbler breed in BCR 8 – the highest proportion of any landbird in this region. More than half the global populations of three other coniferous forest warbler species (Cape May, Connecticut and Blackburnian) breed in BCR 8 (Table 6).

The Ontario portion of BCR 8 supports a particularly high proportion of the global breeding populations of several coniferous forest species, including Bay-breasted Warbler (44%) and Black-throated Green Warbler (24%). Coniferous forests in ON BCR 8 also support more than 10% of the global breeding populations of two other warbler species (Cape May and Blackburnian) and two finch species (Evening Grosbeak and Purple Finch) (Table 6).

Several coniferous forest birds also occur in BCR 8 in substantial numbers during the winter (Table 7), including more than 20% of all Evening Grosbeak and Black-backed Woodpecker.

BLUE-HEADED VIREO © *Simon Dodsworth*

Table 6: Coniferous forest landbirds with ≥ 10% of global population breeding in BCR 8 and/or occurring at very high relative density in BCR 8 during the breeding season.

Species	RD	%G pop BCR 8	%G pop ON BCR 8	ON BBA1	ON BBA2
Yellow-bellied Flycatcher	5	76%	6%	32%	90%
Bay-breasted Warbler	5	75%	44%	56%	75%
Cape May Warbler	5	65%	16%	45%	40%
Connecticut Warbler	5	53%	4%	13%	19%
Blackburnian Warbler	5	50%	11%	47%	58%
Evening Grosbeak	5	43%	16%	52%	42%
Black-throated Green Warbler	5	40%	24%	53%	45%
Purple Finch	4	32%	13%	66%	52%
Blue-headed Vireo	4	30%	8%	47%	82%
Black-backed Woodpecker	5	23%	7%	37%	32%
Ruby-crowned Kinglet	5	22%	5%	82%	97%
Golden-crowned Kinglet	4	20%	10%	52%	93%
Swainson's Thrush	5	19%	6%	95%	98%
Winter Wren	5	17%	9%	78%	97%
Northern Parula	3	14%	3%	21%	33%
Red-breasted Nuthatch	3	12%	6%	78%	89%
Boreal Chickadee	4	12%	1%	56%	68%
Yellow-rumped Warbler	4	11%	3%	94%	98%
Pine Siskin	3	11%	4%	55%	60%
Hermit Thrush	4	11%	3%	63%	94%
Great Gray Owl	4	10%	5%	11%	13%
Sharp-shinned Hawk	5	9%	2%	24%	23%
Boreal Owl #	5	6%	2%	10%	9%

Notes: Specoes are listed by decreasing % of global population in ON BCR 8. Priority species shown in **Boldface. RD** = Relative Density (see Appendix C). **%G pop BCR 8** = estimated % of the global population breeding in BCR 8. **%G pop ON BCR 8** = estimated % of global population breeding in the Ontario portion of BCR 8. **ON BBA1** = % of atlas squares with breeding evidence, 1981–85. **BBA2 =** % of atlas squares with breeding evidence, 2001–05 (preliminary data). **#** = for Boreal Owl, the %G pop figures are based on % of global breeding range because few abundance data are available.

Table 7: Coniferous forest landbirds with ≥ 10% of global population wintering in BCR 8 and/or occurring at very high relative density in BCR 8 during the winter.

Species	RD	%G pop BCR 8	%G pop ON BCR 8
Evening Grosbeak	5	29%	9%
Black-backed Woodpecker	4	23%	8%
Pine Grosbeak	5	13%	3%
Boreal Chickadee	4	12%	4%
Purple Finch	3	12%	8%
Great Gray Owl	5	10%	4%
White-winged Crossbill	5	7%	<1%
Common Redpoll	5	6%	1%
Boreal Owl #	3	6%	2%

Notes: Specoes are listed by decreasing % of global population in ON BCR 8. Priority species shown in **Boldface. RD** = Relative Density (see Appendix C). **%G pop BCR 8** = estimated % of the global population wintering in BCR 8. **%G pop ON BCR 8** = estimate % of global breeding or wintering population occurring in Ontario portion of BCR 8. **#** = for Boreal Owl, the %G pop figures are based on % of global wintering range.

5.2 Coniferous Forest Priority Species

Fifteen (41%) of the priority landbird species in ON BCR 8 breed in coniferous or mixed coniferous forests (Table 8). Five species are present year-round, while the other 10 priority species in this guild are summer residents only. Additional priority species associated with the early successional stages of coniferous forests are included in the successional forest guild (e.g., Magnolia Warbler).

Bay-breasted Warbler is the only Species of Continental Concern (PIF Watch List species) in this habitat guild, and is also a Continental and Regional Stewardship species (Table 8). Populations of this spruce budworm specialist undergo dramatic fluctuations in response to insect outbreaks. This species has experienced a rangewide population decline over the past 30 years (PT=4, Rich et al. 2004). BBS data from this region show an overall increasing trend (not statistically significant), with a large increase in the 1980s followed by a steep decline in the 1990s (see species account, Appendix F).

Connecticut Warbler and Purple Finch are of regional concern due to long-term regional population declines combined with moderate threats to future conditions in this region.

All the priority species in this guild have substantial breeding populations in BCR 8 (Table 6), and all but one qualify as a Stewardship species at the continental and/or regional level. The eight continental Stewardship species (Table 8) are characteristic elements of the Northern Forest avifaunal biome (Rich et al. 2004). The 12 regional Stewardship species (Table 8) have high area importance and elevated threats or biological vulnerability scores (total assessment scores of at least 14; see Appendix E).

None of the species in this habitat guild is listed as a Species at Risk federally, but at the time of writing this plan the Great Gray Owl had Special Concern status in Ontario owing to its small population size and biological vulnerability.

The habitat requirements of the priority species in this guild are summarized in Table 10.

Table 8: Coniferous forest priority landbirds in ON BCR 8, sorted by reasons for priority status.

Priority Species	Season(s)	Reason(s) for Priority Status					
		Concern		Stewardship		At Risk	
		Cont	Reg	Cont	Reg	CA	ON
Bay-breasted Warbler	B	Y		Y	Y		
Connecticut Warbler	B		Y	Y	Y		
Purple Finch	BW		Y		Y		
Black-backed Woodpecker	BW			Y	Y		
Black-throated Green Warbler	B			Y	Y		
Cape May Warbler	B			Y	Y		
Yellow-bellied Flycatcher	B			Y	Y		
Blackburnian Warbler	B			Y			
Blue-headed Vireo	B			Y			
Boreal Owl	BW				Y		
Evening Grosbeak	BW				Y		
Ruby-crowned Kinglet	B				Y		
Sharp-shinned Hawk	B				Y		
Winter Wren	B				Y		
Great Gray Owl*	BW						SC

Notes: Seasons: B = Breeding; **W** = Winter. **Cont** = Continental level, **Reg** = Regional (ON BCR 13) level, **CA** = Canada, **ON** = Ontario, **SC** = Special Concern. See Appendix C for additional details. * When priority species were chosen and analysed for this plan, Great Grey Owl was listed as a species of Special Concern in Ontario (as of June 30th, 2008 it has been downlisted).

5.3 Coniferous Forest Habitats in ON BCR 8

5.3.1 Description

Dense coniferous, mixed coniferous and sparse coniferous forests together comprise 56% of the land cover of ON BCR 8 (Tables 1 and 2). The sparse coniferous forest land cover category (30–40% canopy closure) includes some open successional habitat within a matrix of coniferous forest.

Overall coniferous forest land cover is fairly evenly distributed across ON BCR 8 (Figure 11) The dense and sparse coniferous land cover categories are more frequent in the West subregion, whereas mixed coniferous forest cover is more frequent in the East subregion (Figure 11).

The dominant coniferous forest types vary across the region (Table 9, Figure 12). The lowland conifer forest type, consisting predominantly of Black Spruce on poorly drained sites, is concentrated in the East subregion (Ecoregion 3E). Upland conifer forests, consisting predominantly of spruce and spruce/Jack Pine stands on upland sites, are found across ON BCR 8. Jack Pine forests are patchily distributed, being most extensive in the West subregion, particularly near the western boundary of ON BCR 8 in Ecoregions 3S and 4S. White and Red Pine stands are rare and very local along the southern edge of ON BCR 8. Mixed coniferous–deciduous stands are more frequent in the East subregion and the southern parts of the West subregion.

The age class structure of the coniferous forests varies with forest type and location (OMNR 2002). For example, Jack Pine forests are generally younger than other coniferous forest types. In general, forests in the southern part of ON BCR 8 have a high proportion of trees in the younger age classes (under 80 years) and a more even age structure than forests in the northwest part of the region (Ecoregion 2W), where the majority of the coniferous stands are in older age classes (over 80 years).

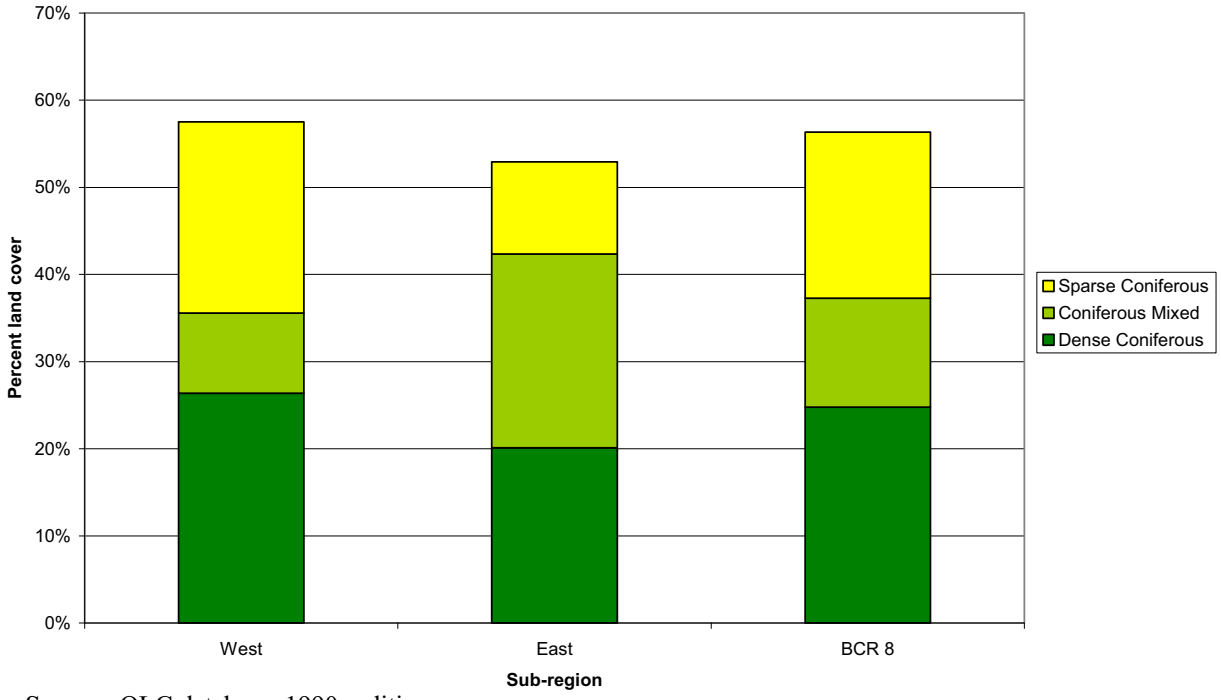
The distribution of some less abundant coniferous tree species is also important to coniferous forest landbirds (tree distribution from OMNR 2002). White Cedar is present locally in lowland areas but is not widespread. Larch is most common in the northern part of the East subregion. Balsam Fir is present throughout ON BCR 8. White Spruce is more frequent in the southern part of ON BCR 8, and Black Spruce is the dominant spruce in the

Table 9: Coniferous and mixed coniferous forest units.

Landbird Habitat Guild	Provincial Forest Types	Northeast Standard Forest Units	Northwest Standard Forest Units
Coniferous Forest	White and Red Pine Jack Pine Upland conifers Lowland conifers Mixedwood	PR1 – Red Pine PW1 – White Pine PRW – White and Red Pine PJ1 – Jack Pine PJ2 – Pine–Spruce SP1 – Spruce–Pine SF1 – Spruce–Fir SBOG – Black Spruce bog SB1 – Black Spruce lowland LC1 – Lowland conifer MW1 – Jack Pine mixedwood MW2 – Spruce–Fir mixedwood	PwDom – White Pine PrDom – Red Pine PrwMix – White and Red Pine UplCe – Cedar, upland OCLow – Lowland conifer, sensitive sites SBLow – Black Spruce lowland, sensitive sites SBSha – Black Spruce upland, sensitive sites SBDee – Black Spruce upland, high productivity PjSha – Jack Pine upland, sensitive sites PjDee – Jack Pine upland, high productivity SBMx1 – Black Spruce mixedwood PjMx1 – Jack Pine mixedwood BfPur – Balsam Fir BfMx1 – Balsam Fir mixedwood ConMx – Conifer mixedwood

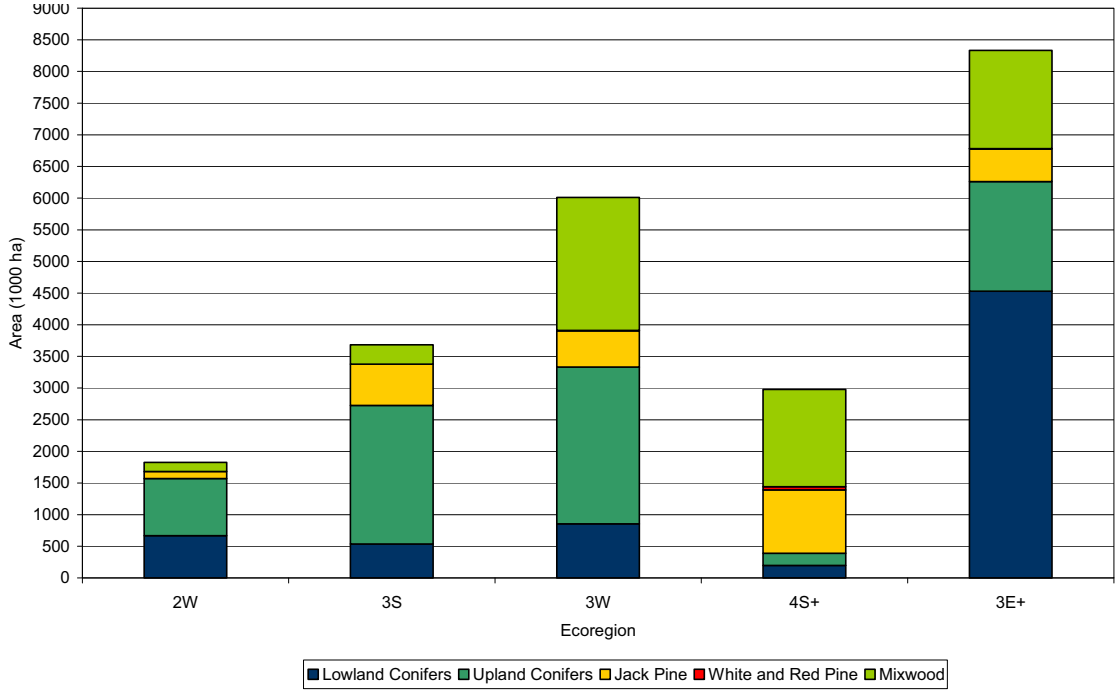
Sources: Provincial Forest Type – OMNR 2002; Northeast Standard Forest Units – Vasiliauskas et al. 2004; Northwest Standard Forest Units – OMNR 2006c.

Figure 11: Coniferous forest land cover in ON BCR 8 by subregion (satellite data).



Source: OLC database, 1990s edition.

Figure 12: Area of coniferous forest by provincial forest type, by ecoregion (FRI data).



Note: The information presented in this chart is for the entire extent of each ecoregion: substantial parts of Ecoregions 3E and 4S (indicated with +) are outside the boundaries of ON BCR 8.
Source: Forest Resource Inventory (FRI) data tabulated in OMNR 2002.

northern half. Spruce budworm cycles that greatly influence landbird populations are driven in part by the availability and distribution of mature Balsam Fir and spruce forest (Niemi et al. 1998; Fleming et al. 2000).

Conifer seed crops, which vary considerably from year to year, are an important food source for many coniferous forest landbirds, particularly finches (Koenig and Knops 2001). Coniferous trees also provide winter cover for some permanent resident landbirds, including grouse and owls (Patrikeev et al. 2004). Some forest raptors preferentially build their nests in conifers (James 1984b).

5.3.2 Current Conditions and Outlook

The current coniferous forest composition and age class structure in the southern parts of this region are influenced by previous extensive forest harvesting, which generally did not seek to emulate natural disturbance regimes. Forests in the northwestern parts of ON BCR 8 have not been extensively harvested and therefore reflect natural disturbance regimes. The extent of forest harvesting in the northwestern parts of ON BCR 8 is expected to increase in the future as a result of the Northern Boreal Initiative (www.mnr.gov.on.ca/MNR/EBR/nbi2003/index.html).

Forest harvesting patterns in the 1980s favoured many small clear-cuts over few large cuts, resulting in more forest edge than natural disturbance patterns (Perera and Baldwin 2000). Current forest harvesting is designed to emulate natural disturbances patterns; over time, the amount of forest edge and fragmentation should shift towards a more natural condition. The impact of landscape pattern effects on landbird populations in forested landscapes such as ON BCR 8 is not well understood (Voigt et al. 2000). Most studies of forest fragmentation and edge effects on landbirds have taken place in settled agricultural landscapes; results of these studies (e.g., minimum forest patch size) are not transferable, and possibly not applicable, to a forested landscape such as ON BCR 8 (Niemi et al 1998; Perera and Baldwin 2000; Wedeles and Donnelly 2004).

5.4 Factors Affecting Coniferous Forest Habitats

Forest habitats in this region are affected to varying degrees by a wide range of natural and anthropogenic factors that have the potential to affect landbird populations. Current forest management guidelines and practices (e.g., retention of snags, protection of stick nests, maintaining old-growth forest) are designed to ensure that forest management activities do not negatively affect populations of landbirds and other wildlife species. Factors identified as of current or potential importance to achieving objectives for coniferous forest landbirds in ON BCR 8 include:

- Current forest harvesting prescriptions, especially choice of harvest method, harvest area size and configuration, and rotation cycles;
- Pre- and post-harvest silvicultural treatments (prescription fires, brush management) that affect conifer regeneration and forest structure;
- Frequency and control of budworm and other insect outbreaks;
- Age-class distribution, particularly the amount and distribution of mature and old-growth forest;
- Supply of conifer trees capable of producing seed crop regularly;
- Predicted impacts of climate change, including short-term impacts of weather patterns that affect insect and disease populations, and longer-term impacts on disturbance regimes and forest composition;
- Impact of atmospheric pollutants, including acid precipitation and smog, that have direct effects on forest health and also indirect effects on bird populations (e.g., leaching of base cations, affecting availability of calcium-dependent molluscs).

5.5 Conservation Objectives for Priority Coniferous Forest Landbirds

Species-level objectives for priority coniferous forest landbirds are presented in the priority species accounts (Appendix F) and summarized in Table 11.

5.5.1 Overall Objectives

For most of the priority coniferous landbirds, the overall conservation objective is simply to:

Maintain the abundance and distribution of priority coniferous forest landbird populations in ON BCR 8 within the range of natural variation by maintaining the overall supply of coniferous forest habitats in each ecoregion within the ERNV.

To implement this conceptual objective, habitat and monitoring objectives are set for most priority coniferous forest landbirds. Population objectives are set for only two species: Connecticut Warbler and Purple Finch.

5.5.2 Habitat Objectives

For most of the priority species in this guild, the main conservation objective is to:

Maintain the supply of suitable coniferous and mixed coniferous forest habitats in each ecoregion within the ERNV through a combination of natural disturbances and forest management practices that emulate natural disturbance patterns.

This coarse filter, landscape-level approach assumes that the availability of suitable coniferous forest habitats is the main factor limiting populations of most coniferous forest landbirds in this region. As long as their breeding habitat objective (amount of suitable habitat) exceeds a minimum threshold, then presumably the species' population will be adequately conserved within its natural range of variation.

OMNR is continuing to develop and revise habitat supply models for a variety of coniferous forest landbirds, including several of the ON BCR 8 priority species (R. Rempel, OMNR, pers. comm.).

Only one of the coniferous forest priority species, Great Gray Owl, requires fine filter habitat guidelines to ensure that the configuration of available habitat meets its particular spatial requirements (e.g., proximity of suitable mature forest patches to open hunting areas) and nest site requirements (stick nests or large broken snags).

5.5.3 Population Objectives

An objective of maintaining population levels at or above current levels is set for two species in this guild that are of regional concern due to regional population declines and elevated threat scores: Connecticut Warbler and Purple Finch. Population objectives for these species are based on the current BBS Index level (2000–2004) and the current BBA2 distribution in the East and West subregions.

No specific population objectives have been set for the Great Gray Owl but any long-term decline would be of concern.

This region also has a responsibility for contributing to PIF continental-level population objectives for several other Species of Continental Importance:

- Bay-breasted Warbler – increase the continental population by 50%; and
- Black-backed Woodpecker, Blackburnian Warbler, Black-throated Green Warbler, Blue-headed Vireo, Cape May Warbler, Yellow-bellied Flycatcher – maintain current populations in North America.

5.5.4 Monitoring Objectives

Current monitoring coverage for most of the priority coniferous forest species in ON BCR 8 is poor (Appendix H) and not adequate for evaluating whether the proposed ERNV habitat-based conservation objective for these species is effective in achieving the overall objective. The monitoring objective set for most priority coniferous forest species is to improve current monitoring capability, as indicated in Appendix H. In particular, increased BBS coverage (more routes surveyed more frequently) and/or a new boreal bird survey are needed to achieve the overall monitoring objectives for landbirds and for priority species (Appendix H). Boreal Owl and Great Gray Owl are monitored by the Ontario Nocturnal Owl Survey (Crewe and Badzinski 2006), although coverage of the latter is poor.

5.5.5 Conservation Focus

The status of all the priority coniferous forest species should be periodically reviewed to ensure that population trends are not diverging significantly from what would be expected due to changes in habitat supply. Improved BBS monitoring coverage is a high priority. Research is needed to determine the cause of population declines in Connecticut Warbler and Purple Finch and to identify actions to halt these declines. The regional population status of the four poorly monitored species (Great Gray Owl, Boreal Owl, Black-backed Woodpecker and Sharp-shinned Hawk) should be assessed every five to 10 years.

5.6 Recommended Conservation Actions

5.6.1 Monitoring

- Improve coverage by existing landbird monitoring programs, especially the BBS, BBA and Ontario Nocturnal Owl Survey.
- Improve the integration and/or analysis of results from existing bird monitoring surveys (including migration counts and winter season surveys), especially for species that are not well monitored by BBS, such as coniferous forest finches.
- Work with partners in adjacent jurisdictions to develop and implement a boreal bird monitoring program.
- Periodically assess the status of species that are not adequately monitored by the BBS (see Appendix H) or other surveys.
- Maintain or improve forest habitat mapping across ON BCR 8, including regular updates of Forest Resource Inventory data across the region and collecting data on stand- and site-level features.

5.6.2 Research and Evaluation

- Promote demographic and habitat research to identify cause(s) of the observed or apparent declines in Connecticut Warbler and Purple Finch.
- Promote research on the wintering grounds for priority species where non-breeding factors are a concern, such as Bay-breasted Warbler and Blackburnian Warbler.
- Promote research on the breeding grounds to increase understanding of the effects of current forest conditions, including landscape level (forest patch size, configuration and heterogeneity), stand level (age, structure, composition, health) and site level (snags, downed woody debris) on the abundance, distribution and demographics of priority coniferous forest birds.
- Promote research on the breeding grounds to increase understanding of the effects of forest insect population dynamics (e.g., low budworm levels, alternative prey species) on the abundance, distribution and demographics of priority coniferous forest birds.

5.6.3 Planning and Policy

- Encourage consideration of the needs of priority coniferous forest landbirds within forest management planning activities on Crown lands.
- Encourage the management of Crown forest lands to maintain coniferous forest habitats across the landscapes within the ERNV through a combination of natural disturbances and forest harvesting that emulates natural disturbance patterns.
- Encourage an adaptive management approach to the conservation of coniferous forest landbirds with ongoing monitoring and research to evaluate the effectiveness of forest management guidelines and outcomes.

5.6.4 Outreach and Education

- Support the development and use of forest management guides (site/stand- and landscape-level guides (OMNR in prep. a,b) that protect coniferous forest birds and other biodiversity. (The use of the existing guides and the guides currently being developed must occur during all forest management planning on Crown lands.)
- Work collaboratively with forest management planning initiatives to evaluate the effectiveness of the guides and ensure that they adequately address landbird conservation needs.
- Promote the development of relevant educational materials and workshops to inform the forest industry of landbird conservation needs.
- Work with partners in the United States and Latin America to protect priority forest landbirds during migration and on wintering grounds, making use of NABCI and PIF initiatives.

BAY-BREASTED WARBLER © *Genny Houghton*

Table 10: Summary of habitat needs of priority coniferous forest landbirds in ON BCR 8.

Priority Species	Breeding Habitat Description	Preferred Forest Types	Stand Age (Development Stage)	Landscape Features*	Stand Features	Site Features
Bay-breasted Warbler	Conifer or mixed forest, with Balsam Fir and Black Spruce	Coniferous or Mixed	Mature to Old	No specific information	Mature Balsam Fir, Black Spruce	Spruce budworm outbreaks
Blackburnian Warbler	Mixed, coniferous or deciduous forest with some mature conifers	Mixed or Coniferous	Mature to Old	Forest patch size >50 ha	Mature conifer	No specific information
Black-throated Green Warbler	Dense mixed forest, also coniferous or open woods and wet cedar swamps	Mixed or Deciduous	Mature to Old	Forest patch size >50 ha	Well developed understorey layer	No specific information
Black-backed Woodpecker	Conifer forest with Black Spruce, Jack Pine and Tamarack. Burned-over areas or stands with insect- or wind-damaged trees heavily utilized	Coniferous	Mature to Old or Recent Burns or Other Natural Disturbances	Recent burns	Recently killed trees with beetle infestation	Conifers dbh>20 cm with heart-rot for nest trees
Blue-headed Vireo	Mature mixed or coniferous forest with spruce, fir, hemlock and pine, or conifers with associated deciduous growth that may be alder and willow shrubs as understorey, or include poplar, birch and/or maple trees in varying numbers	Mixed or Coniferous	Mature	No specific information	Well developed understorey layer	No specific information
Boreal Owl	Dense coniferous forest, as well as mixed forest, with Black and White Spruce, Balsam Fir, Trembling Aspen, Balsam Poplar and White Birch. Also found in muskeg bogs	Mixed or Coniferous	Unspecified	Dense forest in close proximity to open areas	Spruce thickets for diurnal roosting	Cavities for nesting; Prey (voles, rodents, birds)
Cape May Warbler	Mature coniferous or mixed forests with Black and White Spruce with Balsam Fir	Mixed or Coniferous	Mature	No specific information	Spruce–fir	Spruce budworm outbreaks
Connecticut Warbler	Mature lowland coniferous and deciduous forests with well developed understorey	Coniferous Lowland, or Mixed	Mature to Old	Lowland sites	Well developed understorey layer	No specific information
Evening Grosbeak	Coniferous or mixed forests with spruce, fir and alder	Mixed or Coniferous	Immature to Mature	No specific information	Spruce, fir or alder	No specific information

Priority Species	Breeding Habitat Description	Preferred Forest Types	Stand Age (Development Stage)	Landscape Features*	Stand Features	Site Features
Great Gray Owl	Mature spruce and poplar stands adjacent to open fens, bogs, meadows or clear-cuts with hunting perches	Coniferous or Mixed	Mature to Old	Forest patch size >100 ha; Mature spruce or poplar stands in proximity to open wetlands or meadows	Mature spruce or poplar stands	Stick nests or broken snags; Hunting perches; Prey (voles, rodents, birds)
Purple Finch	Prefers coniferous woodland, but will also breed in mixed forest, edge of bogs, deciduous forests and a range of plantations or open woodland settings	Coniferous, Mixed or Deciduous	Mature to Old	No specific information	No specific information	No specific information
Ruby-crowned Kinglet	Immature to old conifer-dominated forest with predominant species including spruce and fir. Also shows preference for Black Spruce/Tamarack muskegs and mixed woods	Coniferous or Mixed	Immature to Old	Lowland Black Spruce sites; Upland pine or spruce forests	Spruce and fir stands with medium to large dbh	No specific information
Sharp-shinned Hawk	Breeds mainly in large stands of dense deciduous, coniferous and mixed pine–hardwood forests and pine plantations	Coniferous, Mixed or Deciduous	Immature to Mature/ Old? (25- to 50-yr-old stand)	Proximity to forest edge	Dense stands	Hunting perches; Prey (passerines and small mammals)
Winter Wren	Prefers mature cedar swamps, spruce bogs and dark, moist coniferous woodlands. Also requires low, dense ground cover and downed trees as well as large trees and snags	Coniferous	Mature	Proximity to riparian areas and water	Low, dense ground cover; Large trees and snags	Downed woody debris
Yellow-bellied Flycatcher	Damp coniferous forest, swamps and bogs with dense understorey and moss ground cover. Often with spruce and Balsam Fir, hemlock, pine and larch. Also found on talus slopes and rocky hillsides	Coniferous	Immature to Old	No specific information	Spruce and fir stands with open canopy, dense understorey and dense moss layer	Moss cover and root tangles

Notes: See priority species accounts (Appendix F) for additional details and key references.
* The patch size requirements presented in this table are typically based on studies done in highly fragmented landscapes and may not apply to the mostly forested landscape of ON BCR 8.

Table 11: Summary of conservation objectives and conservation focus for priority coniferous forest landbirds in ON BCR 8.

<table>
<tr><th>Priority Species</th><th>Population Objective</th><th>Habitat Objective</th><th>Monitoring Objective</th><th>Conservation Focus</th></tr>
<tr><td>Boreal Owl</td><td rowspan="3">Assess Status

No regional population objective</td><td rowspan="2">Coarse Filter; Landscape Scale: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models

Fine Filter; Site Level: Protect occupied nests as per direction in the Site/Stand Guide</td><td>Maintain current population monitoring capability across ON BCR 8</td><td rowspan="5">Assess Status:
Periodically review available population data and assess the status of this species in ON BCR 8 relative to habitat and/or food availability</td></tr>
<tr><td>Sharp-shinned Hawk</td><td rowspan="4">Improve current population monitoring capability across ON BCR 8</td></tr>
<tr><td>Great Gray Owl</td><td>Coarse Filter; Landscape Scale: Maintain the supply of suitable habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Coarse Filter; Stand Level: Leave scattered standing live and dead residual trees in clear-cuts for hunting perches

Fine Filter; Site Level: Protect active primary, alternate and inactice nests as per direction for rare stick-nesting raptors in the Site/Stand Guide.</td></tr>
<tr><td>Black-backed Woodpecker</td><td>Assess Status

Contribute to PIF continental population objective of maintaining the current continental population

No regional population objective</td><td rowspan="2">Coarse Filter; Landscape Scale: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models</td></tr>
<tr><td>Connecticut Warbler</td><td>Maintain Current

Contribute to the PIF continental objective of increasing population by 50%

Maintain breeding population abundance at or above current BBS and BBA levels</td><td>Research:
Investigate factors causing regional population decline</td></tr>
</table>

<table>
<tr><th>Priority Species</th><th>Population Objective</th><th>Habitat Objective</th><th>Monitoring Objective</th><th>Conservation Focus</th></tr>
<tr><td>Purple Finch</td><td>Maintain Current
Maintain breeding population abundance at or above current BBS and BBA levels</td><td rowspan="2">Coarse Filter; Landscape Scale: Maintain availability of suitable breeding and feeding (e.g., seed-bearing conifers) habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models</td><td rowspan="10">Improve current population monitoring capability across ON BCR 8</td><td>Research:
Investigate factors causing regional population decline</td></tr>
<tr><td>Evening Grosbeak</td><td rowspan="3">Maintain within the ERNV
No regional population objective</td><td rowspan="9">Evaluate Trends:
Periodically review available population data and evaluate population trend in ON BCR 8 relative to habitat availability (and relative to insect outbreaks for Ruby-crowned Kinglet, Cape May Warbler and Bay-breasted Warbler))</td></tr>
<tr><td>Ruby-crowned Kinglet</td></tr>
<tr><td>Winter Wren</td></tr>
<tr><td>Blackburnian Warbler</td><td rowspan="5">Maintain within the ERNV
Contribute to the PIF continental objective of maintaining the current population
No regional population objective</td><td rowspan="7">Coarse Filter; Landscape Scale: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models</td></tr>
<tr><td>Yellow-bellied Flycatcher</td></tr>
<tr><td>Black-throated Green Warbler</td></tr>
<tr><td>Blue-headed Vireo</td></tr>
<tr><td>Cape May Warbler</td></tr>
<tr><td>Bay-breasted Warbler</td><td>Maintain within the ERNV
Contribute to the PIF continental objective of increasing population by 50%
No regional population objective</td></tr>
</table>

Notes: ERNV = Estimated Range of Natural Variability (see Box 5); See priority species accounts (Appendix F) for additional details.

6. Conservation of Deciduous Forest Landbirds

6.1 Deciduous Forest Landbirds

The deciduous and mixed deciduous forests found across the Boreal Softwood Shield BCR provide habitat for many migratory landbirds. A few deciduous forest landbirds, such as Ruffed Grouse, Barred Owl, Pileated Woodpecker and Black-capped Chickadee, are year-round residents of this BCR.

This BCR comprises a core breeding range for several deciduous forest landbirds, including 19 species that have 10% or more of their global population breeding in BCR 8 and/or occur at very high relative densities (RD=5) in this BCR during the breeding season (Table 12). Eight of these species have at least 10% of their global population breeding within the Ontario portion of BCR 8 (Table 12). Four deciduous forest species have 10% or more of their total population wintering in BCR 8 (Table 13).

6.2 Deciduous Forest Priority Species

Six (16%) of the priority landbirds in ON BCR 8 are associated with deciduous forest habitats (Table 14). Additional priority species associated with the early successional stages of deciduous and mixed forests are included in the successional forest guild (e.g.,

Table 12: Deciduous forest landbirds with ≥ 10% of global population breeding in BCR 8 and/or occurring at very high relative density in BCR 8 during the breeding season.

Species	RD	%G pop BCR 8	%G pop ON BCR 8	ON BBA1	ON BBA2
Canada Warbler	5	45%	16%	57%	46%
Black-and-white Warbler	5	39%	13%	68%	79%
Ovenbird	5	34%	15%	88%	89%
Veery	4	30%	10%	39%	46%
Red-eyed Vireo	5	29%	12%	87%	100%
American Redstart	4	27%	11%	65%	69%
Yellow-bellied Sapsucker	4	26%	9%	56%	67%
Least Flycatcher	5	25%	10%	85%	92%
Ruffed Grouse	5	25%	5%	67%	73%
Broad-winged Hawk	4	22%	15%	56%	60%
Hairy Woodpecker	5	18%	6%	58%	69%
Cedar Waxwing	4	17%	6%	86%	88%
Black-throated Blue Warbler	3	16%	1%	20%	20%
Rose-breasted Grosbeak	3	15%	2%	26%	18%
Pileated Woodpecker	3	12%	5%	45%	59%
Northern Flicker	5	11%	3%	94%	95%
Black-capped Chickadee	3	10%	2%	80%	82%
Brown Creeper	2	10%	5%	34%	66%
American Robin	4	10%	3%	85%	85%

Notes: Specoes are listed by decreasing % of global population in ON BCR 8. Priority species shown in **Boldface. RD** = Relative Density (see Appendix C). **%G pop BCR 8** = estimated % of the global population breeding in BCR 8. **%G pop ON BCR 8** = estimate % of global population breeding in the Ontario portion of BCR 8. **ON BBA1** = % of atlas squares with breeding evidence, 1981–85. **BBA2 =** % of atlas squares with breeding evidence, 2001–05 (preliminary data).

Table 13: Deciduous forest landbirds with ≥ 10% of global population wintering in BCR 8 and/or occurring at very high relative density in BCR 8 during the winter.

Species	RD	%G pop BCR 8	%G pop ON BCR 8
Ruffed Grouse	5	25%	6%
Hairy Woodpecker	5	18%	4%
Pileated Woodpecker	3	12%	4%
Black-capped Chickadee	3	10%	3%

Notes: Specoes are listed by decreasing % of global population in ON BCR 8. Priority species shown in **Boldface. RD** = Relative Density (see Appendix C). **% G pop BCR 8** = estimated % of the global population wintering in BCR 8. **%G pop ON BCR 8**= estimate % of global breeding or wintering population occurring in Ontario portion of BCR 8.

Chestnut-sided Warbler, Mourning Warbler).

Five of the priority species in the deciduous forest guild are present during the breeding season only. Ruffed Grouse is a permanent resident of ON BCR 8.

Canada Warbler is of continental concern (PIF Watch List species) because it has experienced a rangewide population decline and elevated threats to its wintering habitat. It is also a continental and regional Stewardship species with 16% of its global breeding population in ON BCR 8 (and 45% in BCR 8) (Table 14; Table 12; Appendix F).

Yellow-bellied Sapsucker is also a continental and regional Stewardship species that occurs at high densities in deciduous forests in ON BCR 8 (Table 12; Table 14).

This BCR supports globally important breeding populations of all six priority species in this guild and therefore has a high responsibility for maintaining healthy populations of these regional Stewardship species (Table 12; Table 14). None of the priority species in this guild is of regional concern due to regional population declines or are listed as a Species at Risk (Table 14).

The habitat requirements of the priority species in this guild are summarized in Table 16.

BLACK AND WHITE WARBLER © *Simon Dodsworth*

Table 14: Deciduous forest priority landbirds in ON BCR 8 sorted by reasons for priority status.

Priority Species	Season(s)	Reason(s) for Priority Status					
		Concern		Stewardship		At Risk	
		Cont	Reg	Cont	Reg	CA	ON
Canada Warbler	B	Y		Y	Y	UR	
Yellow-bellied Sapsucker	B			Y	Y		
Black-and-white Warbler	B				Y		
Northern Flicker	B				Y		
Ovenbird	B				Y		
Ruffed Grouse	BW				Y		

Notes: Seasons: B = Breeding; **W** = Winter. **Cont** = Continental level, **Reg** = Regional (ON BCR 8) level, **CA** = Canada, **ON** = Ontario, **UR** = Status under review by COSEWIC (2007b). See Appendix C for details.

Table 15: Deciduous and mixed deciduous forest types in ON BCR 8.

Landbird Habitat Guild	Provincial Forest Types	Northeast Standard Forest Units	Northwest Standard Forest Units
Deciduous Forest	Poplar White Birch Tolerant Hardwood Mixedwood	LH1 – Lowland Hardwood TH1 – Tolerant Hardwood PO1 – Poplar BW1 – Birch–Poplar	PoDee – Poplar, high productivity PoSha – Poplar, sensitive sites BwSha – White Birch, sensitive sites BwDee – White Brich, high productivity OthHd – Other hardwood HrDom – Hardwood mixedwood HrdMw – Hardwood mixedwood

Sources: Provincial Forest Type – OMNR 2002, **Northeast Standard Forest Units** – Vasiliauskas et al. 2004, **Northwest Standard Forest Units** – OMNR **2006c.**

6.3 Deciduous Forest Habitats

6.3.1 Description

Dense deciduous, mixed deciduous and sparse deciduous forests comprise 14% of the land cover of ON BCR 8 (see Tables 1 and 2). The sparse deciduous land cover category (30–40% canopy cover) includes some successional forest habitat within a matrix of open deciduous forest.

Deciduous forest cover, particularly the sparse deciduous and mixed deciduous categories, is more frequent in the East subregion than the West subregion (Figure 13). Deciduous forest is also more widespread in the southern parts of the West subregion (Ecoregions 3W and 4S) and infrequent in the northern ecoregions (Figure 14).

The dominant deciduous forest types also vary across the region (Table 15; Figure 14). Most deciduous forests in ON BCR 8 are in the mixed deciduous forest type, containing poplar, birch, spruce, Jack Pine and fir (OMNR 2002). Poplar- and White Birch–dominated deciduous stands are common in the East subregion and more local in the West subregion. White Birch decreases in frequency along a north–south gradient (OMNR 2002). Black Ash is also present across the southern ON BCR 8 (OMNR 2002).

Birch and ash produce seed crops that are an important food source for landbirds such as grouse and finches. Deciduous tree buds are also an important food source for some species such as Bohemian Waxwing, Evening Grosbeak and Ruffed Grouse.

6.3.2 Current Status and Outlook

Past forest management activities and natural disturbances have influenced the distribution of deciduous forest habitats in this region, as tree deciduous species (especially aspen) often thrive in regenerating clear-cuts following harvesting of conifers (Carleton 2000). If ongoing efforts to emulate natural disturbance patterns by promoting conifer regeneration are successful, then the overall proportion of deciduous stands may gradually decline.

6.3.3 Factors Affecting Deciduous Forest Landbirds

Many of the factors affecting coniferous forest landbirds described in section 5.4 also affect deciduous forest birds. Other factors, such as availability of nest trees and snags for cavity nesters, are addressed by existing forestry management guides.

Factors of current or potential importance to achieving objectives for deciduous forest landbirds in ON BCR 8 include:

- The impact of pre- and post-harvest silvicultural treatments (thinning, brush management) that affect forest structure and composition.

6.4 Conservation Objectives

Species-level objectives for priority deciduous forest landbirds are presented in the species accounts (Appendix F) and summarized in Table 17.

6.4.1 Overall Objectives

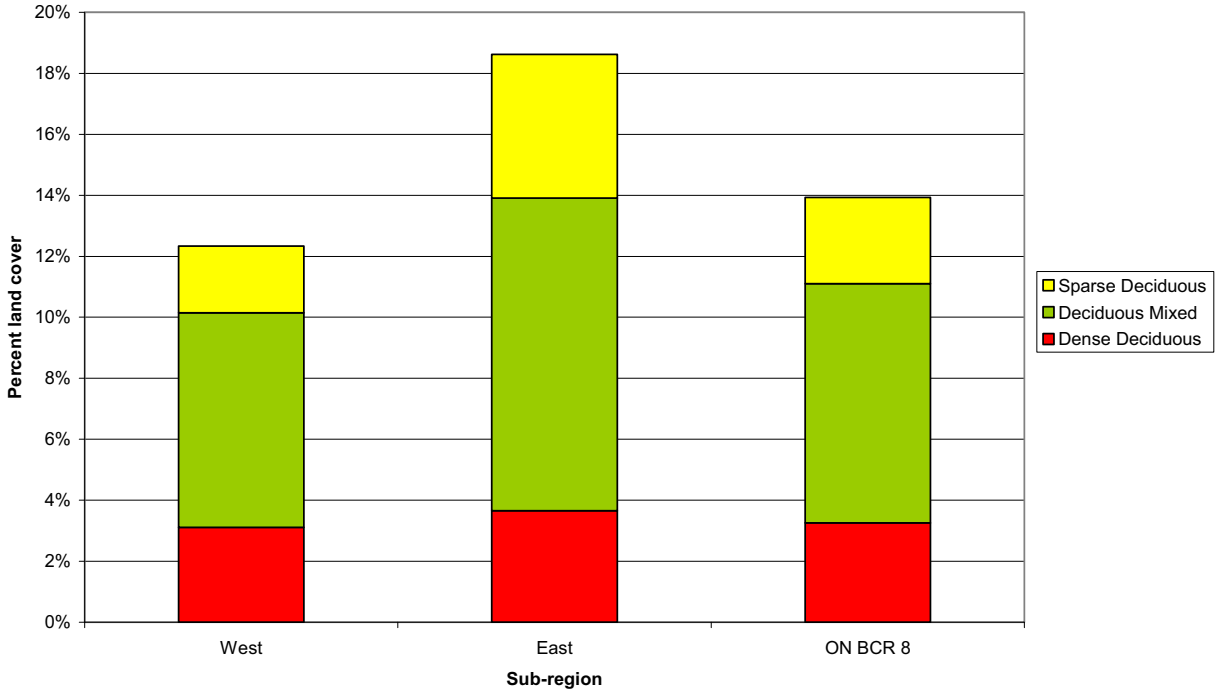
For most of the priority deciduous landbirds, the overall conservation objective is simply to:

Maintain the abundance and distribution of priority deciduous forest landbird populations in ON BCR 8 within the range of natural variation by maintaining the overall supply of deciduous forest habitats in each ecoregion within the ERNV.

To implement this conceptual objective, habitat and monitoring objectives are set for most priority deciduous forest landbirds. Population objectives are set for the one deciduous forest species of particular conservation concern, Canada Warbler, but not for the Stewardship species.

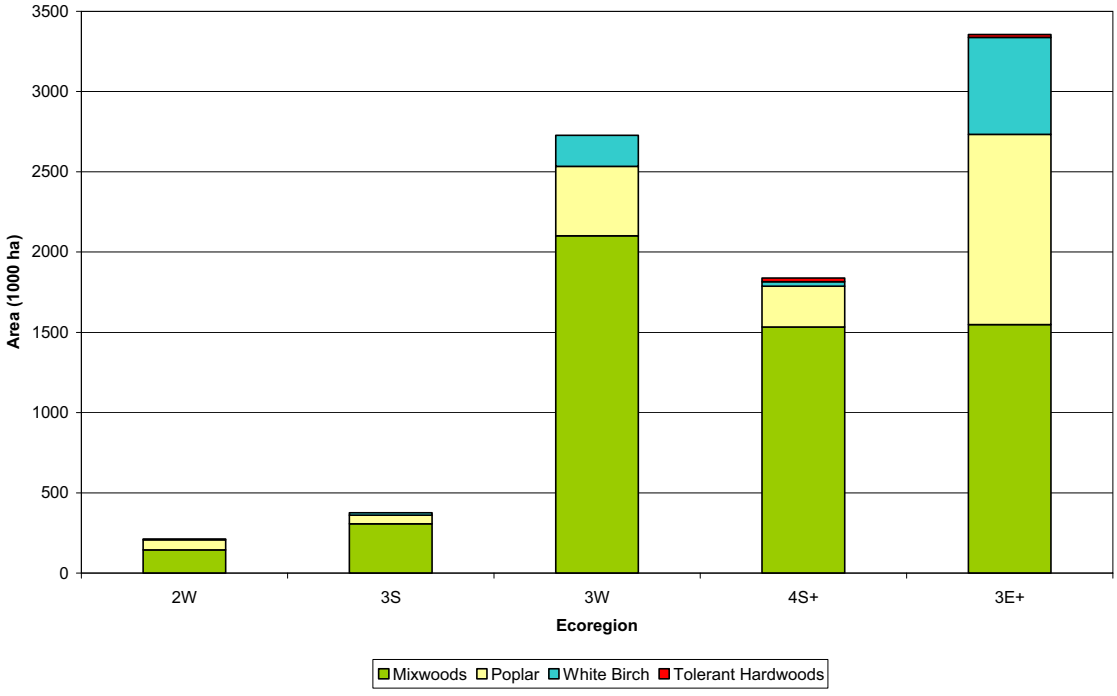
OVENBIRD © *Michael Butler*

Figure 13: Deciduous forest cover in ON BCR by subregion (satellite data).



Source: OLC database, 1990s edition.

Figure 14: Area of deciduous forest by provincial forest type, by ecoregion (FRI data).



Notes: The information presented in this chart is for the entire extent of each ecoregions: substantial parts of Ecoregions 3E and 4S (indicated with +) are outside the boundaries of ON BCR 8.

6.4.2 Habitat Objectives

For most of the deciduous forest priority species, the main conservation objective is to:

Maintain the supply of suitable deciduous forest habitat in each ecoregion within the ERNV through a combination of natural disturbances and forest management practices that emulate natural disturbance patterns.

This coarse filter, landscape-level approach assumes that the availability of suitable deciduous forest habitats is the main factor limiting populations of most deciduous forest landbirds in this region. As long as their breeding habitat objectives can be satisfied (amount of suitable habitat exceeds a minimum threshold) and conditions on their wintering grounds and migration routes do not deteriorate, then presumably the species' population will be adequately conserved within its natural range of variation.

OMNR is continuing to develop and revise habitat supply models for a variety of deciduous and mixed deciduous forest landbirds, including some of the ON BCR 8 priority species (R. Rempel, OMNR, pers. comm.).

For some species with more specialized habitat needs, additional habitat filters are needed as habitat quantity is not an adequate measure. Coarse filter, stand-level objectives specifying the minimum number, size and condition of residual snags and living trees following logging operations are needed for woodpecker species, including Northern Flicker and Yellow-bellied Sapsucker.

6.4.3 Population Objectives

Canada Warbler is a Species of Continental Concern due to the combination of rangewide population declines and elevated threats. The continental population objective is to increase the North American population by 50% (Rich et al. 2004). ON BCR 8 has a high stewardship responsibility for this species, as an estimated 16% of the global population breeds in this region. Although populations in BCR 8 have apparently declined in the past 20 years, limited BBS data from the Ontario portion of the BCR suggest a possible increasing trend. Atlas data show a significant decrease in distribution in the East subregion but no change in distribution in the West subregion. This plan establishes a population objective of at least maintaining current abundance and distribution levels for Canada Warbler in ON BCR 8.

6.4.4 Monitoring Objectives

Monitoring objectives are set for all priority deciduous forest species. For all deciduous forest species other than Northern Flicker, the monitoring objective is *to improve current monitoring capability* to increase the statistical power to detect large population declines (see Appendix H). Current BBS monitoring coverage does provide some trend information that can be used along with data from other surveys (especially migration monitoring data) to evaluate whether the proposed ERNV habitat-based conservation objectives for these priority species are effective in achieving the overall objective of sustaining landbird populations.

6.4.5 Conservation Focus

The status of all the priority deciduous forest species should be periodically reviewed to ensure that population trends are not diverging significantly from what would be expected through changes in habitat supply. Research to determine the factors causing observed population declines is identified as the conservation focus for Canada Warbler.

6.5 Recommended Conservation Actions

Many of the recommended conservation actions for coniferous forest birds outlined in Chapter 5 also apply to deciduous forest birds. Recommended actions specific to deciduous forest birds include research and evaluation.

6.5.1 Research and Evaluation

- Promote demographic and habitat research to identify factors causing population decline (distribution decline in East subregion) and/or limiting population growth in Canada Warbler.
- Promote research on the wintering grounds for declining species where non-breeding factors are a concern, especially Canada Warbler.
- Promote research to increase understanding of the effects of current forest conditions including landscape level (forest patch size, configuration and heterogeneity), stand level (age, structure, composition, health) and site level (snags, downed woody debris) on the abundance, distribution and demographics of priority deciduous forest birds.

Table 16: Summary of habitat needs of priority deciduous forest landbirds in ON BCR 8.

Priority Species	Breeding Habitat Description	Preferred Forest Types	Stand Age (Development Stage)	Landscape Features*	Stand Features	Site Features
Black-and-white Warbler	Mature and second-growth deciduous and mixed deciduous–coniferous forests	Deciduous, Mixed or Coniferous	Mature	Forest patch >290 ha of continuous forest	Low shrub density; High tree density	No specific information
Canada Warbler	Large tracts of older lowland mixed deciduous forest with well developed understorey	Lowland Mixed Deciduous	Mature to Old	Minimum 30-ha forest patch size, prefers >400 ha	Dense understorey; Closed canopy	Dense nest site cover
Northern Flicker	Open forests and forest edges with large snags for nesting cavities	Deciduous, Mixed or Coniferous	Immature to Old	No specific information	Open canopy or forest edge	Snags >30 cm
Ovenbird	Mature, closed canopy, mesic, mid–late successional, closed-canopied deciduous or deciduous–coniferous forests that have deep leaf litter and limited understorey	Deciduous or Mixed	Mature	Forest patch size >100 ha	Low shrub density; Closed canopy	Deep leaf litter
Ruffed Grouse	Mix of open and closed deciduous forest with herbaceous cover and drumming logs, close to area of dense conifer cover	Deciduous with some conifer stands	Sapling to Immature	No specific information	Poplar or birch; Dense canopy and herbaceous ground cover for summer; Coniferous stands for winter cover	Fallen logs; Small clearings (<0.4 ha)
Yellow-bellied Sapsucker	Dry deciduous or mixed forest with nest snags and live foraging trees	Deciduous or Mixed	Mature to Old	No specific information	Poplar, birch, maple and hemlock	Snags >25 cm with heart rot

* The patch size requirements presented in this table are typically based on studies done in highly fragmented landscapes and may not apply to the mostly forested landscape of ON BCR 8.

Table 17: Summary of conservation objectives and conservation focus for priority deciduous forest landbirds in ON BCR 8.

<table>
<tr><th>Priority Species</th><th>Population Objectives</th><th>Habitat Objectives</th><th>Monitoring Objectives</th><th>Conservation Focus</th></tr>
<tr><td>Canada Warbler</td><td>Maintain Current
Contribute to the PIF continental objective of increasing population by 50%
Maintain breeding population abundance at or above current levels, BBS Index of 1.49, ~170 000 birds
Maintain breeding population distribution levels at or above current levels (56% is East subregion and 42% in West); restore to BBA1 level of 72% of squares in East subregion if possible</td><td>Coarse Filter; Landscape Scale: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models</td><td rowspan="2">Improve current population monitoring capability across ON BCR 8</td><td>Research: Determine factors driving population decline in this species</td></tr>
<tr><td>Yellow-bellied Sapsucker</td><td>Maintain within the ERNV
Contribute to PIF continental population objective of maintaining the current population
No regional population objective</td><td>Coarse Filter; Landscape Scale: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models</td><td rowspan="5">Evaluate Trends: Periodically review available population data and evaluate population trend relative to habitat availability in ON BCR 8</td></tr>
<tr><td>Northern Flicker</td><td rowspan="4">Maintain within the ERNV
No regional population objective</td><td>Coarse Filter; Stand Scale: Maintain availability of suitable nest trees (e.g., snags and diseased trees) as per the ‘wildlife tree direction’ in the Site/Stand Guide.</td><td>Maintain current population monitoring capability across ON BCR 8</td></tr>
<tr><td>Black-and-white Warbler</td><td rowspan="3">Coarse Filter; Landscape Scale: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models</td><td rowspan="3">Improve current population monitoring capability across ON BCR 8</td></tr>
<tr><td>Ovenbird</td></tr>
<tr><td>Ruffed Grouse</td></tr>
</table>

Notes: ERNV = Estimated Range of Natural Variability; **SAR** = Species at Risk. See priority species accounts in Appendix F for additional details.

7. Conservation of Successional Forest Landbirds

7.1 Landbirds in Successional Forest Habitats

Early and mid-successional forests, at the pre-sapling and sapling development stages, provide habitat for landbird species that prefer open forest with a well developed shrub layer. The species in this habitat guild are found in regenerating forests created following natural or anthropogenic disturbances. This reliance on disturbed forest habitats makes successional forest species sensitive to changes in forest harvesting and silviculture practices and changes in natural disturbance regimes due to fire suppression, insect control or climate change.

This BCR comprises a core breeding range for 12 species of successional forest landbirds that occur at very high relative densities (RD=5) in this region and/or have 10% of more of their total population occurring in BCR 8 (Table 18). At least half of the global populations of Philadelphia Vireo, Mourning Warbler, Nashville Warbler and Magnolia Warbler breed in BCR 8 (Table 18). No successional forest landbirds occur in BCR 8 at high relative densities during the winter.

The Ontario portion of BCR 8 supports more than 10% of the global breeding population of four warbler species (Mourning, Nashville, Magnolia and Chestnut-sided) and White-throated Sparrow (Table 18).

7.1.1 Priority Landbirds Breeding in Successional Forest Habitats

Seven (19%) of the priority landbirds are included in the successional forest guild (Table 19). All the priority species in this guild are migratory species that occur regularly in ON BCR 8 during the breeding season only.

All seven successional forest species (Table 19) are continental Stewardship species typical of the Northern Forest avifaunal biome. Four of these species are also regional Stewardship species owing to a combination of high relative density and elevated assessment scores due to declining (Chestnut-sided Warbler) or uncertain (Mourning Warbler, Nashville Warbler) regional population trends, or a relatively small global population (Philadelphia Vireo).

The priority species in this guild will use a wide range of shrubby successional habitats created by natural or anthropogenic disturbances (Table 20).

Table 18: Successional forest landbirds with ≥ 10% of their global breeding population in BCR 8 and/or occurring at very high relative density in BCR 8 in the breeding season.

Species	RD	%G pop BCR 8	%G pop ON BCR 8	ON BBA1	ON BBA2
Philadelphia Vireo	5	69%	8%	53%	57%
Mourning Warbler	5	63%	22%	56%	71%
Nashville Warbler	5	58%	14%	64%	95%
Magnolia Warbler	5	50%	18%	79%	98%
Chestnut-sided Warbler	4	42%	18%	68%	66%
White-throated Sparrow	5	37%	13%	98%	100%
Tennessee Warbler	5	30%	7%	87%	81%
Blackpoll Warbler	4	18%	<1%	8%	5%
Fox Sparrow	3	15%	<1%	5%	15%
Chipping Sparrow	5	14%	5%	68%	93%
Black-billed Cuckoo	3	12%	1%	9%	6%
Lincoln's Sparrow	4	11%	2%	54%	69%

Notes: Specoes are listed by decreasing % of global population in ON BCR 8. Priority species shown in **Boldface. RD** = Relative Density (see Appendix C). **%G pop BCR 8** = estimated % of the global population breeding in BCR 8. **%G pop ON BCR 8** = estimate % of global population breeding in the Ontario portion of BCR 8. **ON BBA1** = % of atlas squares with breeding evidence, 1981–85. **ON BBA2 =** % of atlas squares with breeding evidence, 2001–05 (preliminary data).

Table 19: Successional forest priority landbirds in ON BCR 8, sorted by reasons for priority status.

Priority Species	Season	Reason(s) for Priority Status					
		Concern		Stewardship		At Risk	
		Cont	Reg	Cont	Reg	CA	ON
Chestnut-sided Warbler	B			Y	Y		
Mourning Warbler	B			Y	Y		
Nashville Warbler	B			Y	Y		
Philadelphia Vireo	B			Y	Y		
Magnolia Warbler	B			Y			
White-throated Sparrow	B			Y			
Tennessee Warbler	B			Y			

Notes: Season: B = Breeding. **Cont** = Continental level. **Reg** = Regional (ON BCR 8) level, **CA** = Canada, **ON** = Ontario, See Appendix C for details on priority assessment methods.

7.2 Successional Forest Habitats

7.2.1 Description

As used in this plan, the term successional forest includes all regenerating forests at the pre-sapling and sapling development stages. The comparable land cover classes include recent cutover, recent burn and older cuts and burns (see Table 1).

Successional forest habitats are particularly varied, as they can result from one or more disturbance processes affecting any of the deciduous or coniferous forest types described in Chapters 5 and 6. Frequent natural disturbance processes in this region include:

- Fire disturbances ranging from isolated lightning strikes to more extensive ground fires to stand-replacing catastrophic fire.
- Insect outbreaks, most notably spruce budworm, and tree diseases that kill individual trees or entire stands.
- Wind and ice storm disturbances ranging from individual tree falls to local downbursts to landscape-scale hurricane or ice storm damage.
- Periodic flooding in lowland areas with seasonally high water tables and in riparian areas.

Some areas and forest types are inherently more prone to certain types of natural disturbances. But there is a high degree of uncertainty and unpredictability associated with the large-scale disturbances, which are infrequent but ecologically important (Li 2000; Fleming et al. 2000; Voigt et al. 2000).

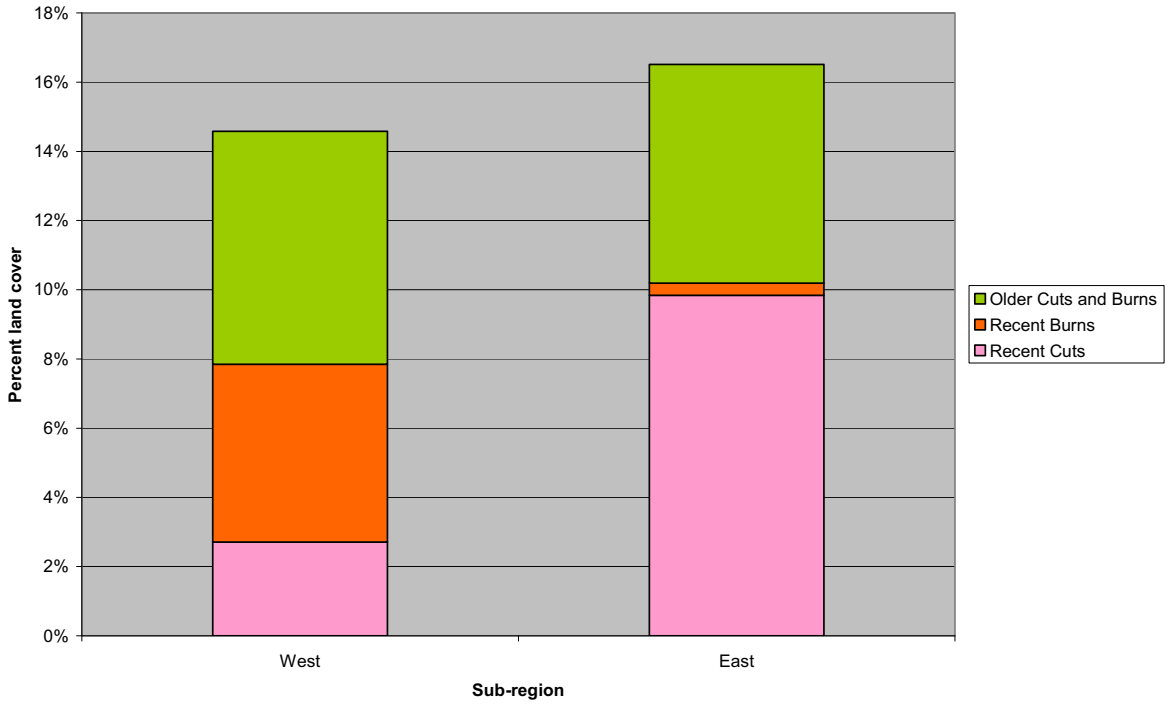
A high proportion of the successional forest habitats in most of this region are the result of forest harvesting rather than natural disturbance processes. Post-logging successional communities differ greatly depending on the site, forest type, harvest method and post-harvest silvicultural treatments.

7.2.2 Current Conditions and Outlook

Information on the current extent of regenerating forest habitat in this region is less complete than for more mature forest habitats for two reasons. Many successional habitat patches are too small to be distinguished in land cover classifications derived from satellite data, and are included in the sparse coniferous and sparse deciduous land cover classes (Figures 11 and 13). Successional forest habitat is inherently dynamic, created by an abrupt disturbance and then maturing into coniferous or deciduous forest habitat following a successional pathway that is dependent on the site conditions, harvest method and subsequent silvicultural treatments (Vasiliauskas et al. 2004). The time required for a coniferous or deciduous forest to regenerate after a disturbance is quite variable. Depending on site conditions and forest type, the pre-sapling development stage can typically last anywhere from 10 to 20 years or more, and the sapling stage can persist for an additional 10 to 25 years (Hollingway et al. 2004).

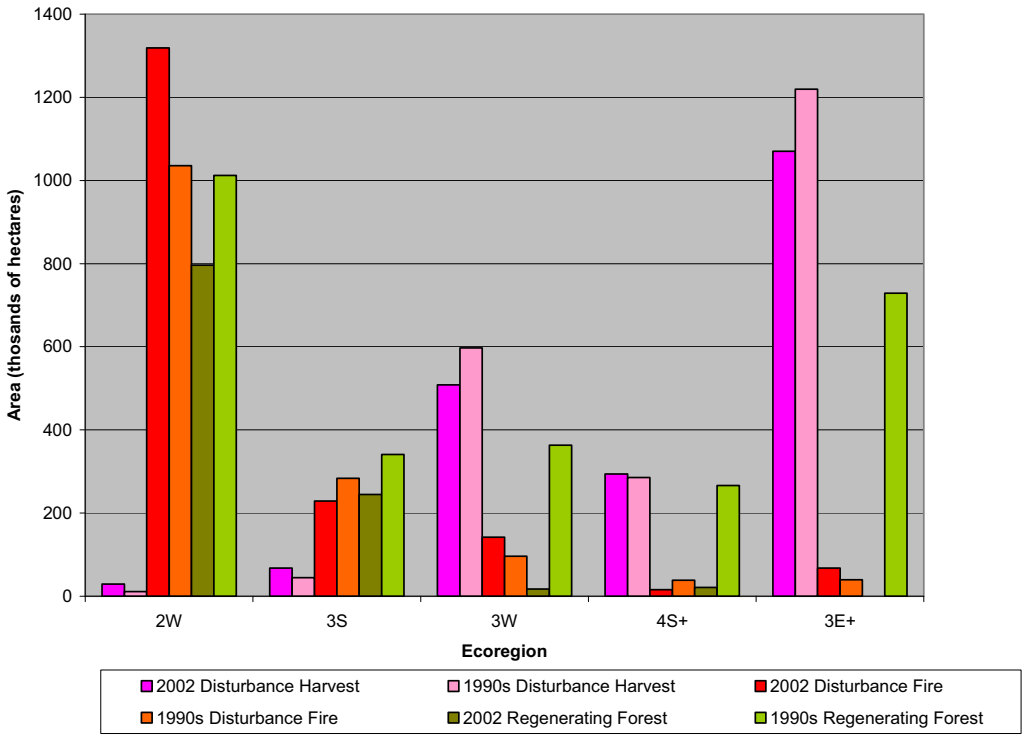
Patches of regenerating disturbed forest (recent cuts, recent burns and old cuts and burns) comprised approximately 15% of the overall land cover in ON BCR 8 in the 1990s (OLC data, 1990s edition). The proportion of disturbed forest is slightly higher in the East subregion than in the West subregion (Figure 15).

Figure 15: Regenerating forest cover in ON BCR 8, by subregion (satellite data).



Source: OLC data, 1990s edition.

Figure 16: Regenerating forest cover in ON BCR 8 in 1990s and 2002, by ecoregion (satellite data).



Source: OMNR 2002 and OMNR in prep. a.

A more important regional difference is that most early successional forests in the East subregion are the result of forest harvesting, whereas extensive areas of post-fire successional forest are present in the West subregion (Figure 15) (Perera and Baldwin 2000).

Many of the disturbed land cover areas present in the 1990s mapping will have matured into immature forest by now, and many new disturbed areas will have been created. A comparison of the 1990s and 2002 land cover data for each ecoregion in ON BCR 8 shows similar patterns (Figure 16), with harvesting being the major disturbance in the East subregion and southern parts of the West subregion. Fire is the major cause of forest disturbance in the northern part of ON BCR 8 (Ecoregions 2W and 3S) (Figure 16).

While many successional forest landbirds are equally common in post-fire or post-harvest successional stands, some species (e.g., Nashville Warbler) are more common in post-fire stands, whereas other species (e.g., Common Yellowthroat) show a preference for harvested landscapes (Zimmerling and Francis, in prep.).

Variability in the amount and distribution of successional forests habitats, and the abundance and distribution of the landbirds that depend on them, is to be expected. Landbirds in this guild are generally adapted to this variability and are quick to colonize newly created habitat patches (Hunter et al. 2001; Dettmers 2003).

7.2.3 Factors Affecting Successional Forest Species

The two main factors facing successional forest birds and their habitats are:

- Forest management practices that directly influence the amount, distribution and composition of successional forest habitats; and
- Fire suppression and insect control practices that limit the amount of successional habitat created by natural disturbance processes.

Research to increase understanding of how differences between natural and anthropogenic disturbances affect the resulting successional forest habitat and successional forest bird populations is ongoing.

There is some concern that intensive silvicultural management to hasten forest regeneration may result in a net reduction in the amount or quality of early successional habitat. However, this is not currently considered a significant factor in ON BCR 8. If intensive forest management becomes more widespread in this region, threat scores for many successional forest species in this guild may need to be upgraded (from low to moderate).

The impact of climate change on natural disturbance regimes and forest regeneration is an issue that may become more important in the future.

7.3 Conservation Objectives for Priority Successional Forest Landbirds

Conservation objectives for the priority landbird species in this guild are presented in the priority species accounts (Appendix F) and summarized in Table 21.

7.3.1 Overall Objectives

For all seven priority landbirds in this habitat guild, the overall conservation objective is to:

Maintain the abundance and distribution of priority successional forest landbird populations in ON BCR 8 within the range of natural variation by maintaining the overall supply of early successional forest habitats in each ecoregion within the ERNV.

To implement this conceptual objective, habitat and monitoring objectives are set for each priority successional forest landbird species.

7.3.2 Population Objectives

Regional population objectives are not proposed for any of the successional forest priority species (see habitat objectives, below). However, all seven species have a PIF continental population objective of *maintain the current North American population* (Rich et al. 2004). This planning region has a high responsibility for meeting the continental-level population objective. If in the future regional populations of any of these species do show a pattern of long-term decline, then consideration should be given to setting a regional population objective.

7.3.3 Habitat Objectives

For all successional forest priority species, the main conservation objective is to:

Maintain the supply of suitable successional forest habitat in each ecoregion within the ERNV through a combination of natural disturbances and forest management practices that emulate natural disturbance and regeneration patterns.

This coarse filter, landscape-level approach assumes that the availability of suitable successional forest habitats is the main factor limiting populations of most successional forest landbirds in this region. As long as the breeding habitat objective (amount of suitable habitat exceeds a minimum threshold) can be satisfied, then presumably the species' population will be adequately conserved within its range of natural variation.

OMNR is continuing to develop and revise habitat supply models for a variety of landbirds that are dependent on early successional forests (pre-sapling and sapling development stages), including several of the ON BCR 8 priority species (R. Rempel, OMNR, pers. comm. March 2006).

7.3.4 Monitoring Objectives

The monitoring objectives are set for all priority successional forest species (Table 21). The monitoring objective for most of these species is *to improve current monitoring capability* to increase the statistical power to detect population declines (see Appendix H). Coverage of two species, Nashville Warbler and White-throated Sparrow, is considered adequate (at least 80% power to detect 50% decline in 20 years; see Appendix H), so the objective for these species is to maintain current BBS monitoring capability. Current BBS monitoring coverage does provide some trend information for all successional priority species that can be used along with data from other surveys (especially migration monitoring data) to evaluate whether the proposed ERNV habitat-based conservation objectives for these priority species are effective in achieving the overall objective of sustaining landbird populations.

7.4 Conservation Focus

For all priority landbirds in this habitat guild, the conservation focus is to periodically evaluate population trends relative to habitat availability to ensure these trends are not diverging.

7.5 Recommended Conservation Actions

Many of the recommended conservation actions for coniferous forest birds outlined in Chapter 5 also apply to successional forest birds. Recommended actions specific to this guild include research and evaluation.

7.5.1 Research and Evaluation

- Promote ongoing research to understand how differences between natural and anthropogenic disturbances (e.g., fire versus logging) affect the resulting successional forest habitat and successional forest bird populations, and develop silviculture guidelines that better emulate natural disturbance regimes.

CHESTNUT-SIDED WARBLER © *Michael Butler*

Table 20: Summary of habitat needs of priority successional forest landbirds in ON BCR 8.

Priority Species	Breeding Habitat Description	Preferred Forest Types	Stand Age (Development Stage)	Landscape Features	Stand Features	Site Features
Chestnut-sided Warbler	Shrubby, early successional deciduous woodlands near mature forest stands. Includes regenerating forests in clear-cuts and burns, large forest gaps, forest edges and riparian thickets	Deciduous	Pre-sapling to Sapling	Regenerating forest patches, gaps and edges in mature forests and riparian thickets	Dense deciduous shrub layer	Dense, shrubby undergrowth for nest site
Magnolia Warbler	Dense mid-successional coniferous and mixed forests, as well as forest openings and edges, especially if young spruce and Balsam Fir are present	Coniferous and Mixed	Sapling to Mature	Regenerating forest patches, gaps and edges in mature forests	Dense growth	Nests located in dense coniferous vegetation
Mourning Warbler	Shrubby, mesic forest clearings and forest edges including burned or cutover areas, and margins of swamps and riparian areas	Mixed, Deciduous or Coniferous	Pre-sapling to Sapling	Regenerating forest patches, gaps, edges in mature forest and riparian thickets	Dense ground cover and shrub layer	Dense, shrubby undergrowth for nest site
Nashville Warbler	Wet, open, regenerating coniferous, deciduous or mixed forest with shrubby undergrowth and in shrubby cedar or spruce swamps and bogs	Coniferous, Deciduous or Mixed	Pre-sapling to Sapling	Regenerating forest patches, forest gaps and treed bogs	Shrub layer	No specific information
Philadelphia Vireo	Prefers early- to mid-successional deciduous or mixed forest, forest edge and regenerating forest in cutovers and burns, also in alder and willow thickets	Deciduous or Mixed	Pre-sapling to Sapling	Regenerating forest patches, gaps and edges in mature forests and riparian thickets	No specific information	No specific information
Tennessee Warbler	Found in open coniferous, mixed and deciduous forests including young clear-cuts, gaps and edges in mature forest and treed bogs, and in alder and willow thickets	Coniferous, Deciduous or Mixed	Sapling to Mature	Regenerating forest patches, gaps and edges in mature forests and riparian thickets	No specific information	Spruce budworm outbreaks
White-throated Sparrow	A wide range of settings including coniferous or mixed, semi-open forests, old burns and cutovers with some regeneration and slash piles, brushy clearings and borders of bogs and beaver meadows	Coniferous or Mixed	Pre-sapling to Sapling	Forest openings, edges and regenerating forest patches	Semi-open coniferous or mixed forest with low understorey layer	Nests near edge of clearing or other forest opening

Notes: See priority species accounts (Appendix F) for additional details and key references.

Table 21: Summary of conservation objectives and conservation focus for priority successional forest landbirds in ON BCR 8.

<table>
<tr><th>Priority Species</th><th>Population Objective</th><th>Habitat Objective</th><th>Monitoring Objective</th><th>Conservation Focus</th></tr>
<tr><td>Chestnut-sided Warbler</td><td rowspan="7">Maintain within the ERNV

Contribute to PIF continental objective of maintaining current population

No regional population objective</td><td rowspan="7">Coarse Filter; Landscape Scale: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models</td><td rowspan="5">Improve current population monitoring capability across ON BCR 8</td><td rowspan="7">Evaluate Trends: Periodically review available population data and evaluate population trend in ON BCR 8 relative to habitat availability</td></tr>
<tr><td>Magnolia Warbler</td></tr>
<tr><td>Mourning Warbler</td></tr>
<tr><td>Philadelphia Vireo</td></tr>
<tr><td>Tennessee Warbler</td></tr>
<tr><td>Nashville Warbler</td><td rowspan="2">Maintain current population monitoring capability across ON BCR 8</td></tr>
<tr><td>White-throated Sparrow</td></tr>
</table>

Notes: ERNV = Estimated Range of Natural Variability (see Box 5). See priority species accounts (Appendix F) for additional details.

WHITE-THROATED SPARROW © *Saul W Bocian*

8. Conservation of Landbirds in Wetland and Riparian Habitats

8.1 Landbirds Associated with Wetland and Riparian Habitats

Relatively few landbird species in this region are closely associated with non-forested lowland areas such as open and treed wetlands (marshes, bogs, fens), beaver meadows, riparian areas and shorelines. Fish-eating landbirds, such as Osprey, Bald Eagle and Belted Kingfisher, are the most dependent on wetland and riparian habitats.

Several forest-associated landbirds (e.g., Winter Wren, Connecticut Warbler) prefer forest habitats that are near wetland and riparian features. Such habitats are also important to landbirds that forage in open areas (e.g., Great Gray Owl, Peregrine Falcon and aerial foragers). Most wetland/riparian landbirds are migratory.

BCR 8 comprises a core breeding range for seven wetland/riparian landbird species that occur at very high relative densities in this region (Table 22). None of these species has 10% or more of its global population breeding within ON BCR 8.

8.1.1 Priority Landbirds in Wetland and Riparian Habitats

Seven (19%) of the priority landbirds are associated with wetland, riparian and/or shoreline habitats (Table 23). All priority wetland/riparian species are present in significant numbers during the breeding season only.

Three of the priority species in this guild (Olive-sided Flycatcher, Rusty Blackbird and Short-eared Owl) are of continental concern owing to a combination of rangewide population declines and high vulnerability scores (Table 23). Olive-sided Flycatcher is also of regional concern due to a severe regional population decline (regional population trends of the other two continental concern wetland species are uncertain). Short-eared Owl is currently designated a Species of Special Concern in Canada and Ontario. Rusty Blackbird was recently designated a Species of Special Concern in Canada (COSEWIC 2007a). A status report on Olive-sided Flycatcher is currently under review by COSEWIC (2007b).

Alder Flycatcher and Swamp Sparrow are both continental and regional Stewardship species with high relative breeding densities in this region and elevated assessment scores (Appendices E and F). Belted Kingfisher is included as a regional Stewardship species because of its high relative breeding density and a possible regional population decline.

The SARO status of Bald Eagle in northern Ontario was recently downlisted from Endangered to Special Concern (OMNR 2006).

The habitat requirements of the priority species in this guild are summarized in Table 24. Further details about the status, ecology and threats facing these species are available in the priority species accounts (Appendix F).

Table 22: Wetland and riparian landbirds with ≥ 10% of global population breeding in BCR 8 and/or occurring at very high relative density in BCR 8 in the breeding season.

Species	RD	%G pop BCR 8	%G pop ON BCR 8	ON BBA1	ON BBA2
Swamp Sparrow	5	31%	4%	76%	84%
Northern Waterthrush	4	21%	2%	72%	79%
Alder Flycatcher	5	15%	4%	75%	93%
Common Yellowthroat	4	14%	3%	72%	74%
Belted Kingfisher	5	12%	5%	69%	65%
Palm Warbler	3	12%	<1%	22%	51%
Tree Swallow	4	12%	4%	82%	55%

Notes: Specoes are listed by decreasing % of global population in ON BCR 8. Priority species shown in **Boldface. RD** = Relative Density (see Appendix C). **%G pop BCR 8** = estimated % of the global population breeding in BCR 8. **%G pop ON BCR 8** = estimate % of global population breeding in the Ontario portion of BCR 8. **ON BBA1** = % of atlas squares with breeding evidence, 1981–85. **ON BBA2 =** % of atlas squares with breeding evidence, 2001–05 (preliminary data).

Table 23: Priority landbirds in wetland and riparian habitats in ON BCR 8, sorted by reasons for priority status.

Priority Species	Season	Reason(s) for Priority Status					
		Concern		Stewardship		At Risk	
		Cont	Reg	Cont	Reg	CA	ON
Olive-sided Flycatcher	B	Y	Y			UR	
Rusty Blackbird	B	Y				SC	
Short-eared Owl	B	Y				SC	SC
Alder Flycatcher	B			Y	Y		
Swamp Sparrow	B			Y	Y		
Belted Kingfisher	B				Y		
Bald Eagle	B						SC

Notes: Season: B = Breeding. **Cont** = Continental level, **Reg** = Regional (ON BCR 8) level, **CA** = Canada, **ON** = Ontario. See Appendix C for details. **SC** = Special Concern, **UR** = Under review by COSEWIC (2007b).

8.2 Wetland and Riparian Habitats in ON BCR 8

8.2.1 Description

Wetland habitats in this guild include marsh, meadow marsh and open bogs and fens, which are all considered non-forested habitats. Treed bogs and fens are also included in the wetland habitat guild, as they are considered non-productive forest habitats. Treed wetlands with commercially productive forests (e.g., lowland coniferous forests) are included as forest habitats rather than wetlands.

Open wetlands comprise about 3% of the land cover in ON BCR 8, but are more common in the West subregion than in the East (Figure 17). Treed wetlands (treed bogs and fens) comprise about 11% of the land cover and are slightly more frequent in the West subregion (Figure 17). Wetlands in this region are often associated with riparian or shoreline features, but also occur as isolated inliers in low-lying areas within the forested landscape.

Riparian and shoreline habitats are linear features defined by the landscape and can include forest and non-forest habitats. Innumerable small and large lakes and streams dot the landscape of this region. Inland open waters comprise 16% of the total area of the Western subregion and 7.6% of the East subregion (OLC data 1990s ed.). Both subregions include a section of the rugged north shore of Lake Superior.

8.2.2 Current Condition

Information on the amount and distribution of wetland and riparian habitats in ON BCR 8 is not generally included in the Forest Resource Inventory. The Ontario Land Cover database provides the best available information on wetland distribution.

Wetland and riparian habitats are generally considered fairly stable elements of the landscape. Small, shallow wetland habitats, such as wet meadows, are affected by short- and long-term fluctuations in precipitation and climate. Dams and other water control structures affect upstream and downstream shoreline and riparian habitats.

8.2.3 Factors Affecting Wetland/ Riparian Landbirds

Factors affecting, or potentially affecting, wetland and riparian habitats in this region:

- Riparian and lowland habitats are affected by hydro-electric developments and by the cumulative impacts of habitat alteration in the watershed.
- Climate change models indicate that wetland and riparian habitats in this area could be affected by greater fluctuations in precipitation and stream flow.
- Increased ultraviolet radiation and acid rain may affect amphibian and aquatic insect populations, including the aquatic stages of many flying insects.
- Water clarity directly affects the suitability of aquatic habitats for foraging by fish-eating landbirds.
- The concentration of persistent contaminants in aquatic ecosystems (breeding and wintering grounds) is of particular concern to long-lived fish-eating raptors such as Bald Eagle.

- Forest management guidelines that leave buffer strips of mature forest along *all* riparian and shoreline features do not necessarily adequately emulate natural disturbance processes that occasionally cross over these features, creating successional shrub and tree growth in riparian zones that is important to beavers, waterfowl and some landbirds.

8.3 Conservation Objectives for Priority Wetland/Riparian Landbirds

Conservation objectives for the priority landbird species in this guild are presented in the priority species accounts (Appendix F) and summarized in Table 25.

8.3.1 Overall Objectives

Fine filter conservation objectives have been set for many of the priority wetland/riparian species (Table 25). These differ from those of the forest habitat guilds, where coarse filter, habitat-based objectives were set for most priority species.

The overall objective for Olive-sided Flycatcher and Rusty Blackbird, which have both experienced severe rangewide and regional population declines, is to *reverse past declines.* The objective for Belted Kingfisher, which also appears to have undergone a regional population decline, is to *maintain current* population levels. For Bald Eagle and Short-eared Owl, which are poorly monitored and are designated Special Concern Species, the overall objective is to periodically *assess status.* The overall objective for the other two priority wetland species, Alder Flycatcher and Swamp Sparrow, which are of high stewardship responsibility, is to *maintain populations within the estimated range of natural variation*. As estimates of the range of natural variation in wetland and riparian habitats are not available, population levels over the past 35 years are used as an indication of the ERNV in populations of these species.

8.3.2 Habitat Objectives

Habitat objectives cannot be set for most species in the wetland/riparian guild, as information on the amount and distribution of their preferred habitat types is not available in the Forest Resource Inventory (FRI). Nonetheless, a few of the species with OMNR habitat supply models are associated with wetland or riparian habitats, including one of the ON BCR 8 priority species, Alder Flycatcher (R. Rempel, OMNR, pers. comm. March 2006).

Fine filter site- or stand-level objectives are needed to protect existing nest sites and ensure supply of potential nest sites for Bald Eagle (Table 25).

8.3.3 Population Objectives

This plan establishes regional population objectives for five of the priority species in this guild (Table 25). In each instance, the proposed population objective is based on population abundance and distribution levels, as measured by BBS abundance indices and BBA distribution levels. However, different benchmarks are used to set the desired population objective.

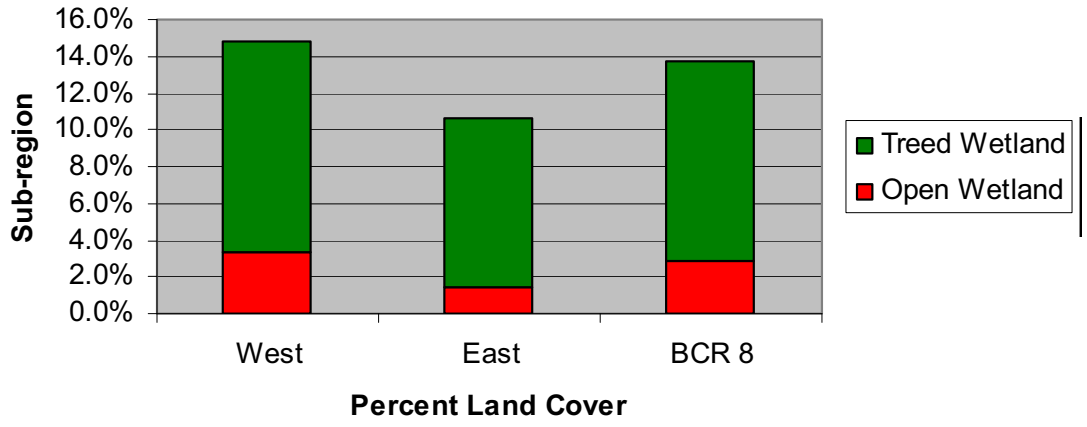
The regional population objective for Olive-sided Flycatcher and Rusty Blackbird is to reverse recent declines and restore the population to 1970s abundance levels and 1981–85 distribution levels. The population objective for Belted Kingfisher is to maintain current population levels, using BBS 2000–2004 and BBA2 levels as the benchmark. The population objectives for Alder Flycatcher and Swamp Sparrow are set based on the ERNV approach, taking 80% of the average BBS indices for the 1970–2004 period as the ERNV population objective, and 95% of the lower of the BBA1 and BBA2 distribution levels as the ERNV distribution objective.

Any increase in regional populations of Olive-sided Flycatcher, Rusty Blackbird or Short-eared Owl would contribute to PIF continental-level objectives of increasing continental population of each of these Watch List species by 100% (Rich et al. 2004).

8.3.4 Monitoring Objectives

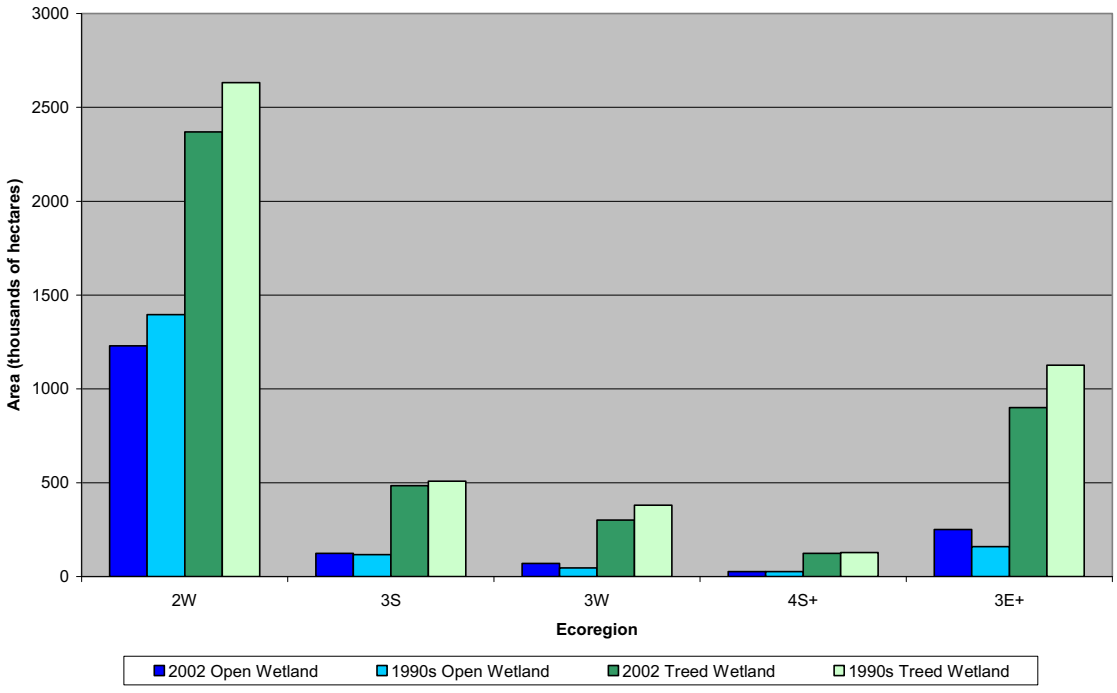
For most priority wetland/riparian landbirds (Table 25), the monitoring objective is to improve current monitoring capability in order to increase the statistical power to detect population declines (see Appendix H). BBS coverage of Alder Flycatcher is considered sufficient (at least 50% power to detect 50% decline in 20 years; see Appendix H), and the objective for this species is to maintain current monitoring capability. The monitoring objective for Bald Eagle and Short-eared Owl is to conduct periodic surveys of suitable habitat to assess status of breeding and wintering populations.

Figure 17: Wetland land cover in ON BCR 8, by subregion.



Source: OLC data, 1990s edition.

Figure 18: Wetland cover in ON BCR 8 in 1990s and 2002, by ecoregion (satellite data).



Source: OMNR 2002 and OMNR 2006b.

8.4 Conservation Focus

Research to better understand factors causing rangewide and regional population declines is identified as the conservation focus for Olive-sided Flycatcher, Rusty Blackbird and Belted Kingfisher. For some of these species, particularly Rusty Blackbird, declines may be due to factors occurring outside the breeding season, such as loss or deterioration of wintering habitat.

For the other priority species in this guild the conservation focus is to track their status, including periodic status assessments for wetland Species at Risk, and monitoring breeding population trends for the two Stewardship species that are not experiencing severe declines.

8.5 Recommended Conservation Actions

8.5.1 Monitoring

- Improve monitoring of wetland-associated birds, including Olive-sided Flycatcher and Rusty Blackbird, which may require conducting off-road point-count surveys to sample remote wetland habitats as part of boreal bird monitoring programs.
- Periodically assess (every five to 10 years) the population status of Bald Eagle and Short-eared Owl.
- Develop a program to measure and monitor wetland and riparian habitat availability.

8.5.2 Research and Evaluation

- Research is needed to understand the factors causing regional and rangewide declines in several wetland/riparian species, including Belted Kingfisher, Olive-sided Flycatcher and Rusty Blackbird.

GREAT GRAY OWL © *Don Pettypiece*

Table 24: Summary of habitat needs of priority wetland and riparian landbirds in ON BCR 8.

Priority Species	Breeding Habitat Description	Preferred Habitat Setting	Landscape Features	Stand Features	Site Features
Alder Flycatcher	Damp fields and meadows that are usually fairly open. Willow and alder thickets that border lakes and streams are also preferred, as well as overgrown fields and meadows containing dogwood, cedar, tamarack, spruce, poplar, birch, hawthorn, elm, hazelnut and maple	Successional/ Second-growth Habitat	No specific information	No specific information	Perches for hunting; Dense foliage, usually low over standing water
Bald Eagle	Extensive breeding area in mature deciduous or mixed woods with super-canopy trees for nest sites and hunting perches near large lakes or rivers	Shoreline/Riparian	>250-ha mature forest patch within 5 km of large body of open water	No specific information	Super-canopy trees for nests and roosting
Belted Kingfisher	Nests in eroded sand, clay or gravely banks usually near open water. Also found in excavated road cuts or gravel pits near water. Forages on small fish in clear running or still water	Riparian/Shoreline	Nest site within 1.5 km of open water with fish	No specific information	Eroding sand or clay banks for nesting
Olive-sided Flycatcher	Semi-open conifer forest edges near water source, such as a lake, pond or river. Also found in other edge and forest opening situations in coniferous and mixed forest including bogs, burns, beaver meadows and small clear-cuts	Open Wetland	Near open area	Forest opening, forest edge or open treed wetland	Hunting perches in open areas
Rusty Blackbird	Openings in conifer woodlands bordering a body of water, including tree-bordered marshes, beaver meadows, bogs, fens, muskegs or wooded swamps	Treed Wetland	Forest near open standing water	Treed wetland	Shrub thickets near water for nesting
Short-eared Owl	Large (>100 ha) areas of grasslands, open areas or bushy/grassy wet meadows as well as marshes or bogs	Wetland/ Agricultural	>100-ha patch of open marsh, meadow or grassland	Sedge or grass meadow	No specific information
Swamp Sparrow	Wetlands, including cattail marshes, wet meadows, bogs, fens and carrs. Also found in low swampy shores of lakes and stream banks, deciduous riparian thickets and moist woodland	Wetland/Shoreline	No specific information	Shrub thicket	No specific information

Notes: See priority species accounts (Appendix F) for additional details and key references.

Table 25: Summary of conservation objectives and conservation focus for priority landbirds in wetland and riparian habitats in ON BCR 8.

<table>
<tr><th>Priority Species</th><th>Population Objective</th><th>Habitat Objective</th><th>Monitoring Objective</th><th>Conservation Focus</th></tr>
<tr><td>Bald Eagle</td><td>Assess status</td><td>Fine Filter; Landscape Scale: Assess the supply of suitable habitat across the landscape using spatial habitat supply model
Fine Filter; Site Scale: Maintain supply of suitable nest trees and protect existing stick nests throughout the year, as per direction in the Site/Stand Guide</td><td>Improve current population monitoring capability across ON BCR 8</td><td rowspan="2">Assess Status: Periodically assess population status using all available data</td></tr>
<tr><td>Short-eared Owl</td><td>Assess Status
Implement SAR management plan when available
Contribute to continental objective of increasing population by 100%</td><td>Implement SAR management plan if/when available
Fine Filter; Site Level: Protect occupied nests as per direction in Site/Stand Guide</td><td rowspan="2">Assess population status every five years using all available data</td></tr>
<tr><td>Rusty Blackbird</td><td>Reverse Decline
Contribute to continental objective of Increasing population by 100%
Restore population to 1970–79 BBS levels and 1981–85 BBA levels</td><td rowspan="2">Fine Filter; Stand Scale: Increase/maintain supply of early successional forest adjacent to water</td><td rowspan="3">Research: Investigate factors causing general population decline</td></tr>
<tr><td>Olive-sided Flycatcher</td><td>Reverse Decline
Contribute to PIF continental population objective of Increasing population by 100%
Restore population to 1970–79 BBS levels; maintain current BBA distribution</td><td rowspan="3">Improve current population monitoring capability across ON BCR 8</td></tr>
<tr><td>Belted Kingfisher</td><td>Maintain Current
Maintain breeding population abundance at or above current BBS and BBA levels</td><td rowspan="3">No regional habitat objective</td></tr>
<tr><td>Swamp Sparrow</td><td>Maintain within the ERNV
Maintain population abundance levels in ON BCR 8 within the ERNV (as estimated by BBS and BBA – see Appendix F)
Contribute to PIF continental population objective of maintaining current levels</td><td rowspan="2">Evaluate Trends: Periodically review available population data and evaluate population trend in ON BCR 8 relative to population objectives</td></tr>
<tr><td>Alder Flycatcher</td><td>Maintain current population monitoring capability across ON BCR 8</td></tr>
</table>

Notes: **ERNV** = Estimated range of Natural Variability; see Box 5. As the range of natural variability in wetland and riparian habitats is not known, variation in population levels over the past 35 years is used as an indication of the range of natural variation in these species. See also priority species accounts (Appendix F).

9. Conservation of Landbirds in Non-forested Upland Habitats

9.1 Landbirds Breeding in Non-forested Upland Habitats in ON BCR 8

This chapter covers those landbirds that breed or winter in non-forested upland habitats in ON BCR 8, including natural settings such as cliffs and rock barrens, and anthropogenic sites such as agricultural fields and other developed settings.

Non-forested upland habitats of importance to landbirds in ON BCR 8 are very local and include:

- Rocky cliffs along the Lake Superior shoreline and some inland lakes and rivers that provide nesting sites for Peregrine Falcon and possibly for Golden Eagle;
- Rock barrens, which are most frequent in the western portion of ON BCR 8 and are important breeding habitat for some species (e.g., Common Nighthawk);
- Agricultural fields in the Claybelt area, which provide habitat for some open grassland landbirds, including Short-eared Owl; and
- Developed areas along the highway corridors, which provide habitat for some landbirds, particularly introduced species (e.g., House Sparrow).

Non-forest upland habitats are not extensive in ON BCR 8 and therefore are localized. No non-forest upland landbird has more than 5% of its global population breeding in BCR 8. More than 10% of the global wintering population of Snowy Owl and Snow Bunting occur in BCR 8 (Appendix E), but these species are not common wintering species in ON BCR 8.

9.1.1 Priority Landbirds in Non-forested Upland Habitats

The two priority species in this habitat grouping (Table 26), Golden Eagle and Peregrine Falcon, are rare at any time of year in ON BCR 8, and breed only locally where suitable habitat is available (Table 27). Both species are included as priority species because they are currently designated as Species at Risk: Golden Eagle is an Endangered species in Ontario; Peregrine Falcon (*anatum* subspecies*)* is designated Threatened in Canada and Ontario.

9.2 Conservation Objectives for Other Priority Landbirds

Conservation objectives for the two priority landbird species in this guild are presented in the priority species accounts (Appendix F) and are summarized in Table 28.

The overall objective for Golden Eagle and Peregrine Falcon is *recovery* to a more secure status, as directed by federal or provincial recovery strategies for these Species at Risk. Population objectives for these species are determined by the recovery strategies. Both species have specific nesting habitat needs that require fine filter habitat objectives to protect known nest sites. Special surveys are needed to monitor breeding and wintering populations of these rare species.

9.3 Conservation Focus

The conservation focus for the two SAR species in this habitat guild is implementation of current SAR recovery strategies and OMNR nest

Table 26: Priority landbirds in non-forested upland habitats in ON BCR 8, with reasons for priority status.

Priority Species	Season	Reason(s) for Priority Status					
		Concern		Stewardship		At Risk	
		Cont	Reg	Cont	Reg	CA	ON
Peregrine Falcon	BW					TH	TH
Golden Eagle	BW						EN

Notes: Season: B = Breeding; **W** = Winter. **Cont** = Continental level, **Reg** = Regional (ON BCR 8) level, **CA** = Canada, **ON** = Ontario. See Appendix C for details. **EN** = Endangered, **TH** = Threatened.

protection guidelines (OMNR 1987b,c). The federal recovery strategy for the *anatum* subspecies of Peregrine Falcon is currently being updated. Provincial recovery strategies have not been formalized.

9.4 Recommended Conservation Actions

9.4.1 Monitoring

- Periodically assess (every five to 10 years) the population status of Golden Eagle and Peregrine Falcon in Ontario and ON BCR 8.

9.4.2 Applied Conservation

- Implement recovery strategies for Peregrine Falcon and Golden Eagle.
- Identify and protect Peregrine Falcon and Golden Eagle nesting sites following existing provincial guidelines (OMNR 1987b,c).
- Identify and protect regular wintering sites and food supplies for wintering Golden Eagle.

Table 27: Summary of habitat needs of priority landbirds in non-forested upland habitat in ON BCR 8.

Priority Species	Breeding Habitat Description	Habitat Settings	Landscape Features	Site Features
Golden Eagle	Forages in large open areas, including marshes and shorelines	Near large open area with prey species (medium-sized mammals or birds)	Large open areas for hunting	Open cliff with ledge or stick nest in large tree
Peregrine Falcon	Forages in open areas, especially over water, marshes, urban areas and shorelines	Natural rock cliffs overlooking water or other open areas; also tall buildings or towers in urban areas	Large open areas for hunting	Vertical rock face or building with nest ledge

Notes: See priority species accounts (Appendix F) for additional details and key references.

Table 28: Summary of conservation objectives and conservation focus for priority landbirds in non-forested upland habitat in ON BCR 8.

Priority Species	Population Objective	Habitat Objective	Monitoring Objective	Conservation Focus
Golden Eagle	***Recovery*** :as directed by provincial recovery strategy		Perodically assess (every 5-10 years) population status in ON BCR 8	***Recovery Action****:* Implementation of existing provincial guidelines (OMNR 1987b) and provincial recovery strategy (to be developed)
Peregrine Falcon	***Recovery*** **:** finalize and implement an updated SAR recovery strategy	*Fine Filter; Stie Level*: Protect nest sites as per the Site/Stand Guide		***Recovery Action:*** Implementation of SAR national recovery strategy (update of Erickson et al. 1988, in prep.) and provincial guidelines (OMNR 1987c, OMNR in prep b)

Notes: See priority species accounts (Appendix F) for additional details

10. Conservation of Aerial-foraging Insectivores

10.1 Aerial-foraging Insectivores

The abundance and distribution of most aerial-foraging insectivorous landbirds breeding in BCR 8 and the Ontario portion of the BCR have undergone a severe decline in the past few decades (Table 29). A general decline in aerial foragers in Ontario has only recently become apparent, and the causal factors are as yet unknown (Heagy and McCracken 2004, 2005).

COSEWIC (2007b) is currently reviewing the status of Common Nighthawk in Canada and has identified two other aerial-foraging insectivores (Barn Swallow and Whip-poor-will) as high-priority candidates for species assessments (2007c).

None of the seven aerial-foraging insectivorous landbirds that occur regularly in ON BCR 8 (Table 29) are identified individually as priority species, but the entire aerial-foraging guild is considered a priority guild. Five of these species were widely distributed in ON BCR 8 during the first BBA (1981–85) but were much less widespread during the second atlas (2001–05) (Table 29). The other two species, Whip-poor-will and Chimney Swift, reach the northern limit of their breeding range in this region and are only locally distributed (Cadman et al. 1987).

The landbirds in this guild all forage "on the wing" (in flight), capturing and eating flying insects. However, they are taxonomically and ecologically diverse. They are all migratory but winter in different parts of the United States, Central America and South America. They have diverse and somewhat specialized nesting requirements. Most are diurnal feeders but the two nightjars (Common Nighthawk and Whip-poor-will) are crepuscular, feeding mostly at dawn and dusk. All aerial-foraging insectivores require large open areas for foraging, such as open water, marshes, meadows, burns, clear-cuts and open developed areas.

10.2 Factors Affecting Aerial-foraging Insectivores

Information on the proximate cause(s) of the observed decline in aerial-foraging insectivores is not available and, therefore, research is urgently needed. Food availability on the breeding grounds is suspected to be a possible common factor causing the recent population declines because the species in this group share a common feeding strategy but are otherwise dissimilar.

All the species in this guild require a steady supply of

Table 29: Changes in the abundance and distribution of aerial-foraging insectivorous landbirds breeding in BCR 8 and ON BCR 8.

Species	BCR 8 CWS BBS Trend 1968–2004	BCR 8 USGS BBS Trend 1966–2004	ON BCR 8 BBS Trend 1969–2005	ON BCR 8 BBA Distribution	
	%/year	%/year	%/year	BBA1	BBA2
Bank Swallow	–16.6	–5.7	–10.2	27%	**4%**
Barn Swallow	**–4.8n**	–2.9	–1.0	44%	**17%**
Chimney Swift				3%	1%
Cliff Swallow	–6.4	–4.9	–3.8	32%	**8%**
Common Nighthawk		–1.5		63%	**39%**
Tree Swallow	–0.6	–0.1	–3.2	82%	**55%**
Whip-poor-will				3%	2%
Aerial-foraging Insectivore Guild			**–4.1***		

Notes: **CWS BBS Trend** – Population trend from Canadian Wildlife Service analysis of BBS data. **USGS BBS Trend** – Population trend from United States Geological Survey analysis of BBS data. **BBA1** = % of atlas squares with breeding evidence, 1981–85 atlas. **BBA2** = % of atlas squares with breeding evidence, 2001–05 atlas. **n** = near-significant trend ($p<0.1$), * = significant trend ($p<0.05$). **Bold red** – significant decrease in distribution in BBA2 relative to BBA1.

flying insects and are highly vulnerable to periods of cold, wet or windy weather that can impede foraging and reduce their food supply. Episodes of mass mortality can occur during prolonged periods of severe weather, particularly early in the breeding season. An increase in the frequency of severe weather, by chance or due to climate change, could be responsible for the observed population decline, although this hypothesis has not been tested yet.

In addition to direct mortality during episodic food shortages, the observed declines could be the result of reduced productivity due to reduced numbers of flying insects. Flying insect populations are sensitive to pesticides and to pollution affecting the land, air or water. Factors that have the potential to contribute to such a hypothetical decline in flying insect populations include:

- Climate change (insect productivity and survival rates are influenced by temperature and moisture conditions);
- Degradation of aquatic habitats used by insect larvae and nymphs (e.g., dragonfly nymphs are sensitive to water quality);
- Increased ultraviolet radiation, which may be adversely affecting the aquatic phase of various flying insects including dragonflies, mayflies, midges, etc.;
- Aerial spraying of insecticides for forest pests (e.g., spruce budworm);
- The spread of exotic insect species or emerging insect diseases.

10.3 Conservation Objectives for the Aerial-foraging Insectivore Guild

10.3.1 Overall Objective

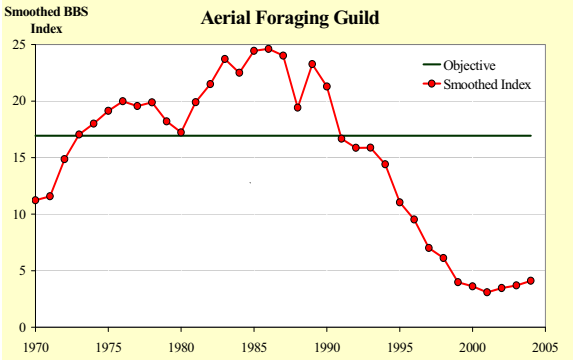
The overall conservation objective for this foraging guild is to reverse recent declines and restore populations to their former abundance and distribution levels.

10.3.2 Population Objectives

The population abundance objective for the aerial-foraging insectivore guild is based on CWS's average BBS guild indices for the 1970s (Figure 19). The BBS guild index has declined by 4.1%/year over the 1969–2005 period, with the entire decline occurring since 1990 (Table 29; Figure 19).

The population distribution objective is based on restoring aerial-foraging insectivore species richness to the 1981–85 BBA1 level in each subregion (Table 30).

Figure 19: Smoothed BBS Indices 1970–2004 and population abundance objective for aerial-foraging insectivore guild in ON BCR 8.



Notes: BBS data have been smoothed using a five-year running average of BBS annual indices because of small sample size and low precision (see Appendix F). Horizontal line indicates the population abundance objective based on the BBS annual index.

Table 30: Population distribution objective for aerial-foraging insectivores in ON BCR 8.

Subregion	Current Level	Distribution Objective
West	1.2	2.1
East	1.3	3.0

Notes: Objective is based on the number of species of aerial foragers detected per atlas square with minimum of 20 hours' effort.

10.4 Conservation Focus

Research is needed to increase understanding of the factors causing the decline of aerial-foraging insectivores in this region and elsewhere in Ontario. Several of the species in this guild are readily studied during the breeding season and could be the focus of demographic studies that would yield useful information on productivity and survival rates.

The two crepuscular species in this guild, Common Nighthawk and Whip-poor-will, are not well monitored by the BBS. Population information for these species could be improved by developing additional surveys, such as crepuscular breeding season surveys or migration counts for Common Nighthawk.

10.5 Recommended Conservation Actions

10.5.1 Monitoring

- Conduct five-year demographic studies on Bank Swallow and Barn Swallow populations (species whose nests are easy to find and monitor) at select sites.
- Conduct periodic crepuscular surveys to improve understanding of the abundance, distribution and population trends of Common Nighthawk, and also of local populations of Whip-poor-will and Chimney Swift.

10.5.2 Research and Evaluation

- Identify factors causing population decline and/or limiting population growth of aerial-foraging insectivores.
- Analyze available nest record data sets (e.g., Ontario Nest Records Scheme data, Peck 2005, www.birdsontario.org/onrs/onrsmain.html) to evaluate the importance of weather and other factors in the decline of aerial-foraging insectivores.

10.5.3 Outreach and Education

- Encourage submission of current and historic nest record data to the Ontario Nest Records Scheme/Project NestWatch to improve understanding of changes in productivity, especially for easily monitored species such as Barn Swallow and Tree Swallow.

TREE SWALLOW © *Saul W Bocian*

11. Implementation Philosophy

11.1 Implementation Philosophy

This landbird conservation plan provides a comprehensive set of priorities, conservation objectives and recommended actions aimed at sustaining native landbirds and their habitats in the Ontario portion of the Boreal Softwood Shield (ON BCR 8) and contributing to continentwide efforts to sustain all North American landbirds. Coordinated action on many fronts will be needed to communicate the priorities and achieve the objectives established in this plan.

The successful implementation of this plan ultimately will depend on allocation of resources and engaging a wide range of actors, including all levels of government, industry associations, non-profit conservation organizations, research institutions, aboriginal and individual landowners and citizen scientists. Effective partnerships will be essential to developing the consensus, cooperation, coordination and communications necessary to influence the actions of this large and diverse group. A graduated approach that engages existing partnerships to build capacity and fosters the development of new partnerships is both practical and strategic.

11.2 Implementation Strategy

On the very extensive forested Crown lands in ON BCR 8, it is expected that this plan will be an important source of information and direction for consideration when reviewing and developing forest management guides or when implementing conservation measures on Crown lands through the existing forest management planning process. In particular, the *Crown Forest Sustainability Act* and the related forest management manuals provide regulatory standards to ensure that forest harvesting maintains forest biodiversity. The landscape guide (OMNR in prep. b) and the stand- and site-level guide (OMNR in prep. c) are expected to provide additional coarse and fine filter directions needed to sustain forest landbird populations, as well as other biodiversity, in this region. The five-year State of the Forest Resource reports (OMNR 2002, 2006b) contain information on changes in forest habitat availability and land cover at the ecoregion level. Forest management plans may provide a structured opportunity to assess the predicted impact of forest management activities by the forest industry on future landbird habitat availability.

On the limited private lands in ON BCR 8, it is anticipated that existing regional partnerships will play a role in implementing this plan. In particular, the Ontario Eastern Habitat Joint Venture (OEHJV, www.on.ec.gc.ca/wildlife/ehjv/oehjv-e.html) provides a proven model for building effective partnerships to deliver the conservation actions on private lands and in cooperation with forest management planning activities of the OMNR. This plan is expected to guide implementation activities under emerging OEHJV landbird conservation initiatives on private lands in ON BCR 8.

Many of the conservation actions identified in this plan will be implemented directly by agencies, organizations and partnerships that have relevant mandates and programs. The OEHJV could play an important role in coordinating and evaluating the implementation of this landbird conservation plan.

Because most landbirds in this region are migratory, their conservation also depends on influencing conservation activities outside Ontario. The existing Canadian and international Partners in Flight (PIF) partnerships provide for a developing consensus and cooperation across jurisdictional boundaries, necessary to ensuring the conservation of landbirds throughout their annual life cycles.

11.3 Evaluating Progress

Landbird conservation priorities, and the ensuing objectives and recommended actions, are expected to change over time as bird populations respond to changes in the environment and as new research and monitoring results become available. This plan is, therefore, a working document and will need to be revised and reviewed periodically as follows:

- The priority species lists will be revisited regularly as new data and analyses become available (e.g., new BBA data, changes to Species at Risk status, or posting of new species assessment data in the PIF continental database).
- More specific habitat objectives will be developed as the OMNR forest management guides and habitat modelling results become available.
- Progress reports also will be prepared periodically (approximately every five years) to measure progress towards achieving the various habitat, population and monitoring objectives set

out in this plan, to revisit these objectives in light of new data and to adjust objectives, if necessary.

- Conservation actions will be updated regularly and adapted based on information resulting from evaluating monitoring results (adaptive management feedback) and new research, with a complete review scheduled approximately every five years.

Updates and five-year reviews will be undertaken by the Ontario PIF partnership, coordinated through Environment Canada – Ontario Region and the Ontario Ministry of Natural Resources.

11.4 Next Steps

This plan establishes priorities, objectives and recommended actions for the conservation of landbirds in ON BCR 8. Some of the next steps to expand and follow up on the information in this plan are:

- Where possible, develop measurable habitat objectives for priority species associated with forest habitats (as indicated in Tables 11, 17 and 21 and Appendix F), based on OMNR forest habitat modelling.
- Consider the habitat needs of priority landbirds in the review and development of provincial forest management guides that are used for forest management planning.
- Use the landbird density mapping produced by BBA2 to highlight geographic areas supporting important concentrations of priority landbirds, and carry out additional analyses to develop landbird priorities and objectives at the ecoregion and/or forest management unit (FMU) level.
- Prepare a summary comparing landbird conservation needs identified in this plan with management guidelines in the OMNR site/stand- and landscape-level forest management guides (OMNR in prep. a,b) to highlight areas of overlap and identify potential gaps.
- Develop and implement a landbird monitoring and research strategy to address the information and monitoring needs identified in this plan (in coordination with CWS, OMNR and BSC).
- Work with partners in adjacent jurisdictions to develop and implement a boreal bird monitoring program to increase population monitoring capability across BCR 8 and other boreal BCRs.
- Formalize the Ontario PIF partnership or a similar collaboration to further implementation of this plan.

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13. Glossary

Avifaunal biome: Clusters of Bird Conservation Regions (BCRs) with a high degree of shared landbird avifauna as identified in the PIF North American Landbird Conservation Plan (Rich et al. 2004). See also Northern Forest Avifaunal Biome.

BBS Guild Index: A measure of the frequency with which a species or guild is detected based on the sum of species/stops across all 50 stops on a BBS route, corrected for which routes were run, using BBS software developed by Brian Collins.

Biodiversity/biological diversity: The variability among living organisms from all sources including, among other things, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part. This includes diversity within species, between species and among ecosystems.

Bird Conservation Region (BCR): A set of 66 ecoregions across North America that each have similar biophysical elements, such as soil type, vegetation, and associated bird species, and are used as the basis for planning and evaluation of integrated bird conservation.

Bird Studies Canada (BSC): A national, member-based, not-for-profit ornithological research organization in Port Rowan, Ontario: www.bsc-eoc.org

Best Management Practice or Beneficial Management Practice (BMP): A proven, practical and affordable method, measure or practice that, if implemented, will prevent or reduce a known adverse environmental impact (e.g., conservation tillage practices that reduce soil erosion).

Breeding Bird Survey (BBS): The primary large-scale, long-term bird monitoring program in North America (www.pwrc.usgs.gov/bbs/; for Canada, see http://www.bsc-eoc.org/bbsont.html

Canadian Migration Monitoring Network (CMMN): A network of stations counting northern-breeding landbirds at migration concentration points across southern Canada: www.bsc-eoc.org/national/cmmn.html

Christmas Bird Count (CBC): Annual one-day counts of wintering birds conducted across North America: www.audubon.org/bird/cbc/

Committee on the Status of Endangered Species in Canada (COSEWIC): An independent body of experts responsible for identifying and assessing species considered to be at risk in Canada. COSEWIC reports its results to the Canadian government and the public. Species that have been designated by COSEWIC may then qualify for legal protection and recovery under the federal *Species at Risk Act* (SARA): www.cosewic.gc.ca

Committee on the Status of Species at Risk in Ontario (COSARRO): An OMNR committee that evaluates the conservation status of species in Ontario and recommends them for listing on the SARO List.

Conservation Land Tax Incentive Program (CLTIP): A provincial program that offers a reduction in property taxes to landowners who agree to protect specific natural heritage features identified by OMNR on their land. Activities that would degrade, destroy or result in the loss of natural values of the site may not be carried out. Eligible lands include those with Provincial Significant Wetlands or Areas of Natural and Scientific Interest, habitat for Endangered species and community conservation lands.

Conservation lands: Natural areas that are managed or regulated (e.g., through land use policy) for the long-term protection of their significant natural heritage values. Conservation lands in the Ontario portion of BCR 13 that may be of importance to landbirds include National Wildlife Areas, Migratory Bird Sanctuaries, National Parks and Park Reserves, Provincial Parks and Conservation Reserves, Provincially Significant Wetlands, Provincially Significant Areas of Natural and Scientific Interest, Conservation Authority lands and private conservation lands.

Continental Concern species: Species identified in the PIF North American Landbird Conservation Plan (Rich et al. 2004) as PIF Watch List species that have multiple reasons for conservation concern across their entire ranges.

Continental Stewardship species: Species identified in the PIF North American Landbird Conservation Plan (Rich et al. 2004) as having a high proportion of their global population within a single avifaunal biome during either the breeding or wintering season.

Crown land: Land vested in Her Majesty in right of Ontario.

Disturbance: A significant change in the structure and/or composition of ecosystems, communities or populations through natural or human-induced events.

Ecodistrict: A subunit of an ecoregion that is defined by a characteristic set of physiographic features that play a major role in determining successional pathways, patterns of species association and the habitats that may develop. Local climatic patterns, such as higher areas of snowfall caused by the effect of a lake, also may characterize ecodistricts.

Ecological Land Classification (ELC): A hierarchical approach developed in Ontario to classify land that is based on a consistent framework of landscape-scale through site-scale ecosystems by combinations of geographic, climatic, vegetative, soil and landform features. Major levels include the ecozone (3 in Ontario), ecoregion (7 in Ontario), ecodistrict and ecosite (88 in southern Ontario).

Ecoregion: An ecological landscape unit (nested within an ecozone) characterized by distinct patterns of responses to climate as expressed by soils, hydrology, vegetation (species ranges and productivity) and fauna.

Ecosystem approach: As much a philosophy as it is a planning and management tool, it aims to understand the interrelationships that may exist between the elements that are considered when evaluating projects. Furthermore, it encourages people to consider the elements of ecosystem composition, structure and function; understand how peoples' actions affect the human and natural environment; ensure that human actions and disturbance mimic natural processes to the greatest extent possible; recognize the wide range of resource values; and use ecological classifications to map ecosystems.

Ecosystem health: An approach to environmental management that recognizes the importance of maintaining ecosystem structure, function and biodiversity, as well as the relationships between healthy functioning ecosystems and a healthy functioning society.

Ecosystem management: The management of human activities so that ecosystems, their structure, composition and function, and the processes that shaped them, can continue at appropriate temporal and spatial scales.

Ecozone: An ecological land classification unit at the most general level, characterized by interacting abiotic and biotic factors. Three ecozones have been defined in Ontario.

Endangered species: A species that is facing imminent extirpation or extinction, as determined by COSEWIC and/or COSSARO. Endangered species may also be regulated under the federal *Species at Risk Act* and/or the provincial *Endangered Species Act*.

Exotic: A non-native species. Also known as an alien, non-indigenous or introduced species.

Extinct species: A wildlife species that no longer exists.

Extirpated species: A wildlife species that no longer exists in the wild in Ontario and/or in Canada, but exists elsewhere in the wild.

Fire regime: The natural wildfire activity or patterns that characterize a given area.

Forb: A broad-leaved herbaceous (non-woody) plant.

Forest dynamics: The natural processes involved in the development of a forest and associated with growth and change in its structure and composition over time.

Forest Resource Inventory (FRI): A resource inventory conducted by OMNR for each management unit on average every 20 years. The FRI divides the area into a number of components, such as water, non-forested, non-productive forest and productive forest, and further classifies each component by ownership/land use categories. The FRI provides descriptive information about the timber resource on each management unit (e.g., stand age, stand height, species composition, stocking level) in the form of interpreted aerial photographs, forest stand maps and a set of standard inventory ledgers referred to as reports.

Fragmentation: Breaking up a widespread habitat type into isolated patches, such as the fragmentation of forest due to clearing for agriculture or urban development.

Graminoids: Grasses (family *Gramineae* or *Poaceae*) and grasslike plants such as sedges (family *Cyperaceae*) and rushes (family *Juncaceae*).

Guild: A group of species that share a common habitat need, foraging strategy, migration strategy or other ecological feature or process.

Habitat obligate: A species that is dependent on or closely associated with a particular habitat, such as forest-dependent species.

Important Bird Areas (IBAs): Areas that have been identified as vital to the long-term conservation of the world's birds. In Canada, the IBA program was initiated in 1996 in conjunction with the launch of parallel programs in the United States and Mexico.

Integrated management approach: An approach that considers and systematically assesses the full range of environmental, social and economic factors when decisions are made about the use of natural resources in all program areas.

Landbirds: This term encompasses a broad variety of species that rely primarily on terrestrial habitats throughout the year, including vultures, eagles, hawks, falcons, grouse, quail, doves, cuckoos, owls, nightjars, swifts, hummingbirds, kingfishers, woodpeckers and passerines (songbirds).

Mature: In even-aged management, those trees or stands that are sufficiently developed to be harvestable and that are at or near rotation age (includes over-mature trees and stands for which an over-mature class has not been recognized).

Migration monitoring: Monitoring bird population trends by systematically counting migrants at concentration areas.

Natural disturbance regimes: The historic patterns (frequency and extent) of fire, insects, wind, landslides and other natural processes in an area.

Natural heritage features and areas: Features and areas, such as wetlands, fish habitat, woodlands, valleylands, portions of the habitat of Endangered and Threatened species, other wildlife habitat and social values as a legacy of the natural landscapes of an area.

Natural Heritage Information Centre (NHIC): A part of OMNR's Biodiversity Section/Fish and Wildlife Branch that compiles, maintains and provides information on rare species and spaces in Ontario: http://nhic.mnr.gov.on.ca/nhic_.cfm

Natural Heritage System: A system made up of core conservation lands and waters linked by natural corridors and restored connections, and that are identified as landscape networks for the conservation of biological diversity, natural functions and viable populations of indigenous species and ecosystems.

Northern Forest Avifaunal Biome: Shared avifauna of BCRs 4, 6, 7, 8 and 12. Species with 90% or more of their global population breeding or wintering in the Northern Forest Avifaunal Biome are considered Stewardship species in the North American Landbird Conservation Plan (Rich et al. 2004).

Old-growth forest: A stand of mature or over-mature trees relatively uninfluenced by human activity.

Ontario Breeding Bird Atlas (BBA, the atlas): A volunteer-based, five-year project to gather data on the breeding distribution and abundance of all the bird species that breed in Ontario. Data collection for the second atlas (OBBA2) occurred between 2001 and 2005: www.birdsontario.org/atlas/atlasmain.html

Ontario Land Cover (OLC): Provincial digital land cover maps derived from LANDSAT satellite data: www.spectranalysis.com/HTM/landcov.htm

Ontario Nest Records Scheme (ONRS): A volunteer-based project that compiles data on bird nests and productivity: www.birdsontario.org/onrs/onrsmain.html

Patch: The basic component of the landscape, a contiguous area of a cover type that is bounded by areas with other cover types.

Project FeederWatch (PFW): An international volunteer-based project in which volunteers systematically record the number and species of birds at their bird feeders over the winter months: www.bsc-eoc.org/national/pfw.html

Project NestWatch (PNW): A national online version of the provincial volunteer nest record schemes, including the Ontario Nest Records Scheme: www.bsc-eoc.org/national/nestwatch.html

Protected area: Refers to a provincial or federal park, wilderness area, ecological reserve, recreation area or conservation reserve, either existing in regulation, or recommended through an approved land use direction such as Ontario's Living Legacy Land Use Strategy (1999) or OMNR District Land Use Guidelines. Protected areas are land and freshwater or marine areas set aside to protect the province's diverse natural and cultural heritage.

Provincial Policy Statement (PPS): A key element in Ontario's land use planning system that provides direction on matters of provincial interest related to land use planning and development, and promotes the provincial "policy-led" planning system. The PPS recognizes the complex interrelationships among economic and environmental factors and embodies good planning principles.

Restoration: Changing existing function and structure of habitat to those resembling some historical condition. The term encompasses rehabilitation, remediation, creation and enhancement.

Riparian: An area of land adjacent to a stream, river, lake or wetland that contains vegetation that, because of the presence of water, is distinctly different from the vegetation of adjacent upland areas.

SAR action plan: A document that defines the project or activities required to meet the goals and objectives outlined in the recovery strategy for a wildlife species.

SAR management plan: A document that sets goals and objectives for maintaining sustainable population levels of one or more species that are particularly sensitive to environmental factors, but which are not in danger of becoming extinct.

SARO List: OMNR's Species at Risk in Ontario (SARO) List, regulated under the Endangered Species Act (2007), that lists Extirpated, Endangered, Threatened and Special Concern species in Ontario.

SAR recovery strategy: A document created as part of a recovery plan that identifies any threats to the survival of a species (including any loss of habitat) listed as Extirpated, Endangered, or Threatened. The document describes a broad strategy to be taken – including time-frames – to address the threats to a species. Recovery strategies must be developed within one year of designation for Endangered species and within two years of designation for Threatened species.

SAR Schedule 1: The official list of species that are classified as Extirpated, Endangered, Threatened and of Special Concern in Canada.

SAR Schedule 2: The official list of species that have been designated as Endangered or Threatened in Canada and have yet to be reassessed by COSEWIC using revised criteria. Once these species have been reassessed, they may be considered for inclusion in Schedule 1.

SAR Schedule 3: The official list of species that had been designated as Special Concern in Canada and have yet to be reassessed by COSEWIC using revised criteria. Once these species have been reassessed, they may be considered for inclusion in Schedule 1.

Silviculture: The theory and practice of controlling the establishment, composition, constitution and growth of forests.

Smart Growth: An OMMAH initiative to manage growth in Ontario and promote a strong economy, strong communities and a clean and healthy environment. Smart Growth provides a coordinated approach to growth, linking decisions about infrastructure, the natural environment, transportation and public investment.

Special Concern species: A wildlife species that may become a Threatened or Endangered species because of a contribution of biological characteristics and identified threats. Formerly described as Vulnerable from 1990 to 1999 or Rare prior to 1990.

Species at Risk (SAR): Species with a conservation status of Special Concern, Threatened or Endangered, as well as Extirpated or Extinct. The status of species in Ontario is determined by COSEWIC (federally) and COSSARO/OMNR (provincially). Ontario's Species at Risk are regulated under Ontario's *Endangered Species Act* (2007).

Species of Continental Importance: Species identified in the PIF North American Landbird Conservation Plan (Rich et al. 2004) as Watch List and/or Stewardship species that deserve special consideration in conservation planning and implementation at the continental scale.

Status report: A report containing a summary of the best available information on the status of a wildlife species, including scientific knowledge, community knowledge and aboriginal traditional knowledge.

Stewardship: The responsible use of resources based on a balance of economic, environmental and social values, in order to sustain production of these amenities and values to people, and all life, today and for the future.

Threat score: A measure of how a species population is expected to fare in the future, based on expert assessment of current and probable future conditions that pose a threat. (See Appendix C, section D.)

Threatened: Any native species that is at risk of becoming Endangered through all or a portion of its Ontario range if the limiting factors are not removed.

Watch List species: Species identified in the PIF North American Landbird Conservation Plan (Rich et al. 2004) as having multiple reasons for conservation concern across their entire ranges.

Appendix A: ON BCR 8 and 12 Landbird Technical Advisory Committee (TAC)

Name	Organization	Role
Ken Abraham	Ontario Ministry of Natural Resources	October 2004 Workshop
Ted Armstrong	Ontario Ministry of Natural Resources	
Rhonda Barkley	Ontario Federation of Anglers and Hunters	
Leeanne Beaudin	Ontario Ministry of Natural Resources	
Gregor Beck	Ontario Nature	October 2004 Workshop
Jacques Bouvier	Wetland Habitat Fund	October 2004 Workshop
Glen Brown	Ontario Ministry of Natural Resources	October 2004 Workshop
Mike Cadman	Canadian Wildlife Service, Environment Canada/ Ontario Breeding Bird Atlas Coordinator	October 2004 Workshop
Chris Chenier	Ontario Ministry of Natural Resources	
Bill Crins	Ontario Ministry of Natural Resources	October 2004 Workshop
Martin Damus	Canadian Wildlife Service, Environment Canada	October 2004 Workshop
Peter Davis	Ontario Ministry of Natural Resources	October 2004 Workshop
Darren Elder	Ontario Ministry of Natural Resources	
Don Fillman	Canadian Wildlife Service, Environment Canada	October 2004 Workshop
Gilles Falardeau	Canadian Wildlife Service, Environment Canada	October 2004 Workshop
David Ferguson	Ontario Ministry of Natural Resources	
George Holborn	Ontario Ministry of Natural Resources	October 2004 Workshop
Steve Holmes	Canadian Forest Service, Natural Resources Canada	
Steve Hounsell	Ontario Power Generation	
Jean Iron	Ontario Field Ornithologists	October 2004 Workshop
Marc Johnson	Ontario Ministry of Natural Resources	
Andrew Jobes	Ontario Ministry of Natural Resources	
Eva Kennedy	Ontario Ministry of Natural Resources	October 2004 Workshop
Dana Kinsman	Ontario Ministry of Natural Resources	October 2004 Workshop
Dan Kraus	Nature Conservancy of Canada	
Kathryn Lindsay	Canadian Wildlife Service, Environment Canada	
Ken McIlwrick	Canadian Forest Service, Natural Resources Canada	October 2004 Workshop
Marg McLaren	Ontario Ministry of Natural Resources	October 2004 Workshop
Don McNicol	Canadian Wildlife Service, Environment Canada	October 2004 Workshop
Stephen Mills	Ontario Ministry of Natural Resources	October 2004 Workshop
Brian Naylor	Ontario Ministry of Natural Resources	October 2004 Workshop
Mike Norton	Canadian Wildlife Service, Environment Canada	Provided comments on Workshop notes
Robert Pineo	Ontario Federation of Anglers and Hunters	
Rob Rempel	Ontario Ministry of Natural Resources	October 2004 Workshop
Derrick Romain	Abitibi Consolidated	
Mark Stabb	Wildlife Habitat Canada/Wetland Habitat Fund	
Don Sutherland	Ontario Ministry of Natural Resources	October 2004 Workshop
Kandyd Szuba	Domtar Inc.	
Ian Thompson	Canadian Forest Service, Natural Resources Canada	
Mike Turner	Ontario Ministry of Natural Resources	

Name	Organization	Role
Stan Vasiliauskas	Ontario Ministry of Natural Resources	
Lisa Venjer	Canadian Forest Service, Natural Resources Canada	October 2004 Workshop
Ryan Zimmerling	Bird Studies Canada/LGL Limited	

Appendix B: Avian Data Sets and Data Analyses

Some of the landbird monitoring programs described in the Canadian Landbird Monitoring Strategy (Downes et al. 2000) and the Ontario Wildlife Monitoring Programs summary (Konze 1998; OMNR 2004) collect data in the Ontario portion of BCR 8 (ON BCR 8), but with much reduced coverage (lower sample sizes, larger geographic gaps, more geographic bias) compared to farther south in Ontario.

Most data are collected during the breeding season, with relatively few standard surveys of the distribution and abundance of wintering landbirds in this region. Standardized migration monitoring data sets are available for some locations at the southern edge and south of ON BCR 8, but birds breeding in BCR 8 cannot be distinguished during migration from birds breeding in other BCRs and provinces/territories.

Avian data sets used in preparing this plan are described below.

Breeding Bird Survey (BBS)

The Breeding Bird Survey (BBS) is the primary large-scale, long-term bird monitoring program in North America (www.pwrc.usgs.gov/bbs/; www.cws-scf.ec.gc.ca/nwrc-cnrf/default.asp?lang=en&n=416B57CA).

BBS data are used for several purposes in this plan:
- To determine population trends used in species assessment;
- To establish the relative importance of ON BCR 8 to the species; and
- To set measurable population abundance objectives for some species.

Surveywide BBS trends were used to determine Species of Continental Concern (Rich et al. 2004). BCR-wide BBS trend data from across BCR 8 were used to determine Species of Regional Concern. Other uses of BBS data (e.g., trend graphs in priority species accounts, Appendix F) relied on data from ON BCR 8 alone.

BBS coverage in ON BCR 8 is generally sparse in the east and non-existent north and west of Lake Nipigon. A total of 18 routes have been surveyed at least once (Figures B1 and B2), covering 14-degree blocks of latitude and longitude, with 32 full degree blocks not surveyed at all. Nine routes have been surveyed at least eight times, providing the main trend data. Coverage during the past decade (1995–2004) has been variable, with one to seven routes surveyed per year, 10 routes surveyed in total, seven of which have been surveyed at least three times in the decade. These 10 routes are distributed across eight degree blocks in the south and east. BBS data therefore represent only the southeast portion of ON BCR 8.

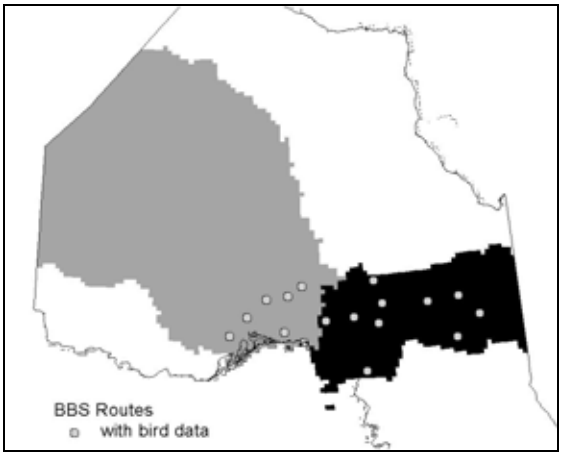


Figure B1: BBS coverage in ON BCR 8, showing W and E subregions.

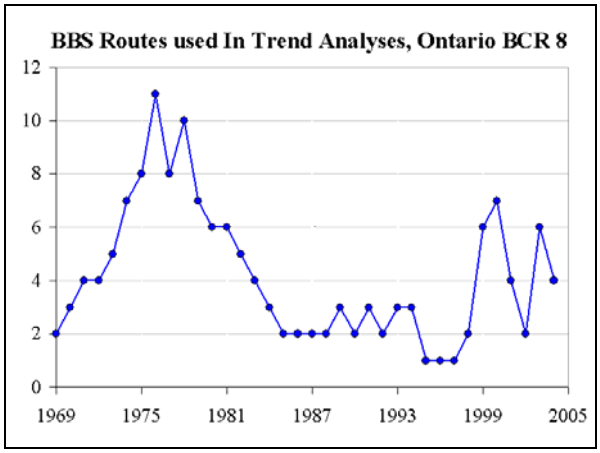


Figure B2: Number of BBS routes surveyed in ON BCR 8 (y-axis) per year.

Count data from 16 BBS routes within ON BCR 8 were converted to annual abundance indices, using the current Canadian BBS trend program (provided by Brian Collins, Environment Canada) to remove the effect of different routes being run from year to year. Use of annual indices allows annual assessment of population change and progress towards objectives. BBS trends for the 1969–2004 period from ON BCR 8 could be calculated for 88 species, including 76 landbirds.

Ontario Breeding Bird Atlases (BBA)

The other major, comprehensive data sets for Ontario's breeding birds are the Ontario Breeding Bird Atlases (BBA). The first Ontario BBA (Cadman et al. 1987) provided information for breeding bird distribution from 10 km x 10 km squares across Ontario during the 1981–1985 period. The second atlas project (www.birdsontario.org/atlas/atlasmain.html) will provide comparable information for the 2001–2005 period. The second BBA also collected bird abundance (point-count) data. Approximately 20% of atlas squares were covered in the first BBA, 30% in the second. Data used in this plan come mainly from squares with 20+ hours of survey coverage, which represents about 2% (BBA1) and 5% (BBA2) of squares in ON BCR 8. Unlike BBS, atlas squares surveyed were fairly well distributed across the region.

BBA data are used in this plan:

- To measure changes in bird distribution over the past 20 years for comparison with BBS long-term population;
- For trend information; and
- To set measurable population distribution objectives for some species and one guild.

Results from the second BBA are preliminary, pending final reviews of the data in 2006. To compensate for differences in survey effort between the two atlases, squares with a minimum of 20 hours of survey coverage in both atlas periods were used in most analyses.

Christmas Bird Count (CBC)

Christmas Bird Count (CBC) data (www.audubon.org/bird/cbc/index.html) provide information on the abundance and distribution of wintering landbirds across much of North America. CBC data for the 1990/91 to 1997/98 period were analyzed, along with comparable data from elsewhere in North America, to determine the relative importance (relative density scores) of ON BCR 8 to wintering landbirds. Coverage in this period was limited to 34 counts at seven sites in ON BCR 8, mainly in the populated southern portion of the region.

To date, use of CBC data for technical analyses has been limited because of inter-year and inter-region variations in observer effort. New statistical analysis methods (Sauer et al. 2004) have the potential to make the CBC data set more relevant for conservation purposes. Winter population trends should be available soon, and future analyses of relative density data will be more robust to regional differences in observer effort.

Other Data Sets

Other data sets of landbird abundance and distribution that were consulted in preparing this plan include the Ontario Nocturnal Owl Survey (www.bsc-eoc.org/owls.html), the Canadian Migration Monitoring Network (www.bsc-eoc.org/volunteer/cmmn/index.jsp?targetpg=index&lang=EN), Project FeederWatch (www.birds.cornell.edu/PFW/; www.bsc-eoc.org/national/pfw.html) and digital breeding and wintering range information (Ridgely et al. 2003; www.natureserve.org/getData/birdMaps.jsp).

Appendix C: Identifying Priority Species at a Regional Scale – the PIF Approach

Partners In Flight (PIF) uses standard methods to identify priority species at a regional scale, that is, species most in need of attention within a region (Panjabi et al. 2001, 2005). Species assessment methods and data continue to evolve and be updated over time because it is important to ensure that priorities are based on the latest and most objective data and methods available. The PIF methods used in the ON BCR 8 Landbird Conservation Plan are those described in the 2005 PIF Assessment Handbook (Panjabi et al. 2005) and are summarized below.

Criteria for Species Assessment

PIF uses six measures of species status to assess the vulnerability of each species. Together, these measures reflect a species' vulnerability to current and future conditions, its population trend and the importance of the region to the bird's global population. Species are assessed separately in breeding and non-breeding seasons.

Species Vulnerability – Two Global Measures:

A) Distribution – Breeding Distribution (BD) and Non-breeding Distribution (ND)

Underlying assumption: Broadly distributed species are less vulnerable to a variety of known and unanticipated impacts than species with a restricted geographic range.

Distribution is a measure of the geographic extent of a species' global range during the breeding and wintering periods. Distribution or degree of concentration during migration is not assessed at this time, though it could be in the future.

Scores range from 1 (least vulnerable) to 5 (most vulnerable), as follows:

1 Range size > 4 000 000 km^2
2 Range size > 2 000 000 km^2
3 Range size > 1 000 000 km^2
4 Range size > 500 000 km^2
5 Range size < 500 000 km^2

B) Population Size (PS)

Underlying assumption: Species with large populations are generally less vulnerable than species with small populations.

This score is based on an estimate of the size of the world breeding population (methods in Rich et al. 2004). A global estimate is used to reflect the potential for regional populations to be replenished (in numbers and genetic diversity) from elsewhere in the species' range.

Scores range from 1 (least vulnerable) to 5 (most vulnerable), as follows:

1 World breeding population > 50 000 000 individuals
2 World breeding population > 5 000 000
3 World breeding population > 500 000
4 World breeding population > 50 000
5 World breeding population < 50 000

Concern for Species Population – Two Measures, Each Scored Globally and BCR-wide:

C) Population Trend – Global (PT_G) and BCR-wide (PT_B)

Underlying assumption: Conditions that resulted in recent population declines may continue to cause declines in future. Declining populations may be significantly below natural levels of abundance and distribution, such that they are below the lower limit of the estimated range of natural variability (ERNV).

The direction and magnitude of change in a species population over the past 30 years is measured, across its range and within the BCR. For most landbirds, Breeding Bird Survey (BBS) data have been used, supplemented by Christmas Bird Count (CBC) trends and other sources (e.g., censuses of Endangered species) for species without BBS trends.

Scores range from 1 (least concern) to 5 (greatest concern), as follows:

1 Population Increase ≥ 50% over 30 years
2 Population Increase ≥ 15% over 30 years, or Pop'n Stable (<15% change)
3 Population Trend is Unknown (no trend data) or Uncertain (highly variable)
4 Population Decrease ≥ 15% over 30 years
5 Population Decrease ≥ 50% over 30 years

D) Threats – Global Breeding (TB_G) and Non-breeding (TN_G), BCR Breeding (TB_L) and Non-breeding (TN_L)

Underlying assumption: Knowledge of changing environmental conditions and potential threats facing birds in future helps identify birds and habitats that may decline in future unless corrective action is taken now.

Threats to species due to current and probable future conditions are assessed by landbird experts as a measure of how a species population is expected to fare in the future, both rangewide and within the BCR, and on the breeding and wintering grounds.

Scores range from 1 (least concern) to 5 (greatest concern), as follows:

1 Expected future conditions for breeding/non-breeding populations are enhanced by human activities or land-uses
2 Future conditions are expected to remain stable; no known threats
3 Slight to moderate decline in the future suitability of conditions is expected
4 Severe deterioration in the future suitability of conditions is expected
5 Extreme deterioration in the future suitability of conditions is expected; species is in danger of regional extirpation or major range contraction, or has a low probability of successful reintroduction where already extirpated

Area Importance – Two Regional Measures:

E) Relative Density – Breeding (RD_B) and Non-breeding (RD_N)

Underlying assumption: Regions with densities approaching maximum density for the species are assumed to have highest importance to rangewide population; management action here will affect highest numbers of birds per unit area.

Density of a species across the entire BCR is measured relative to the BCR with highest density for that species, for the breeding and non-breeding seasons. Relative densities (RD) for most species have been calculated from BBS data for the breeding season and by using CBC data for the non-breeding season. Other sources of data and expert opinion have been used for species with few rangewide abundance data.

Scores range from 1 (lowest area importance) to 5 (highest area importance), as follows:

1 BCR density <1 of maximum density across all other BCRs
2 BCR density 1–10% of maximum density
3 BCR density 10–25% of maximum density
4 BCR density 25–50% of maximum density
5 BCR density ≥ 50%% of maximum density

F) Percentage of World Population (% Pop) – Breeding and Non-breeding

Underlying assumption: Regions containing a high proportion of a species' population are assumed to be of high importance to the overall population of a given species; therefore, actions in these regions will affect the largest numbers of birds.

The percentage of a species' world population in each BCR has been estimated by PIF (Rich et al. 2004) as an alternative measure of area importance. Unlike RD, % Pop is area-dependent, so the two measures provide complementary perspectives on area importance across the spectrum of BCR sizes: RD emphasizes BCRs with high regionwide density, whereas % Pop highlights BCRs with large numbers of birds.

Species with at least 25% of their world or western hemisphere population in a single BCR are highlighted.

Applying the Criteria for the Selection of Priority Species

PIF highlights species that are in greatest need of conservation attention in a region, in order to focus efforts where they are needed most. These species are listed as priority species.

Species are included on a region's priority list for a variety of reasons. All Species of Continental Importance (Rich et al. 2004) that have significant populations in the BCR are listed as priority species, so that local efforts will contribute to continental conservation. Results of BCR-wide species assessment (above) are used to add Species of Regional Importance, including species with high vulnerability and concern at the regional level, and Species with High Area Importance in the BCR. Species that are officially designated through federal or provincial Species at Risk (SAR) legislation and which occur in the region are also included as priority species. Finally, species lists are screened to ensure that all species on the list occur regularly and in significant numbers in the planning area (i.e., in the Ontario portion of the BCR), and additional species of management interest or concern in the planning area may be added.

Criteria for each of these categories of priority species are outlined below.

Species of Continental Importance – Two Categories:

A) Continental Concern: Species must meet all of the following criteria:

- Listed on PIF Continental Watch List (Rich et al. 2004);
- Occurs regularly in significant numbers in the BCR, i.e., RD>1; and
- Future conditions are not enhanced by human activities, i.e., Threat Score > 1.

B) Continental Stewardship: Species must meet all of the following criteria:

- Listed as a PIF Continental Stewardship species (Rich et al. 2004);
- High Area Importance in the BCR: % Pop ≥ 25% or (RD=5 and % Pop ≥ 5%); and
- Future conditions are not enhanced by human activities, i.e., Threat Score > 1.

Species of Regional Importance – Two Categories:

Species of Regional Importance include species identified by the PIF regional assessment process as Regional Concern or Regional Stewardship species. For the PIF regional breeding and wintering species assessment, a Total Assessment Score (maximum of 25) is calculated for each species in the BCR by summing scores for distribution, population size, population trend, threats and relative density. Scores pertinent to each season are used, as shown in Table C1.

Table C1: Scores used in calculating regional total assessment scores in different seasons.

	Breeding Distribution	Non-breeding Distribution	Population Size	Population Trend - Global	Population Trend Breeding – local	Regional Threats - Breeding	Regional Threats - Non-breeding	Relative Density - Breeding	Relative Density - Non-breeding
	BD	ND	PS	PT_G	PT_B	TB_L	TN_L	RD_B	RD_N
Total Breeding Score	✎		✎		✎	✎		✎	
Total Non-breeding Score (permanent resident)		✎	✎		✎		✎	✎	
Total Non-breeding Score (winter resident only)		✎	✎	✎			✎		✎

C) Regional Concern: Species must meet all criteria in the season(s) for which it is listed:

- Total Assessment Score > 13
- High regional threats (>3) or moderate regional threat (3) combined with significant population decline (PT > 3);
- Occurs regularly in significant numbers in the BCR, i.e., RD>1.

D) Regional Stewardship: Species must meet all criteria in the season(s) for which it is listed:

- High Area Importance in the BCR: % Pop ≥ 25% or (RD=5 and % Pop ≥ 5%);
- Total Assessment Score > 13; and
- Future conditions are not enhanced by human activities, i.e., Threat Score > 1.

Species at Risk – Two Categories:

Listed Species at Risk that currently occur or potentially occur in the Ontario portion of the BCR are included, regardless of their total score, population density (RD) or threat score.

E) Federal Species at Risk: Listed according to Canada's *Species At Risk Act* (SARA)

F) Provincial Species at Risk: Listed Species at Risk in Ontario (SARO)

Other Species of Management Concern:

Based on expert opinion obtained at the PIF Ontario landbird conservation workshop held in October 2004 (www.bsc-eoc.org/PIF/BCR8%2012_WorkshopSummary.pdf), no additional priority species of regional management interest were identified. However, the aerial-foraging insectivore guild was identified as a priority foraging guild in ON BCR 8.

Appendix D: Landbirds Occurring Regularly in Ontario BCR 8 during the Breeding and/or Wintering Seasons

Table D1 lists all landbirds occurring regularly (see below) in the Ontario portion of BCR 8 (ON BCR 8) during the breeding and/or wintering seasons, along with additional information on their residency status and Species at Risk (SAR) status. An explanation of the information in the columns and the various codes used in Table D1 is provided below, along with the sources of information used in developing this table.

Most of the breeding species included in this list are widespread in ON BCR 8, but the list includes some species that breed regularly at only few sites or occur only locally within this region (e.g., Golden Eagle, Wood Thrush). Irruptive winter finches (e.g., Hoary Redpoll) are included as regular wintering birds, even though their numbers vary markedly from year to year.

Explanatory Notes for Table D1:

Bold = Priority species in ON BCR 8; **[species enclosed in square brackets]** = Introduced species

Residency Status in ON BCR 8: PR = Permanent resident; **B =** Resident during breeding season only; **W =** Resident during wintering season only. **BW =** Species is resident during breeding and wintering seasons (but not a permanent resident). **Sources:** James 1991; Breeding Bird Atlas data; Christmas Bird Count data; NatureServe range maps.

SAR Status CA/ON: Federal (CA) and provincial (ON) Species at Risk status designations: **EN =** Endangered; **TH =** Threatened; **SC** = Special Concern; **(SC)** = Special Concern but undergoing public consultation, or on Schedule 3 of *Species at Risk Act* pending review of updated status report; **UR** = Under Review by COSEWIC (currently not listed). **CL =** On list of Candidate Species for COSEWIC review. **Sources:** SARA Public Registry March 2007; COSEWIC 2007a,b,c; OMNR 2006a.

Table D1: List of landbirds occurring regularly in Ontario BCR 8 during breeding and/or wintering seasons, along with additional information on residency status, and Species at Risk status.

Common Name	Scientific Name	Residency Status	SAR Status CA/ON
Ruffed Grouse	*Bonasa umbellus*	PR	
Spruce Grouse	*Falcipennis canadensis*	PR	
Willow Ptarmigan	*Lagopus lagopus*	W	
Sharp-tailed Grouse	*Tympanuchus phasianellus*	PR	
Turkey Vulture	*Cathartes aura*	B	
Osprey	*Pandion haliaetus*	B	
Bald Eagle	*Haliaeetus leucocephalus*	B	—/SC
Northern Harrier	*Circus cyaneus*	B	
Sharp-shinned Hawk	*Accipiter striatus*	B	
Northern Goshawk	*Accipiter gentiles*	BW	
Broad-winged Hawk	*Buteo platypterus*	B	
Red-tailed Hawk	*Buteo jamaicensis*	B	
Golden Eagle	*Aquila chrysaetos*	BW	—/EN
American Kestrel	*Falco sparverius*	B	
Merlin	*Falco columbarius*	B	
Gyrfalcon	*Falco rusticolus*	W	
Peregrine Falcon	*Falco peregrinus*	B	TH/TH
[Rock Pigeon]	*Columba livia*	PR	
Mourning Dove	*Zenaida macroura*	B	
Black-billed Cuckoo	*Coccyzus erythropthalmus*	B	
Great Horned Owl	*Bubo virginianus*	PR	
Snowy Owl	*Bubo scandiacus*	W	
Northern Hawk Owl	*Surnia ulula*	PR	
Barred Owl	*Strix varia*	PR	
Great Gray Owl	*Strix nebulosa*	PR	—/SC
Long-eared Owl	*Asio otus*	BW	
Short-eared Owl	*Asio flammeus*	B	(SC)/SC
Boreal Owl	*Aegolius funereus*	PR	
Northern Saw-whet Owl	*Aegolius acadicus*	BW	
Common Nighthawk	*Chordeiles minor*	B	UR
Whip-poor-will	*Caprimulgus vociferus*	B	CL
Chimney Swift	*Chaetura pelagica*	B	UR
Ruby-throated Hummingbird	*Archilochus colubris*	B	
Belted Kingfisher	*Ceryle alcyon*	B	
Yellow-bellied Sapsucker	*Sphyrapicus varius*	B	
Downy Woodpecker	*Picoides pubescens*	PR	

Common Name	Scientific Name	Residency Status	SAR Status CA/ON
Hairy Woodpecker	*Picoides villosus*	PR	
American Three-toed Woodpecker	*Picoides dorsalis*	PR	
Black-backed Woodpecker	*Picoides arcticus*	PR	
Northern Flicker	*Colaptes auratus*	B	
Pileated Woodpecker	*Dryocopus pileatus*	PR	
Olive-sided Flycatcher	*Contopus cooperi*	B	UR
Eastern Wood-Pewee	*Contopus virens*	B	
Yellow-bellied Flycatcher	*Empidonax flaviventris*	B	
Alder Flycatcher	*Empidonax alnorum*	B	
Least Flycatcher	*Empidonax minimus*	B	
Eastern Phoebe	*Sayornis phoebe*	B	
Great Crested Flycatcher	*Myiarchus crinitus*	B	
Eastern Kingbird	*Tyrannus tyrannus*	B	
Northern Shrike	*Lanius excubitor*	W	
Blue-headed Vireo	*Vireo solitarius*	B	
Warbling Vireo	*Vireo gilvus*	B	
Philadelphia Vireo	*Vireo philadelphicus*	B	
Red-eyed Vireo	*Vireo olivaceus*	B	
Gray Jay	*Perisoreus canadensis*	PR	
Blue Jay	*Cyanocitta cristata*	BW	
American Crow	*Corvus brachyrhynchos*	B	
Common Raven	*Corvus corax*	PR	
Tree Swallow	*Tachycineta bicolor*	B	
Bank Swallow	*Riparia riparia*	B	
Cliff Swallow	*Petrochelidon pyrrhonota*	B	
Barn Swallow	*Hirundo rustica*	B	CL
Black-capped Chickadee	*Poecile atricapillus*	PR	
Boreal Chickadee	*Poecile hudsonica*	PR	
Red-breasted Nuthatch	*Sitta canadensis*	BW	
White-breasted Nuthatch	*Sitta carolinensis*	PR	
Brown Creeper	*Certhia americana*	BW	
House Wren	*Troglodytes aedon*	B	
Winter Wren	*Troglodytes troglodytes*	B	
Sedge Wren	*Cistothorus platensis*	B	
Golden-crowned Kinglet	*Regulus satrapa*	B	
Ruby-crowned Kinglet	*Regulus calendula*	B	
Eastern Bluebird	*Sialia sialis*	B	
Veery	*Catharus fuscescens*	B	
Swainson's Thrush	*Catharus ustulatus*	B	
Hermit Thrush	*Catharus guttatus*	B	
Wood Thrush	*Hylocichla mustelina*	B	

Common Name	Scientific Name	Residency Status	SAR Status CA/ON
American Robin	*Turdus migratorius*	B	
Gray Catbird	*Dumetella carolinensis*	B	
Brown Thrasher	*Toxostoma rufum*	B	
[European Starling]	*Sturnus vulgaris*	BW	
Bohemian Waxwing	*Bombycilla garrulus*	W	
Cedar Waxwing	*Bombycilla cedrorum*	BW	
Tennessee Warbler	*Vermivora peregrina*	B	
Orange-crowned Warbler	*Vermivora celata*	B	
Nashville Warbler	*Vermivora ruficapilla*	B	
Northern Parula	*Parula americana*	B	
Yellow Warbler	*Dendroica petechia*	B	
Chestnut-sided Warbler	*Dendroica pensylvanica*	B	
Magnolia Warbler	*Dendroica magnolia*	B	
Cape May Warbler	*Dendroica tigrina*	B	
Black-throated Blue Warbler	*Dendroica caerulescens*	B	
Yellow-rumped Warbler	*Dendroica coronata*	B	
Black-throated Green Warbler	*Dendroica virens*	B	
Blackburnian Warbler	*Dendroica fusca*	B	
Pine Warbler	*Dendroica pinus*	B	
Palm Warbler	*Dendroica palmarum*	B	
Bay-breasted Warbler	*Dendroica castanea*	B	
Blackpoll Warbler	*Dendroica striata*	B	
Black-and-white Warbler	*Mniotilta varia*	B	
American Redstart	*Setophaga ruticilla*	B	
Ovenbird	*Seiurus aurocapilla*	B	
Northern Waterthrush	*Seiurus noveboracensis*	B	
Connecticut Warbler	*Oporornis agilis*	B	
Mourning Warbler	*Oporornis philadelphia*	B	
Common Yellowthroat	*Geothlypis trichas*	B	
Wilson's Warbler	*Wilsonia pusilla*	B	
Canada Warbler	*Wilsonia canadensis*	B	UR
Scarlet Tanager	*Piranga olivacea*	B	
Chipping Sparrow	*Spizella passerina*	B	
Clay-colored Sparrow	*Spizella pallida*	B	
Vesper Sparrow	*Pooecetes gramineus*	B	
Savannah Sparrow	*Passerculus sandwichensis*	B	
Le Conte's Sparrow	*Ammodramus leconteii*	B	
Fox Sparrow	*Passerella iliaca*	B	
Song Sparrow	*Melospiza melodia*	B	
Lincoln's Sparrow	*Melospiza lincolnii*	B	
Swamp Sparrow	*Melospiza georgiana*	B	

Common Name	Scientific Name	Residency Status	SAR Status CA/ON
White-throated Sparrow	*Zonotrichia albicollis*	B	
Dark-eyed Junco	*Junco hyemalis*	BW	
Snow Bunting	*Plectrophenax nivalis*	W	
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	B	
Indigo Bunting	*Passerina cyanea*	B	
Bobolink	*Dolichonyx oryzivorus*	B	
Red-winged Blackbird	*Agelaius phoeniceus*	B	
Rusty Blackbird	*Euphagus carolinus*	B	(SC)
Common Grackle	*Quiscalus quiscula*	B	
Brown-headed Cowbird	*Molothrus ater*	B	
Pine Grosbeak	*Pinicola enucleator*	BW	
Purple Finch	*Carpodacus purpureus*	BW	
Red Crossbill	*Loxia curvirostra*	BW	
White-winged Crossbill	*Loxia leucoptera*	BW	
Common Redpoll	*Carduelis flammea*	W	
Hoary Redpoll	*Carduelis hornemanni*	W	
Pine Siskin	*Carduelis pinus*	BW	
American Goldfinch	*Carduelis tristis*	B	
Evening Grosbeak	*Coccothraustes vespertinus*	BW	
[House Sparrow]	*Passer domesticus*	PR	

Appendix E: PIF Species Assessment Scores for Landbirds in Ontario BCR 8

See Appendix C and Panjabi et al. 2005 for a detailed explanation of the PIF scoring system. Seasonal assessment scores are provided for all species that occur regularly in ON BCR 8 during the breeding and/or wintering seasons (Appendix D).

Explanatory Notes for Table E-1:

Bold = Species on priority list in Ontario BCR 8; **[…]** = Introduced (non-native) species

Breeding Assessment Scores =1 (low) to 5 (high vulnerability, concern or responsibility)

Total = Sum of BD + PS + PT Breeding + TB + RD Breeding

BD = Breeding Distribution Score, based on global range

PS = Population Size Score, based on estimated global breeding population

PT = Population Trend Score, based on BCR-wide BBS trend since 1966
***** = Large loss in % squares with breeding between 1st and 2nd BBA, equivalent to PT score of 5

TB = Threats Breeding Score, based on BCR-wide assessment of threats

RD = Relative Density Score, based on BCR-wide breeding density relative to density in other North American BCRs

Global % Pop = Estimated percentage of global population breeding in BCR 8

Breeding Evidence = % of adequately surveyed Ontario Breeding Bird Atlas squares (10 km x 10 km) with breeding evidence (only squares with a minimum of 20 hrs.' effort are included in calculation). **BBA1** = 1981–85 (Cadman et al. 1987)**; BBA2** = 2001–05 (preliminary data as of December 2005)

Wintering Assessment Scores = 1 (low) to 5 (high vulnerability, concern or responsibility)

Total = Sum of ND + PS + PT Non-breeding + TN + RD Non-breeding

ND = Non-breeding Distribution Score, based on global range in winter

PS = Population Size Score, based on estimated global breeding population

PT = Population Trend Score, based on global trend

TN = Threats Non-breeding Score, based on global assessment of threats in the non-breeding season

RD = Relative Density Score, based on BCR-wide wintering density relative to density in other North American BCRs

Global % Pop = Estimated percentage of global population wintering in BCR 8

Table E1: PIF Species assessment scores for landbirds in Ontario BCR 8.

Common Name	Breeding Assessment Scores						Global	Breeding Evidence		Winter Assessment Scores						Global
	Total	BD	PS	PT	TB	RD	% Pop	BBA1	BBA2	Total	ND	PS	PT	TN	RD	% Pop
Ruffed Grouse	14	2	2	3	2	5	25%	67%	73%	14	2	2	3	2	5	25%
Spruce Grouse	12	1	3	3	2	3	4%	29%	31%	12	1	3	3	3	2	4%
Willow Ptarmigan										9	1	2	3	2	1	<1%
Sharp-tailed Grouse	11	2	3	3	2	1	<1%	4%	7%	11	2	3	3	2	1	
Turkey Vulture	9	1	3	3	1	1	<1%	7%	31%							
Osprey	12	1	4	3	2	2	6%	54%	38%							
Bald Eagle	12	2	4	3	2	1	1%	23%	55%							
Northern Harrier	11	1	3	3	2	2	1%	25%	22%							
Sharp-shinned Hawk	14	1	3	3	2	5	9%	24%	23%							
Northern Goshawk	12	1	4	3	2	2	1%	20%	9%	15	1	4	3	3	4	4%
Broad-winged Hawk	14	1	3	3	3	4	22%	56%	60%							
Red-tailed Hawk	11	1	3	3	2	2	1%	29%	45%							
Golden Eagle	12	1	4	3	2	2	<1%	0%	1%	11	1	4	3	2	1	<1%
American Kestrel	13	1	2	5	2	3	5%	49%	56%							
Merlin	13	1	3	3	2	4	5%	20%	42%							
Gyrfalcon										11	1	4	1	3	2	6%
Peregrine Falcon	11	1	3	3	3	1	<1%	0%	2%							
[Rock Pigeon]	8	1	1	3	1	2	<1%	10%	2%	10	1	1	3	1	4	<1%
Mourning Dove	7	1	1	3	1	1	<1%	14%	8%							
Black-billed Cuckoo	13	2	3	3	2	3	12%	9%	6%							
Great Horned Owl	9	1	2	3	2	1	<1%	18%	8%	8	1	2	3	1	1	<1%
Snowy Owl										13	1	4	2	2	4	20%
Northern Hawk Owl	14	1	4	3	2	4	8%	3%	10%	13	1	4	3	2	3	8%
Barred Owl	10	1	3	3	2	1	1%	14%	11%	10	1	3	3	2	1	1%

Common Name	Breeding Assessment Scores						Global	Breeding Evidence		Winter Assessment Scores						Global
	Total	BD	PS	PT	TB	RD	% Pop	BBA1	BBA2	Total	ND	PS	PT	TN	RD	% Pop
Great Gray Owl	14	1	4	3	2	4	10%	11%	13%	15	1	4	3	2	5	10%
Long-eared Owl	14	1	4	3	3	3		2%	2%	14	1	4	4	3	2	
Short-eared Owl	12	1	3	3	3	2	<1%	3%	4%							
Boreal Owl	15	1	3	3	3	5		10%	9%	13	2	3	3	2	3	
Northern Saw-whet Owl	13	2	3	3	2	3		2%	13%	12	2	3	2	2	3	
Common Nighthawk	11	1	2	3	3	2	2%	63%	39%							
Whip-poor-will	12	2	3	3	3	1	1%	3%	2%							
Chimney Swift	10	1	2	3	3	1	<1%	3%	1%							
Ruby-throated Hummingbird	10	1	2	3	2	2	7%	33%	22%							
Belted Kingfisher	15	1	3	4	2	5	12%	69%	65%							
Yellow-bellied Sapsucker	14	2	2	4	2	4	26%	56%	67%							
Downy Woodpecker	10	1	2	2	2	3	8%	51%	43%	9	1	2	2	1	3	8%
Hairy Woodpecker	13	1	2	3	2	5	18%	58%	69%	13	1	2	3	2	5	18%
American Three-toed Woodpecker	14	1	3	3	3	4	6%	11%	16%	13	1	3	3	3	3	6%
Black-backed Woodpecker	16	2	3	3	3	5	23%	37%	32%	15	2	3	3	3	4	23%
Northern Flicker	14	1	2	4	2	5	11%	94%	95%							
Pileated Woodpecker	12	1	3	3	2	3	12%	45%	59%	12	1	3	3	2	3	12%
Olive-sided Flycatcher	14	1	3	4	3	3	9%	48%	48%							
Eastern Wood-Pewee	10	1	2	3	2	2	2%	8%	16%							
Yellow-bellied Flycatcher	14	2	2	3	2	5	76%	32%	90%							
Alder Flycatcher	14	1	2	4	2	5	15%	75%	93%							
Least Flycatcher	13	1	2	3	2	5	25%	85%	92%							
Eastern Phoebe	11	1	2	3	2	3	7%	9%	6%							
Great Crested Flycatcher	9	1	2	3	2	1	<1%	2%	2%							

Common Name	Breeding Assessment Scores						Global	Breeding Evidence		Winter Assessment Scores						Global
	Total	BD	PS	PT	TB	RD	% Pop	BBA1	BBA2	Total	ND	PS	PT	TN	RD	% Pop
Eastern Kingbird	12	1	2	4	3	2	1%	47%	19%							
Northern Shrike										11	1	3	2	2	3	2%
Blue-headed Vireo	13	2	2	3	2	4	30%	47%	82%							
Warbling Vireo	9	1	2	3	2	1	<1%	4%	2%							
Philadelphia Vireo	14	2	3	2	2	5	69%	53%	57%							
Red-eyed Vireo	11	2	1	1	2	5	29%	87%	100%							
Gray Jay	13	1	2	5	2	3	6%	75%	85%	13	1	2	5	2	3	6%
Blue Jay	10	1	2	3	2	2	3%	44%	59%	12	2	2	4	1	3	5%
American Crow	8	1	2	1	1	3	8%	68%	76%							
Common Raven	10	1	2	2	1	4	3%	91%	94%	10	1	2	2	1	4	3%
Tree Swallow	12	1	2	3	2	4	12%	82%	55%							
Bank Swallow	11	1	2	3	3	2	1%	27%	4%							
Cliff Swallow	10	1	1	3	3	2	1%	32%	8%							
Barn Swallow	11	1	1	4	3	2	1%	44%	17%							
Black-capped Chickadee	11	1	2	3	2	3	10%	80%	82%	11	1	2	3	2	3	10%
Boreal Chickadee	13	1	2	4	2	4	12%	56%	68%	13	1	2	4	2	4	12%
Red-breasted Nuthatch	12	1	2	4	2	3	12%	78%	89%	10	1	2	1	2	4	8%
White-breasted Nuthatch	9	1	2	3	2	1	<1%	4%	3%	9	1	2	3	2	1	<1%
Brown Creeper	11	1	2	3	3	2	10%	34%	66%	10	1	2	3	2	2	2%
House Wren	9	1	2	3	1	2	1%	3%	3%							
Winter Wren	14	1	2	3	3	5	17%	78%	97%							
Sedge Wren	13	3	2	3	3	2	4%	3%	4%							
Golden-crowned Kinglet	13	2	2	3	2	4	20%	52%	93%							
Ruby-crowned Kinglet	14	1	1	5	2	5	22%	82%	97%							

Common Name	Breeding Assessment Scores						Global	Breeding Evidence		Winter Assessment Scores						Global
	Total	BD	PS	PT	TB	RD	% Pop	BBA1	BBA2	Total	ND	PS	PT	TN	RD	% Pop
Eastern Bluebird	9	1	2	3	2	1	<1%	8%	6%							
Veery	12	2	2	2	2	4	30%	39%	46%							
Swainson's Thrush	12	1	1	3	2	5	19%	95%	98%							
Hermit Thrush	11	1	1	3	2	4	11%	63%	94%							
Wood Thrush	10	2	2	3	2	1	1%	4%	1%							
American Robin	8	1	1	1	1	4	10%	85%	85%							
Gray Catbird	9	1	2	3	2	1	<1%	11%	3%							
Brown Thrasher	10	1	2	3	3	1	<1%	5%	1%							
[European Starling]	8	1	1	3	1	2	<1%	32%	14%	9	1	1	4	1	2	2%
Bohemian Waxwing	10	1	3	3	2	1	<1%	0%	1%	13	1	3	2	2	5	37%
Cedar Waxwing	12	1	2	3	2	4	17%	86%	88%	9	1	2	2	2	2	2%
Tennessee Warbler	13	2	1	3	2	5	30%	87%	81%							
Orange-crowned Warbler	9	1	1	3	2	2	1%	18%	17%							
Nashville Warbler	14	2	2	3	2	5	58%	64%	95%							
Northern Parula	12	2	2	3	2	3	14%	21%	33%							
Yellow Warbler	13	1	2	4	2	4	8%	65%	48%							
Chestnut-sided Warbler	14	2	2	4	2	4	42%	68%	66%							
Magnolia Warbler	12	1	2	2	2	5	50%	79%	98%							
Cape May Warbler	15	2	3	3	2	5	65%	45%	40%							
Black-throated Blue Warbler	14	3	3	3	2	3	16%	20%	20%							
Yellow-rumped Warbler	11	1	1	3	2	4	11%	94%	98%							
Black-throated Green Warbler	14	2	2	3	2	5	40%	53%	45%							
Blackburnian Warbler	13	2	2	2	2	5	50%	47%	58%							
Pine Warbler	11	3	2	3	2	1	<1%	0%	5%							

Common Name	Breeding Assessment Scores						Global	Breeding Evidence		Winter Assessment Scores						Global
	Total	BD	PS	PT	TB	RD	% Pop	BBA1	BBA2	Total	ND	PS	PT	TN	RD	% Pop
Palm Warbler	12	2	2	3	2	3	12%	22%	51%							
Bay-breasted Warbler	16	3	3	3	2	5	75%	56%	75%							
Blackpoll Warbler	14	2	2	3	3	4	18%	8%	5%							
Black-and-white Warbler	14	2	2	3	2	5	39%	68%	79%							
American Redstart	12	1	2	3	2	4	27%	65%	69%							
Ovenbird	14	2	2	3	2	5	34%	88%	89%							
Northern Waterthrush	12	1	2	3	2	4	21%	72%	79%							
Connecticut Warbler	18	3	3	4	3	5	53%	13%	19%							
Mourning Warbler	15	3	2	3	2	5	63%	56%	71%							
Common Yellowthroat	13	1	2	4	2	4	14%	72%	74%							
Wilson's Warbler	11	1	2	4	2	2	6%	39%	54%							
Canada Warbler	15	2	3	3	2	5	45%	57%	46%							
Scarlet Tanager	12	2	3	3	2	2	2%	10%	6%							
Chipping Sparrow	11	1	1	3	1	5	14%	68%	93%							
Clay-colored Sparrow	10	2	2	3	2	1	1%	4%	6%							
Vesper Sparrow	10	1	2	3	3	1	<1%	8%	5%							
Savannah Sparrow	11	1	1	4	2	3	4%	38%	23%							
Le Conte's Sparrow	12	2	3	3	2	2	2%	5%	8%							
Fox Sparrow	11	1	2	3	2	3	15%	5%	15%							
Song Sparrow	10	1	1	3	2	3	9%	84%	77%							
Lincoln's Sparrow	12	1	2	3	2	4	11%	54%	69%							
Swamp Sparrow	14	2	2	3	2	5	31%	76%	84%							
White-throated Sparrow	13	2	1	3	2	5	37%	98%	100%							
Dark-eyed Junco	12	1	1	5	2	3	3%	71%	79%	10	1	1	4	2	2	3%

Common Name	Breeding Assessment Scores						Global	Breeding Evidence		Winter Assessment Scores						Global
	Total	BD	PS	PT	TB	RD	% Pop	BBA1	BBA2	Total	ND	PS	PT	TN	RD	% Pop
Snow Bunting										10	1	2	2	2	3	12%
Rose-breasted Grosbeak	13	2	3	3	2	3	15%	26%	18%							
Indigo Bunting	9	1	2	3	2	1	<1%	5%	5%							
Bobolink	11	2	2	3	2	2	3%	14%	1%							
Red-winged Blackbird	11	1	1	5	2	2	1%	64%	32%							
Rusty Blackbird	13	1	3	3	3	3	8%	41%	24%							
Common Grackle	8	1	1	3	1	2	2%	69%	58%							
Brown-headed Cowbird	11	1	1	5	2	2	1%	34%	3%							
Pine Grosbeak	14	1	3	3	3	4	7%	13%	6%	14	1	3	3	2	5	13%
Purple Finch	16	2	3	4	3	4	32%	66%	52%	13	1	3	4	2	3	12%
Red Crossbill	11	1	2	3	3	2	1%	4%	6%	11	1	2	3	3	2	<1%
White-winged Crossbill	11	1	2	3	2	3	3%	29%	63%	13	1	2	2	3	5	7%
Common Redpoll	9	1	1	3	2	2	<1%	1%	1%	11	1	1	2	2	5	6%
Hoary Redpoll										10	1	2	3	2	2	2%
Pine Siskin	11	1	2	3	2	3	11%	55%	60%	12	1	2	4	2	3	7%
American Goldfinch	11	1	2	4	2	2	5%	33%	30%							
Evening Grosbeak	15	2	2	3	3	5	43%	52%	42%	14	1	2	4	2	5	29%
[House Sparrow]	9	1	1	3	2	2	<1%	15%	2%	9	1	1	3	1	3	1%

Appendix F: Ontario BCR 8 Priority Species Accounts

The species accounts in this appendix summarize the conservation status, biology, population-limiting factors and threats, objectives and recommended actions for each of the 37 priority species identified in the Ontario BCR 8 Landbird Conservation Plan. The accounts follow a standard format as shown in the template (Figure F1). Additional information on the format, content and sources of information used in these accounts is provided below.

Additional Information on the Contents of the Priority Species Accounts:

Status

- **PIF Continental Watch List Species:** Identified as Watch List species in the North American Landbird Conservation Plan (Rich et al. 2004)
- **PIF Continental Stewardship Species:** Identified as Stewardship species in the North American Landbird Conservation Plan (Rich et al. 2004), with at least 5% of global population in BCR 8
- **COSEWIC Status:** Identified as Endangered, Threatened or Special Concern by the Committee on the Status of Endangered Wildlife in Canada, November 2006 (www.cosewic.gc.ca)
- **OMNR Status:** Identified as Endangered, Threatened or Special Concern by the Ontario Ministry of Natural Resources in Ontario, June 2006 (www.mnr.gov.on.ca/mnr/speciesatrisk/status_list.html)
- **ON BCR 8 Priority Species (Breeding/Wintering):** Identified as a priority breeding and/or wintering species in this plan
- **OMNR Evaluative Indicator Species:** Species for which habitat models have been developed and simulated ranges of natural variation have been calculated. These habitat models were created to evaluated policy and management options during development of the Landscape Guide (OMNR, in prep.) and, once completed, results of the models will be made available in Ontario's Landscape Tool and be used within the forest management planning process.

Reason(s) for ON BCR 8 Priority Status

Lists of priority categories and reasons why the species is considered a priority in ON BCR 8 (Table 3); also BBS trend information for BCR 12 and percentage of global population in BCR 12. See Appendix C for a detailed explanation of the PIF approach to identifying priority species at a regional scale and PIF scoring system (e.g., RD, PT, TB and TN).

ON BCR 8 Population

Summary of the current status of the species in ON BCR 8, including available information on current abundance, distribution and trend.

Range Map

Range maps were constructed by Bird Studies Canada using data provided by NatureServe in collaboration with Robert Ridgely, James Zook, The Nature Conservancy – Migratory Bird Program, Conservation International – Center for Applied Biodiversity Science, World Wildlife Fund – US and Environment Canada – WILDSPACE (Ridgely et al. 2003).

Objectives

Objectives for the conservation of the species in ON BCR 8, as established in this plan (except for Endangered and Threatened species), are provided. Objectives for Endangered and Threatened species are as set by current recovery strategies, where available.

Conservation Actions

"Fine filter" priority actions specific to the conservation of the particular species in ON BCR 8 are included in the species accounts. "Coarse filter" actions that apply to all or most species in a particular habitat suite or foraging guild are included in the relevant chapters in the plan.

Key References

The main sources of information (mostly secondary references) used in preparing the species account.

Figure F1: Template for the priority species accounts.

Common Name

Scientific name

HABITAT GUILD

Status

- PIF Status in North America (Continental Watch List or Continental Stewardship Species in Rich et al. 2004)
- SAR Status in Canada (COSEWIC 2007a; SARA Public Registry 2007)
- SAR Status in Ontario (OMNR 2006)
- Status in ON BCR 8 (Breeding or Wintering Priority Species as identified in this plan)
- OMNR Evaluative Indicator Species

Reason(s) for ON BCR 8 Priority Status

- *Continental Concern:* Supporting criteria
- *Continental Stewardship:* Supporting criteria
- *Regional Concern:* Supporting criteria
- *Regional Stewardship:* Supporting criteria
- *Species at Risk:* Reasons for designation
- *Management Interest:* Supporting criteria
- BBS population trend in ON BCR 8 based on Canadian analysis of 1968–2004 data and US analysis of 1966–2004 data
- % of global population in BCR 8 (see Appendix B in Rich et al. 2004)

Colour Codes for Range Map
Red = breeding range
Yellow = passage migrant
Blue = wintering range
Purple = year-round range

ON BCR 8 Population

- % of global population in ON BCR 8 (based on 1990s population estimates in Appendix G and comparable estimates in Rich et al. 2004)
- Current BBS Index (2000–04) and population estimate (Appendix G), or best available population estimate
- Table: Current BBA distribution (2001–05 preliminary data) of % of atlas squares (minimum 20 hours of coverage) with breeding evidence in each subregion. **Bolded** numbers indicate a significant change in distribution (P<0.1) between BBA1 and BBA2, with **blue** and **red** colours highlighting significant increases or decreases, respectively
- BBS population trend and graph of smoothed BBS indices based on five-year running averages of 1969–2004 data from ON BCR 8 (low sample size and low precision, see Appendix G)

Ecology

- Key ecological factors such as area sensitivity,

Ecology cont'd

- breeding habitat, specific habitat or nesting requirements, foraging strategy, etc.

Limiting Factors and Threats

Main population-limiting factors and threats affecting the conservation of this species, e.g.:

- *Habitat Loss or Alteration on the Breeding or Wintering Grounds, Interspecific Competition, Direct or Indirect Mortality*

Overall Objective(s)

- General description of overall regional conservation objective for this species
- PIF continental population objective (if any)

Population Objectives

- Quantitative population objective and population objective, where available
- Quantitative distribution objective based on BBA data. Current distribution objectives are based on 2001–05 preliminary data.

Habitat Objective

- Rationale and analysis that will be used to set quantitative habitat objective, where applicable

Monitoring Objective

- Population monitoring targets (measure of ability to detect change) needed to evaluate effectiveness of conservation actions

Conservation Focus

- Primary tactic needed to address conservation needs of this priority species

Conservation Actions

Priority actions in one or more of the following categories:

- *Monitoring*
- *Research and Evaluation*
- *Planning and Policy*
- *Outreach and Education*
- *Applied Conservation*

Key References

BBA1: Ontario Breeding Bird Atlas (1981–85)
BNA: Birds of North America species accounts.
Status: Available status reports.
Recovery: Available recovery strategy documents.
Needs: Relevant action needs documents.
Management: Species management accounts
Landscape Guide: OMNR in prep a
Site/Stand Guide: OMNR in prep b.
Other: Additional references.

Alder Flycatcher

Empidonax alnorum

WETLAND/RIPARIAN

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)
- OMNR Evaluative Indicator Species

Reason(s) for ON BCR 8 Priority Status

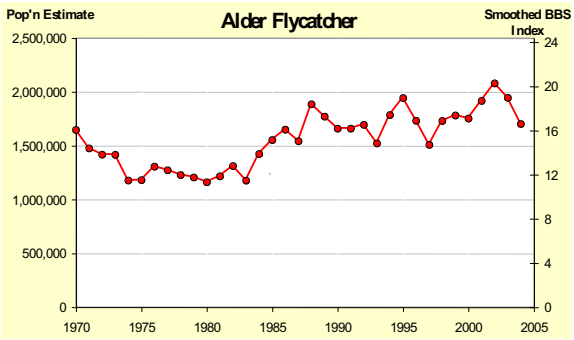
- *Continental Stewardship:* Northern forest Stewardship species with very high relative density in BCR 8 (RD=5); future conditions are expected to remain stable (TB=2)
- *Regional Stewardship:* Very high relative density (RD=5) in BCR 8 and moderate regional concern due to regional population decline (PT=4, total score=14)
- BBS trend indicates a possible moderate population decrease in BCR 8
- ~15% of global population in BCR 8

ON BCR 8 Population

- ~4% of global population in ON BCR 8
- Current BBS Index (2000–04) of 18.3, ~1 900 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	74%	97%
West	76%	91%

- BBS trend (1969–2005) in ON BCR 8 is uncertain but suggests population is stable or increasing



Ecology

- Breeds in alder and willow thickets along lakes and streams, also in damp open meadows and fields with patches of dense shrubs or saplings
- Prefers dense foliage and shrubbery for nesting, usually low over standing water
- Uses successional habitats
- Uses perches for aerial foraging

Limiting Factors and Threats

- No known threats (TB=2, TN=2)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to PIF continental population objective of maintaining current population

Population Objectives

- Maintain population abundance levels in ON BCR 8 within the ERNV, estimated as no lower than 80% of long-term (1970–2005) BBS average, BBS Index of 12.2, ~1 300 000 birds
- Maintain distribution in each subregion within the ERNV, estimated as at least 95% of minimum distribution in BBA1 and BBA2:

Subregion	Current	Objective
East	97%	70%
West	91%	72%

Monitoring Objective

- Maintain current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends:* Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to population objectives

Conservation Actions

- *Monitoring:* Maintain current monitoring effort in ON BCR 8

Key References

BBA1: Prescott 1987a.
BNA: Lowther 1999.

Bald Eagle

Haliaeetus leucocephalus

WETLAND/RIPARIAN

Status

- Special Concern in northern Ontario
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

- *Species at Risk:* Northern Ontario population has recovered from decline due to pesticide (DDT) contamination, but species is inherently sensitive to changes in survival rates due to toxins, disease and human disturbance impacts
- BBS population trend in BCR 8 is unknown but other surveys indicate population increase
- ~1% of global population in BCR 8

ON BCR 8 Population

- <1% of global population in ON BCR 8
- Information on population size in ON BCR 8 not available; breeding evidence reported from 386 squares during BBA2
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	4%	**39%**
West	40%	**62%**

- BBS population trend in BCR 8 unknown but other surveys indicate large population increase

Ecology

- Associated with water, including shoreline and riparian habitats
- Requires large super-canopy trees for nest sites (frequently reused) and for perching and roosting, situated within large (>255 ha) forested nesting territory close to large lake or river
- Feeds primarily on fish, also carrion, small mammals and waterfowl

Limiting Factors and Threats

- *Habitat Alteration:* Modification of shoreline or riparian nesting habitat or nest trees due to logging, marinas, wind turbines or other activities is a concern in some areas
- *Disturbance:* Sensitive to disturbance near nest site during breeding season
- *Direct and Indirect Mortality:* Population vulnerable to effects of bioaccumulation of toxins (pesticides, mercury, lead shot) and disease (West Nile virus, botulism)

Overall Population Objective

- Assess status

Habitat Objective

- *Fine Filter; Landscape Scale:* Assess the supply of suitable habitat across the landscape using a spatial habitat supply model
- *Fine Filter; Site Scale:* Maintain supply of suitable nest trees and protect existing stick nests throughout the year, as per direction in the Site/Stand Guide

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Assess Status:* Periodically assess population status compared to habitat supply using all available data (BBS, BBA, nest records, hawk counts, CBC)

Conservation Actions

- *Monitoring:* Evaluate the potential to monitor this species in ON BCR 8 in conjunction with the ongoing CWS duck survey
- *Nest Site Protection:* Avoid disturbance of active nest sites (February to mid-June); avoid destruction of nest trees at any time

Key References

BBA1: Bortolotti 1987.
BNA: Buehler 2000.
Status: Austen et al. 1994; Grier et al. 2003; OMNR 2005.
Management: OMNR 1987a.

Bay-breasted Warbler

Dendroica castanea

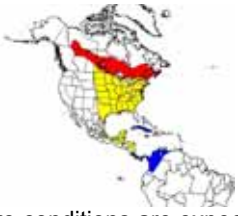
CONIFEROUS FOREST

Status

- PIF Continental Watch List Species
- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)
- OMNR Evaluative Indicator Species

Reason(s) for ON BCR 8 Priority Status

- *Continental Concern:* Rangewide population decline (PT=4) and restricted wintering range (ND=4)
- *Continental Stewardship*: Northern forest Stewardship species (Rich et al. 2004) with a very high proportion of global population breeding in BCR 8



(75%); future conditions are expected to remain stable (TB=2)

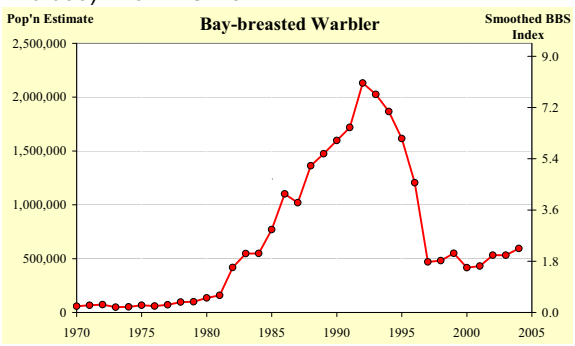
- *Regional Stewardship*: Very high relative density in BCR 8 (RD=5) and moderate regional concern (BD=3, PS=3, PT=3, total score=16)
- BBS trend is highly variable but suggests a possible overall population increase in BCR 8
- 75% of global population in BCR 8

ON BCR 8 Population

- ~44% of global population in ON BCR 8
- Current BBS Index (2000–04) of 1.89, ~500 000 birds (poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	66%	**83%**
West	46%	**72%**

- Population fluctuates; BBS trend (1969–2005) indicates a probable large population increase (8.9%/yr, P=0.053) in ON BCR 8



Ecology

- Spruce budworm specialist
- Local populations may increase 10-fold in response to spruce budworm outbreaks (Williams 1996a)
- Habitat specialist breeding in mature spruce and Balsam Fir forests

Limiting Factors and Threats

- *Monitoring:* Low precision due to population fluctuations
- *Mature Habitat Specialist:* Requires mature Balsam Fir and spruce stands
- *Insect Outbreaks:* Local populations increase in response to increases in spruce budworm
- *Wintering Habitat:* Deforestation on its limited wintering grounds a concern (TN=3)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to the PIF continental objective of increasing population by 50%

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability and insect outbreaks

Conservation Actions

- *Monitoring*: Improve BBS monitoring coverage in ON BCR 8 and improve data analysis

Key References

BBA1: Welsh 1987a.
BNA: Williams 1996a.
Needs: Dunn 2005; PIF 2005.
Other: Patrikeev et al. 2004.

Belted Kingfisher

Ceryle alcyon

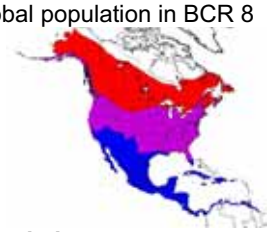
WETLAND/RIPARIAN

Status

- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

- Rangewide population decline (PT=4)
- *Regional Stewardship:* Very high relative density (RD=5) and possible population decrease in BCR 8 (PT=4)
- BBS trend indicates a possible large population decline in BCR 8
- 12% of global population in BCR 8

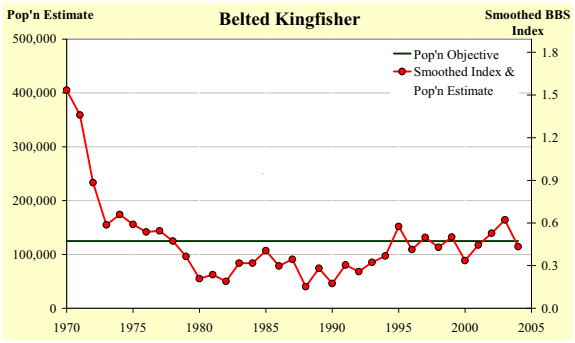


ON BCR 8 Population

- 5% of global population in ON BCR 8
- Current (2000–04) BBS Index of 0.47, ~120 000 birds (poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	70%	66%
West	68%	64%

- BBS trend (1969–2005) in ON BCR 8 is uncertain



Ecology

- Riparian obligate, occurs in shoreline, riparian and wetland habitats
- Nests in burrows dug into vertical surfaces composed of soft sand or silt, such as eroded riverbanks, lakeshore bluffs, road cuts and excavated quarry faces within 1.6 km of food source
- Forages primarily on small fish, also crayfish, tadpoles, insects and other prey in clear, slow-moving water; uses hunting perches

Limiting Factors and Threats

- *Habitat Quality:* Water quality and clarity affect food availability; sensitivity to effects of acid precipitation is unknown
- *Nest Site Availability:* Availability of suitable nesting sites often limits local abundance
- *Direct or Indirect Mortality:* Sensitive to disturbance at nest sites during breeding season (April–July), particularly at active quarries
- No known threats (TB=2, TN=2)

Overall Population Objective

- Maintain population abundance and distribution at or above current levels

Population Objectives

- Maintain breeding population abundance at or above current (2000–04) level, BBS Index of 0.47, ~120 000 birds
- Maintain breeding distribution at or above current (BBA2) levels in each subregion:

Subregion	Current	Objective
East	66%	66%
West	64%	64%

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Research:* Investigate factors causing population decline

Conservation Actions

- *Monitoring:* Improve BBS monitoring coverage in ON BCR 8, and evaluate the potential to monitor this species in conjunction with the ongoing CWS duck survey
- *Research:* Assess effects of acid precipitation
- *Research:* Investigate potential causes of population decline
- *Habitat Management:* Promote measures to maintain or restore water clarity, water quality and food availability in riparian systems
- *Nest Site Protection:* Avoid destruction or disturbance of nest sites during breeding season

Key References

BBA1: Read 1987.
BNA: Hamas 1994
Needs: Dunn 2005.
Other: McHattie et al. 1995.

Black-and-white Warbler

Mniotilta varia

DECIDUOUS FOREST

Status

- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

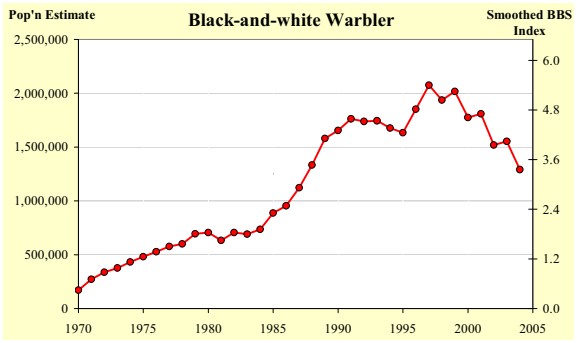
- *Regional Stewardship*: Very high relative density in BCR 8 (RD=5) and moderate regional concern (PT=3, total score=14)
- BBS trend uncertain but suggests population in BCR 8 is stable or increasing
- 39% of global population in BCR 8

ON BCR 8 Population

- 13% of global population in ON BCR 8
- Current BBS Index (2000–04), 4.14, ~1 600 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	85%	91%
West	52%	**74%**

- BBS trend indicates a large long-term population increase in ON BCR 8 (6.2%/yr, P=0.038)



Ecology

- Prefers mature deciduous and mixed forests but also uses immature successional forest
- Usually nests on or near the ground
- Forages on bark of trunks and thick limbs
- Forest-interior, area-sensitive (>300 ha of continuous forest) species

Limiting Factors and Threats

- No known threats (TB=2, TN=2)

Overall Population Objective

- Maintain population abundance and distribution within the ERNV

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend relative to habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring coverage in ON BCR 8

Key References

BBA1: Cartwright 1987.
BNA: Kricher 1995.
Management: Palis and Cannings 2000a.

Black-backed Woodpecker

Picoides articus

CONIFEROUS FOREST

Status
- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding & Wintering)

Reason(s) for ON BCR 8 Priority Status

- *Continental Stewardship*: Northern forest Stewardship species with a very high relative density (RD=5) in BCR 8 and moderate regional threats (TB=3)
- *Regional Stewardship*: Very high relative density (RD=5) and elevated regional concern (GS=3, TB=3, PT=3, total score=16)
- BBS trend (1966–2004) in BCR 8 uncertain; suggests a possible population increase
- 23% of global population in BCR 8

ON BCR 8 Population
- 7% of global population in ON BCR 8
- Not monitored by BBS; no population estimate available for ON BCR 8
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	45%	**23%**
West	30%	35%

- Population trend in ON BCR 8 is unknown

Ecology
- Year-round resident in ON BCR 8
- Shows a preference for mature and old Black Spruce, Tamarack and Jack Pine forests but uses other conifer stands and occurs in high densities in recent burns and insect-killed stands
- Cavity nester; nests in living and dead trees (>20 cm dbh), usually with heart-rot, often in stands with high stem density and often near open area or water such as bogs, beaver ponds or lakeshores

Ecology (cont'd)
- Irruptive species that forages opportunistically on outbreaks of wood-boring beetles in recently burned habitats and insect-killed stands

Limiting Factors and Threats
- *Habitat Loss and Alteration*: Loss and alteration of breeding and wintering habitat due to fire suppression, forest harvesting and salvage operations that remove snags in burned-over and insect-infested areas
- *Monitoring*: Not well monitored by BBS because of its irruptive movements and difficulty in accessing habitat

Overall Population Objectives
- Assess status
- Contribute to PIF continental population objective of maintaining the current continental population

Habitat Objective
- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models

Monitoring Objective
- Improve current population monitoring capability across ON BCR 8

Conservation Focus
- *Assess Status:* Periodically review available population data (BBA, BBS, CBC) and assess status in ON BCR 8 relative to habitat availability

Conservation Actions
- *Monitoring*: Improve BBS monitoring coverage in ON BCR 8

Key References

BBA1: McIlveen 1987a.
BNA: Dixon and Saab 2000.
Needs: Dunn 2005.
Management: Paige et al. 1999.
Other: Patrikeev et al. 2004.

Blackburnian Warbler

Dendroica fusca

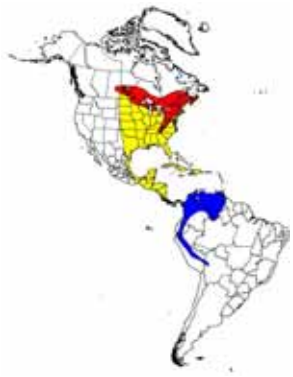
CONIFEROUS FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)
- OMNR Evaluative Indicator Species

Reason(s) for ON BCR 8 Priority Status

- *Continental Stewardship*: Northern forest Stewardship species with a high proportion of global population (50%) breeding in BCR 8 (RD=5); future conditions are expected to remain stable (TB=2)
- BBS trend in BCR 8 is uncertain but suggests population may be stable or increasing
- 50% of global population in BCR 8

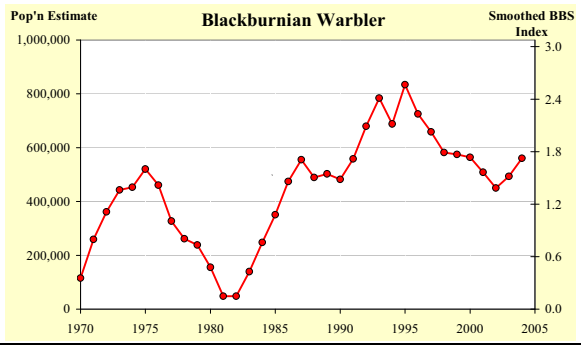


ON BCR 8 Population

- 11% of global population in ON BCR 8
- Current BBS Index (2000–04) of 1.59, ~520 000 birds (poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	57%	60%
West	38%	**57%**

- BBS trend variable but suggests possible long-term population increase in ON BCR 8



Ecology

- Preferred breeding habitat is mature to old mixed and coniferous forests with spruce or pine

Limiting Factors and Threats

- *Insect Outbreaks:* Local populations increase in response to spruce budworm outbreaks
- *Mature Forest Specialist:* Requires mature to old forest stands
- *Wintering Habitat Loss/Alteration:* Vulnerable to logging or deforestation of its wintering grounds (TN=3)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to the PIF continental objective of maintaining the current population

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring coverage in ON BCR 8
- *Research*: Research needed on breeding, wintering and migration ecology

Key References

BBA1: Crins 1987a.
BNA: Morse 2004.
Management: Catlin et al. 1999a.
Other: Patrikeev et al. 2004.

Black-throated Green Warbler

Dendroica virens

CONIFEROUS FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

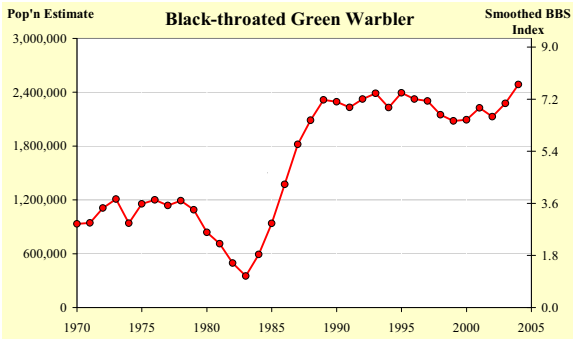
- *Continental Stewardship*: Northern forest Stewardship species with a high proportion of global population breeding in BCR 8 (40%); future conditions are expected to remain stable (TB=2)
- *Regional Stewardship*: Very high relative density (RD=5) in BCR 8; moderate regional concern (PT=3, total score=14)
- BBS trend in BCR 8 is uncertain; suggests population may be stable or increasing
- 40% of global population in BCR 8

ON BCR 8 Population

- 24% of global population in ON BCR 8
- Current BBS Index (2000–04) of 6.95, ~2 200 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	68%	54%
West	38%	40%

- BBS trend (1969–2005) indicates a probable large population increase (4.3%/yr, P=0.079) in ON BCR 8



Ecology

- Breeds in coniferous and mixed forests containing pine, spruce and/or Balsam Fir; also in some deciduous forests and wet cedar swamps
- Forest structure important as this insect-gleaning species needs multi-layered leaf canopy
- Forest-interior, area=sensitive species

Limiting Factors and Threats

- *Habitat Structure:* Requires multi-layered structure and closed canopy
- *Threats on Non-breeding Grounds*: No known threats (TN=2)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to the PIF continental objective of maintaining the current population

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring coverage in ON BCR 8

Key References

BBA1: Crins 1987b.
BNA: Morse and Poole 2005.

Blue-headed Vireo

Vireo solitarius

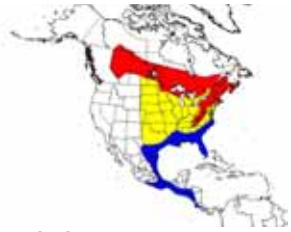
CONIFEROUS FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

- *Continental Stewardship*: Northern forest Stewardship species with a very high proportion of global population (69%) breeding in BCR 8; future conditions are expected to remain stable (TB=2)
- BBS trend (1966–2004) suggests a possible moderate to severe population decline in BCR 8
- 69% of global population in BCR 8

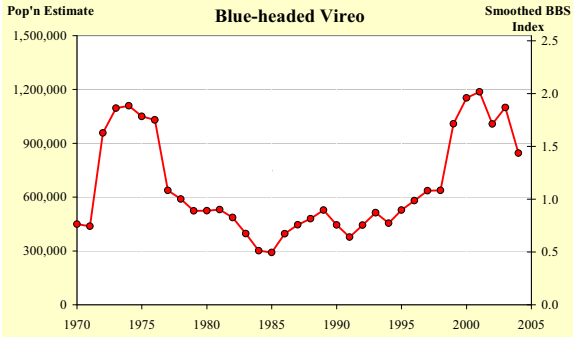


ON BCR 8 Population

- 8% of global population in ON BCR 8
- Current BBS Index (2000–04) of 1.80, ~1 100 000 birds (poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	43%	**84%**
West	52%	**81%**

- Population trend in ON BCR 8 (1969–2005) is uncertain



Ecology

- Prefers mature mixed or coniferous forests with a continuous canopy and a well developed understorey of shrubs and small trees
- Prefers coniferous forests with spruce, fir or pine, often with associated deciduous growth such as alder and willow shrubs as understorey, or poplar, birch and/or maple trees
- Nests in shrubs or saplings generally between 2–5 m

Limiting Factors and Threats

- *Monitoring*: Difficult to monitor as song is similar to that of other vireo species
- *Threats on Non-breeding Grounds*: No known threats (TN=2)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to PIF continental population objective of maintaining the current population

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring coverage in ON BCR 8
- *Research*: Research needed on wintering ecology and also breeding ecology

Key References

BBA1: James 1987a.
BNA: James 1998.

Boreal Owl

Aegolius funereus

CONIFEROUS FOREST

Status

- ON BCR 8 Priority Species (Breeding & Wintering)

Reason(s) for ON BCR 8 Priority Status

- *Regional Stewardship*: Regional Stewardship species with a high relative density (RD=5) in BCR 8 and moderate regional concern (GS=3, TB=3, PT=3, total score=15)
- Population trend in BCR 8 is not known
- ~6% of global population in BCR 8
- Circumboreal range

ON BCR 8 Population

- ~2% of global population in ON BCR 8 (based on proportion of breeding range as few abundance data are available)
- Recorded in 90 squares in ON BCR 8 during BBA2, as compared to 12 in BBA1
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	4%	6%
West	16%	10%

- Not monitored by BBS; Ontario Nocturnal Owl Survey indices show large annual variation; trend uncertain but apparently stable (Crewe and Badzinski 2006)

Ecology

- Year-round resident in ON BCR 8; occasional irruptive movements during low prey years
- Preference for dense coniferous forest as well as mixed forest, alder, aspen and stunted spruce thickets, generally near open, grassy areas; also found in muskeg bogs

Ecology (cont'd)

- Nocturnal species
- Cavity nester; will use nest boxes

Limiting Factors and Threats

- *Monitoring*: Difficult to monitor because breeding window is earlier than most breeding bird surveys; has large breeding range, and population fluctuates in response to fluctuations in prey populations
- *Habitat Alteration*: Requires mature forest with nest cavities and prey supply

Overall Population Objective

- Assess status

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models
- *Fine Filter*; *Site Level*: Protect occupied nests as per direction in the Site/Stand Guide

Monitoring Objective

- Maintain current population monitoring capability across ON BCR 8

Conservation Focus

- *Assess Status:* Periodically review available population data (Ontario Nocturnal Owl Survey, BBA, CBC) and assess population status relative to prey and habitat availability

Conservation Actions

- *Monitoring*: Maintain current Ontario Nocturnal Owl Survey in ON BCR 8 and increase effort if possible
- *Research*: Research needed to increase understanding of the effects of forestry practices on this species

Key References

BBA1: Mills 1987.
BNA: Hayward and Hayward 1993.
Needs: Dunn 2005.
Other: Crewe and Badzinski 2006.

Canada Warbler

Wilsonia canadensis

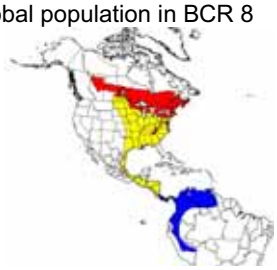
DECIDUOUS FOREST

Status

- PIF Continental Watch List Species
- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)
- COSEWIC status report under review

Reason(s) for ON BCR 8 Priority Status

- *Continental Concern:* Rangewide population decline (PT=4); high threats on wintering grounds (TN=4)
- *Continental Stewardship*: Northern forest Stewardship species (Rich et al. 2004) with high proportion of global population (45%) breeding in BCR 8; future conditions expected to remain stable (TB=2)
- *Regional Stewardship*: Very high relative density (RD=5) in BCR 8 and moderate regional concern (PS=3, PT=3, total score=15)
- BBS trend indicates a moderate to steep population decrease in BCR 8
- 45% of global population in BCR 8

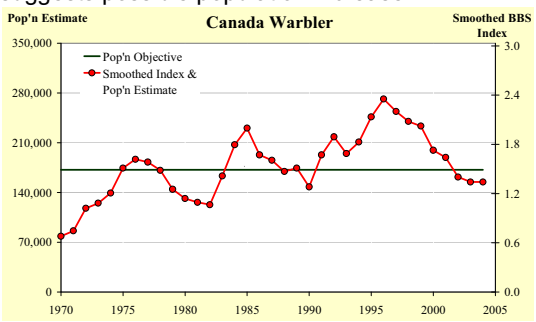


ON BCR 8 Population

- 16% of global population in ON BCR 8
- Current BBS Index of 1.49, ~170 000 birds (poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	72%	**56%**
West	42%	42%

- BBS trend (1969–2005) in ON BCR 8 is uncertain; suggests possible population increase



Ecology

- Breeds in lowland mixed forest with closed canopy and dense understorey
- Ground-nesting, area-sensitive; requires 30 ha of suitable habitat, prefers forest patches >400 ha

Limiting Factors and Threats

- *Habitat Loss on Wintering Grounds*: Loss of wintering habitat a major concern (TN=4)
- *Breeding Habitat Quality:* Affected by forest succession and/or disturbances that affect understorey density
- *Monitoring:* Preferred breeding habitats not well sampled by BBS

Overall Population Objectives

- Maintain population abundance and distribution levels at or above current levels
- Contribute to the PIF continental objective of increasing population by 50%

Population Objective

- Maintain breeding population abundance at or above current levels, BBS Index of 1.49, ~170 000 birds
- Maintain breeding population distribution levels at or above current levels; restore to BBA1 level of 72% of squares in E subregion if possible:

Subregion	Current	Objective
East	56%	56%
West	42%	42%

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Research:* Determine factors driving population decline in this species

Conservation Actions

- *Research:* Determine causes of overall population decline; investigate the effect of forest management treatments on breeding density, productivity and survival
- *Monitoring:* Improve BBS monitoring coverage in ON BCR 8
- *Wintering Habitat Protection:* Prevent further loss of habitat on wintering grounds in northern Andes
- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Key References

BBA1: McLaren 1987a.
BNA: Conway 1999.
Needs: Dunn 2005; PIF 2005.
Management: Catlin et al. 1999.

Cape May Warbler

Dendroica tigrina

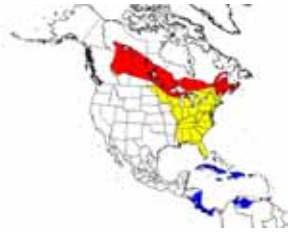
CONIFEROUS FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

- *Continental Stewardship*: Northern forest Stewardship species with a very high proportion of global population (65%) breeding in BCR 8; future conditions are expected to remain stable (TB=2)
- *Regional Stewardship*: Very high relative density (RD=5) in BCR 8 and moderate regional concern (PT=3, PS=3, total score=15)
- BBS trend suggests a possible steep population decline in BCR 8
- 65% of global population in BCR 8

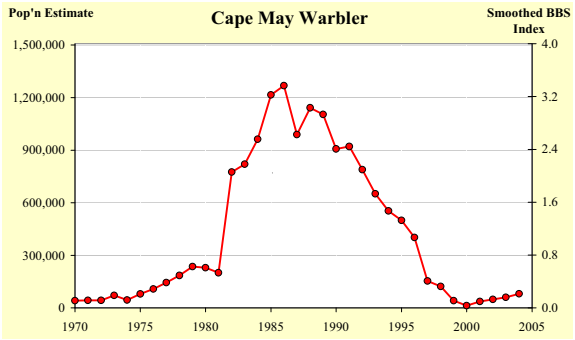


ON BCR 8 Population

- 16% of global population in ON BCR 8
- Current BBS Index (2000–04) of 0.13, ~48 000 birds (poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	45%	**29%**
West	46%	45%

- Population fluctuates; BBS trend (1969–2005) in ON BCR 8 is uncertain



Ecology

- Breeds in mature coniferous and mixed forests
- Spruce budworm specialist; population fluctuations related to outbreaks

Limiting Factors and Threats

- *Insect Outbreaks:* Local populations increase in response to increases in spruce budworm
- *Threats on Non-breeding Grounds*: No known threats (TN=2)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to PIF continental population objective of maintaining the current population

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models

Monitoring Objective

- Improve current population abundance monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability and insect outbreaks

Conservation Actions

- *Monitoring*: Improve BBS monitoring coverage in ON BCR 8

Key References

BBA1: Welsh 1987b.
BNA: Baltz and Latta 1998.
Needs: Dunn 2005.
Management: Robertson et al. 2001.

Chestnut-sided Warbler

Dendroica pensylvanica

SUCCESSIONAL FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)
- OMNR Evaluative Indicator Species

Reason(s) for ON BCR 8 Priority Status

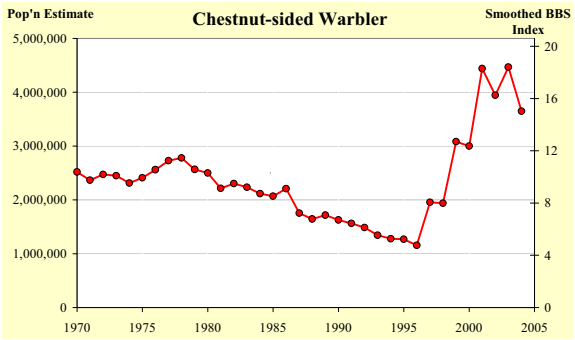
- *Continental Stewardship*: Northern forest Stewardship species with a high proportion of the global population (42%) breeding in BCR 8; future conditions are expected to remain stable (TB=2)
- Rangewide population decline (PT=4), small wintering range (ND=4) and moderate threats in non-breeding season (TN=3)
- *Regional Stewardship*: Very high relative density in BCR 8 (RD=5) and possible regional population decline (PT=4)
- BBS trend suggests possible large population decline in BCR 8
- 42% of global population in BCR 8

ON BCR 8 Population

- 18% of global population in ON BCR 8
- Current BBS Index (2000–04) of 16.07, ~3 900 000 (poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	81%	79%
West	56%	60%

- BBS trend (1969–2005) in ON BCR 8 is uncertain



Ecology

- Breeds in early successional deciduous habitats near mature forest including regenerating forests in burns and cutovers, large forest gaps, forest edges and shrubby riparian areas

Limiting Factors and Threats

- *Habitat Alteration:* Early successional specialist; highly responsive to fire and forest management activities that increase availability of regenerating forest (adversely affected by fire suppression and intensive forest management to accelerate succession in cutovers)
- *Winter Habitat Alteration:* Loss of habitat on restricted winter range a concern (TN=3)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to PIF continental objective of maintaining current population

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring coverage in ON BCR 8

Key References

BBA1: Martin 1987.
BNA: Richardson and Brauning 1995.
Needs: Dunn 2005.

Connecticut Warbler

Oporornis agilis

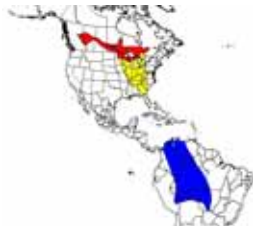
CONIFEROUS FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

- *Regional Concern*: Large regional population decline (PT=4); very high relative density (RD=5) in BCR 8
- *Continental Stewardship*: Northern forest Stewardship species with a very high proportion of global population (53%) breeding in BCR 8 and moderate regional threats (TB=3)
- *Regional Stewardship*: Very high relative density (RD=5) in BCR 8 and high regional concern (BD=3, PS=3, TB=3, PT=4, total score=18)
- BBS trend indicates a possible large population decline in BCR 8
- 53% of global population in BCR 8

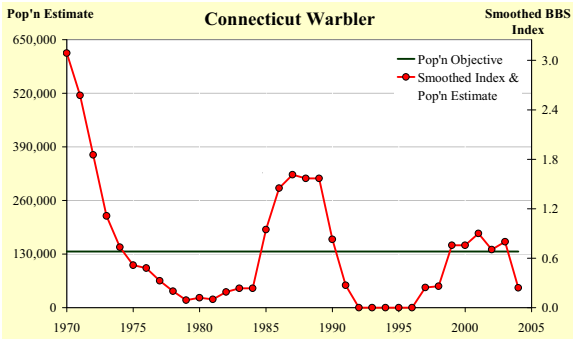


ON BCR 8 Population

- 4% of global population in ON BCR 8
- Current BBS Index (2000–04) of 0.68, ~140 000 birds (poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	9%	6%
West	18%	25%

- BBS population trend (1969–2005) in ON BCR 8 is uncertain, highly variable.



Ecology

- Breeds in mature lowland coniferous, especially Black Spruce and Tamarack bogs and fens with scattered trees and well developed understorey; also in regenerating cutovers and young Jack Pine forest
- Breeding distribution is patchy, sometimes forming loose colonies in extensive areas of suitable habitat

Limiting Factors and Threats

- *Monitoring:* Preferred habitat is not well sampled by BBS, particularly in West subregion where it occurs at higher densities. Also, not monitored at migration monitoring stations
- *Lack of Information:* Ecology of this species is poorly known; impact of forest management practices, factors driving population decline are unknown

Overall Population Objectives

- Maintain population abundance and distribution levels at or above current levels
- Contribute to the PIF continental objective of increasing population by 50%

Population Objective

- Maintain breeding population abundance at or above current levels, BBS Index 0.68, ~140 000 birds
- Maintain breeding population distribution levels at or above current levels:

Subregion	Current	Objective
East	6%	6%
West	25%	25%

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Research:* Investigate factors causing regional population decline

Conservation Actions

- *Research*: Investigate causes of population decline in BCR 8
- *Monitoring*: Improve BBS monitoring coverage in ON BCR 8, especially in W subregion

Key References

BBA1: Helleiner 1987.
BNA: Pitoccchelli et al. 1997.
Needs: Dunn 2005.
Other: Patrikeev *et al.* 2004.

Evening Grosbeak

Coccothraustes vespertinus

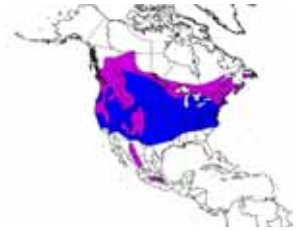
CONIFEROUS FOREST

Status

- ON BCR 8 Priority Species (Breeding & Wintering)

Reason(s) for ON BCR 8 Priority Status

- *Regional Stewardship*: Regional Stewardship species with high relative density (RD=5) in BCR 8 and moderate regional concern (TB=3, PT=3, total score=15)
- Long-term BBS trend in BCR 8 is uncertain due to population fluctuation



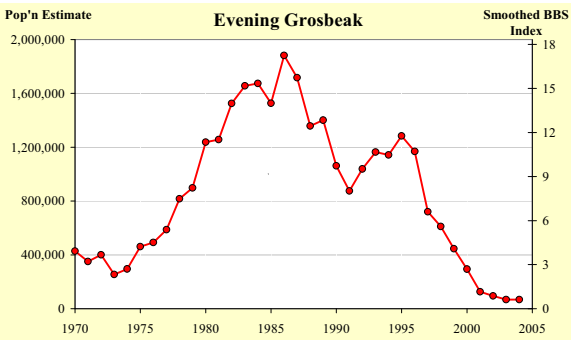
- 43% of global population in BCR 8

ON BCR 8 Population

- 16% of global population in ON BCR 8
- Current BBS Index (2000–04) of 1.19, ~130 000 birds (poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	70%	**50%**
West	34%	39%

- Population trend in ON BCR 8 (1969–2005) is uncertain; overall pattern is large increase followed by large decline



Ecology

- Year-round resident
- Found in coniferous and mixed forests, particularly those with spruce, fir and alder, but not as closely tied to a specific species as other finches

Limiting Factors and Threats

- *Range Expansion/Contraction:* Breeding and wintering range expanded east across Ontario in mid-20th century, possibly due to increased food availability; current decline may be related to reversal of favourable conditions
- *Threats to Non-breeding Grounds*: No known threats (TN=2)

Overall Population Objective

- Maintain population abundance and distribution within the ERNV

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding and feeding (e.g., see-bearing conifers) habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA, CBC, PFW and CMMN) and evaluate population trend relative to habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring coverage in ON BCR 8

Key References

BBA1: Peck 1987.
BNA: Gillihan and Byers 2001.
Needs: Dunn 2005.

Golden Eagle

Aquila chrysaetos

NON-FORESTED UPLAND

Status
- Endangered in Ontario
- ON BCR 8 Priority Species (Breeding & Wintering)

Reason(s) for ON BCR 8 Priority Status

- *Species at Risk*: Endangered status due to very few documented nesting sites in Ontario
- Very small breeding and wintering population in Ontario
- Population trend in BCR 8 is unknown
- <1% of global population in BCR 8
- Cosmopolitan species

ON BCR 8 Population
- <1% of global population breeding or wintering in ON BCR 8
- No breeding or wintering population estimates for this region available; species is very rare in this region
- Recorded in two squares in ON BCR 8 (preliminary data) during BBA2, compared to 0 accepted records during BBA1
- Population trend in ON BCR 8 is unknown, but hawk counts for eastern North America show long-term population increase (Austen et al. 1994; E.R. Inzunza, HMANA, pers. comm.)

Ecology
- Specific information on nesting and wintering habitat in ON BCR 8 not available
- Hunts in open, non-forested areas including large burns, large marshes, fields and sparsely treed rocky ridges
- Typically nests on cliff or rock ledge, or large tree such as White Pine, capable of supporting large stick nest
- Shows site fidelity and tends to reuse nests from previous breeding seasons
- Defends a very large home territory during the breeding season (>20 km^2) (Kochert et al. 2002)
- Relatively long maturation period and low fecundity

Limiting Factors and Threats
- *Direct or Indirect Mortality*: Accumulation of persistent toxins (pesticides, lead) throughout the year a concern
- *Direct Mortality*: Potential risk from power lines and wind turbine blades, especially during migration
- *Lack of Information*: Rare species; nests in remote locations that are difficult to access or monitor

Overall Population Objective
- Recovery, as directed by provincial recovery strategy

Population Objective

- Objectives to be determined by provincial recovery strategy

Monitoring Objective

- Periodically assess (every 5-10 years) population status in ON BCR 8

Conservation Focus

- *Recovery Action:* Implementation of existing provincial guidelines (OMNR 1987b) and provincial recovery strategy (to be developed)

Conservation Actions

Continue ongoing monitoring and recovery activities, including:
- *Monitoring*: Periodically check status of any known nest sites and follow up on any reported possible breeding reports in ON BCR 8
- *Monitoring*: Identify and track use at any regular wintering sites
- *Monitoring*: Use data from hawk migration counts to assess population trends
- *Nest Site Protection:* Avoid disturbance of active nest sites (February to mid-June); avoid destruction of nest sites at any time

Key References

BBA1: De Smet and James 1987.
BNA: Kochert et al. 2002.
Status: Austen et al. 1994.
Management: Delong 2004; OMNR 1987b.

Great Gray Owl

Strix nebulosa

CONIFEROUS FOREST

Status
- ON BCR 8 Priority Species (Breeding & Wintering)
- Special Concern in Ontario*

Reason(s) for ON BCR 8 Priority Status
- *Species at Risk in Ontario*:* Special Concern status due to small population size and specialized habitat requirements
- Population trend in BCR 8 not known (PT=3)
- 10% of global population breeding or wintering in BCR 8
- Circumboreal range

ON BCR 8 Population
- 5% of global population breeding or wintering in ON BCR 8
- Population estimate for ON BCR 8 not available
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	13%	10%
West	10%	14%

- Not monitored by BBS and not well monitored by Ontario Nocturnal Owl Survey; population trend in ON BCR 8 not known

Ecology
- Year-round resident in ON BCR 8; occasional irruptive movements in response to prey shortages
- Breeds in mature stands of spruce, larch or poplar adjacent to open foraging areas
- Nest sites are typically old raptor or corvid stick nests, or large snags with broken tops
- Foraging areas include open fens, bogs, meadows or clear-cuts with scattered hunting perches or forest edge, and adequate supply of meadow voles and other prey items
- Roosts in mature spruce stands during winter

Limiting Factors and Threats
- *Monitoring:* Population abundance and distribution not well monitored by BBS or BBA because breeding typically occurs outside main breeding survey windows; erratic movements in response to food availability
- *Direct Mortality:* Vulnerable to vehicular collisions

Overall Population Objective
- Assess status

Habitat Objective
- *Coarse Filter; Landscape Scale*: Maintain the supply of suitable habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models
- *Coarse Filter; Stand Scale*: Leave scattered standing live and dead residual trees in clear-cuts for hunting perches
- *Fine Filter; Site Level*: Protect active primary, alternate and inactive nests as per direction for rare stick-nesting raptors in the Site/Stand Guide

Monitoring Objective
- Improve current population monitoring capability across ON BCR 8

Conservation Focus
- *Assess Status:* Periodically review available population data (Ontario Owl Survey, CBC, BBA) and assess status in ON BCR 8 relative to habitat availability and prey availability information

Conservation Actions
- *Monitoring*: Maintain current Ontario Nocturnal Owl Survey in ON BCR 8 and increase effort if possible
- *Research*: Research needed to increase understanding of effects of forestry practices on this species

Key References
BBA1: Prevett 1987.
BNA: Bull and Duncan 1993.
Needs: Dunn 2005.
Other: Patrikeev *et al.* 2004; Crewe and Badzinski 2006.

*Note: When priority species were chosen and analysed for this plan, Great Grey Owl was listed as a species of Special Concern in Ontario (as of June 30th, 2008 it has been downlisted).

Magnolia Warbler

Dendroica magnolia

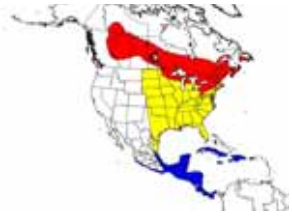
SUCCESSIONAL FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

- *Continental Stewardship*: Northern forest Stewardship species with a high proportion of global population (50%) breeding in BCR 8; future conditions are expected to remain stable (TB=2)
- BBS trend suggests population in BCR 8 is fairly stable
- 50% of global population in BCR 8

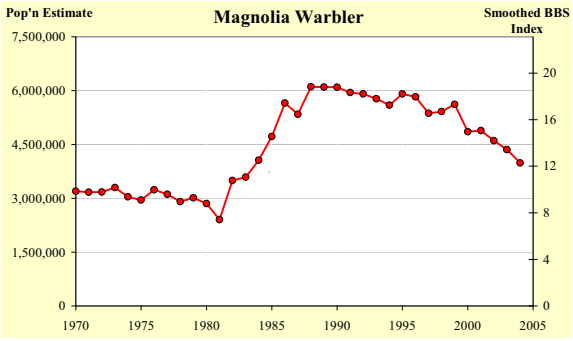


ON BCR 8 Population

- 18% of global population in ON BCR 8
- Current BBS Index (2000–04) of 13.99, ~4 500 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	87%	**99%**
West	72%	**98%**

- BBS trend (1969–2005) indicates a possible population increase in ON BCR 8



Ecology

- Breeds in dense mid-successional coniferous and mixed forests, as well as forest openings and edges, especially if young spruce and Balsam Fir are present

Limiting Factors and Threats

- *Habitat Alteration:* Early successional species that benefits from some human activities such as clear-cut logging but is affected by changes in disturbance regimes
- No known threats (TB=2, TN=2)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to PIF continental population objective of maintaining the population

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models

Monitoring Objective

- Improve current population abundance monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring effort in ON BCR 8

Key References

BBA1: Welsh 1987c.
BNA: Hall 1994.

Mourning Warbler

Oporornis philadelphia

SUCCESSIONAL FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

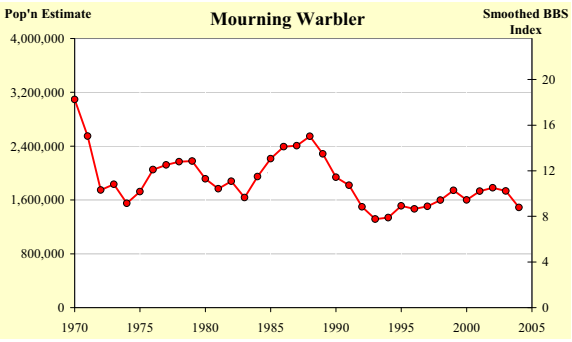
- *Continental Stewardship:* Northern forest Stewardship species with a very high proportion of global population breeding in BCR 8 (63%); future conditions are expected to remain stable (TB=2)
- *Regional Stewardship:* Very high relative density in BCR 8 (RD=5); moderate regional concern (PS=3, PT=3, total score=15)
- BBS population trend in BCR 8 is uncertain but suggests a possible population decline
- 63% of global population in BCR 8

ON BCR 8 Population

- 22% of global population in ON BCR 8
- Current BBS Index (2000–04) of 9.83, ~1 700 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	77%	87%
West	36%	**63%**

- BBS trend (1969–2005) in ON BCR 8 is uncertain



Ecology

- Breeds in disturbed successional open mixed or deciduous forests, including large forest gaps, burns and cutover areas, and margins of swamps and riparian areas
- Nests on or near the ground in dense shrubby undergrowth

Limiting Factors and Threats

- *Habitat Alteration:* Early successional species benefits from some human activities such as clear-cut logging
- No known threats (TB=2, TN=2)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to PIF continental population objective of maintaining current population

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring coverage in ON BCR 8

Key References

BBA1: Fraser 1987.
BNA: Pitocchelli 1993.
Needs: Dunn 2005.

Nashville Warbler

Vermivora ruficapilla

SUCCESSIONAL FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

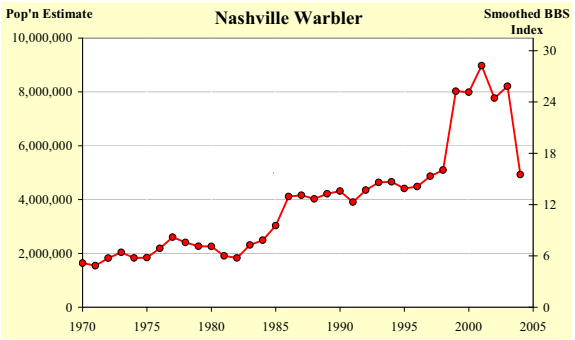
- *Continental Stewardship:* Northern forest Stewardship species with a very high proportion of global population (58%) breeding in BCR 8; future conditions are expected to remain stable (TB=2)
- Small wintering range (ND=4)
- *Regional Stewardship*: Very high relative density in BCR 8 (RD = 5) and moderate regional concern (PT=3, total score=14)
- BBS trend uncertain but suggests possible moderate population decline in BCR 8
- 58% of global population in BCR 8

ON BCR 8 Population

- 14% of global population in ON BCR 8
- Current BBS Index (2000–04) of 23.84, ~7 600 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	68%	**97%**
West	60%	**94%**

- BBS trend (1969–2005) indicates a probable large population increase (5.3%/yr, P=0.078) in ON BCR 8



Ecology

- Breeds in wide range of open and successional mixed forests with shrubby undergrowth and in shrubby coniferous bogs and swamps
- Ground-nesting

Limiting Factors and Threats

- *Habitat Alteration:* Early successional species that benefits from some human activities such as clear-cut logging
- No known threats (TB=2, TN=2)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to PIF continental population objective of maintaining current population

Habitat Objective

- *Coarse Filter; Landscape Scale:* Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Monitoring Objective

- Maintain current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Maintain current population monitoring capability in ON BCR 8

Key References

BBA1: McLaren 1987b.
BNA: Williams 1996b.
Needs: Dunn 2005.

Northern Flicker

Colaptes auratus

DECIDUOUS FOREST

Status

- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

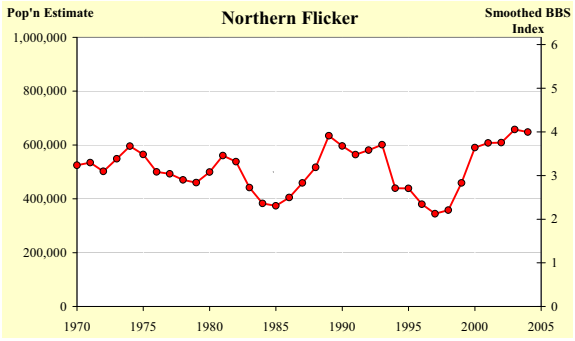
- *Regional Stewardship*: Very high relative density in BCR 8 (RD = 5) and moderate regional concern due to possible population decline (PT=4, total score=14)
- BBS trend indicates possible moderate population decline in BCR 8
- 11% of global population in BCR 8

ON BCR 8 Population

- 3% of global population in ON BCR 8
- Current BBS Index (2000–04) of 3.84, ~620 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	98%	99%
West	90%	94%

- BBS trend (1969–2005) uncertain, highly variable



Ecology

- Breeds in wide range of open forested habitats including forest edges, sparse forests, beaver ponds, roadsides and agricultural areas

Ecology (cont'd)

- Primary cavity nester; excavates nests in large (>30 cm dbh) dead or diseased trees
- Plays a key ecological role in creating cavities for hole-dwelling species, and as the primary predator of ants

Limiting Factors and Threats

- *Nest Site Availability:* Availability of nesting substrate (snags >30 cm dbh, dead limbs, diseased trees) may limit population in some areas
- *Competition:* Competes with European Starling for nest cavities (impact on productivity not known)
- *Threats on Non-breeding Grounds*: Fire ant control measures a possible concern

Overall Population Objective

- Maintain population abundance and distribution within the ERNV

Habitat Objective

- *Coarse Filter; Landscape Scale:* Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models
- *Coarse Filter; Stand Scale:* Maintain availability of suitable nest trees (e.g., snags and diseased trees) as per the 'wildlife tree direction' in the Site/Stand Guide

Monitoring Objective

- Maintain current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Research:* Investigate factors causing population fluctuations and widespread population decline
- *Monitoring*: Maintain current population monitoring effort in ON BCR 8

Key References

BBA1: McIlveen 1987b.
BNA: Moore 1995
Needs: Dunn 2005.
Management: James 1984a.

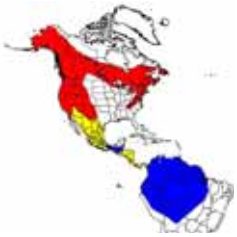
Olive-sided Flycatcher

Contopus cooperi

WETLAND/RIPARIAN

Status

- PIF Continental Watch List Species
- ON BCR 8 Priority Species (Breeding)
- COSEWIC status report under review



Reason(s) for ON BCR 8 Priority Status

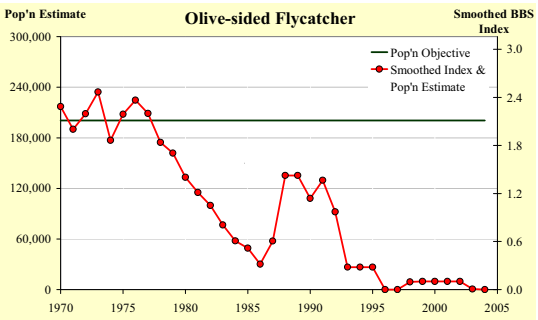
- *Continental Concern:* Severe rangewide population decline (PT=5); high threats on wintering grounds (TN=4)
- *Regional Concern:* Regional population decline (PT=4), moderate regional threats (TB=3) and moderate relative density in BCR 8 (RD=3) (total score=14)
- BBS trend indicates severe population decline in BCR 8
- 9% of global population in BCR 8

ON BCR 8 Population

- 4% of global population in ON BCR 8
- Current (2000–04) BBS Index of 0.06, ~6000 birds (very poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	51%	53%
West	46%	46%

- BBS trend (1969-–2005) uncertain, but suggests population in ON BCR 8 has declined



Ecology

- Breeds along the wooded edges of open wetlands, lakes and rivers and in other openings and edge situations in coniferous and mixed forests including bogs, burns, beaver meadows and small clear-cuts
- Uses exposed perches (snags and live trees) in open areas to forage on flying insects

Ecology (cont'd)

- Inherently low productivity rate, so high survivorship needed to sustain populations

Limiting Factors and Threats

- *Wintering Habitat:* Loss or alteration of wintering habitat (in Andes) due to development is a potential limiting factor (TN=4)
- *Habitat Alteration:* Fire suppression and/or forest management practices may have adversely affected breeding habitat suitability by decreasing availability of snags in open areas
- *Food Shortages:* Vulnerable to food shortages during bad weather
- *Habitat Loss:* Concern that decline in beavers (and thus beaver ponds) may contribute to population decline

Overall Population Objectives

- Reverse decline
- Contribute to PIF continental population objective of Increasing population by 100%

Population Objectives

- Restore population to 1970–79 level, BBS Index of 2.11, ~200 000 birds
- Maintain current distribution in each subregion of ON BCR 8:

Subregion	Current	Objective
East	53%	53%
West	46%	46%

Habitat Objective

- *Fine Filter: Stand Scale*: Increase/maintain supply of successional forest adjacent to water.

Monitoring Objective

- Improve current population monitoring capability in ON BCR 8

Conservation Focus

- *Research:* Investigate causes of the population decline

Conservation Actions

- *Research:* Investigate potential causes of the population decline including studying population demographics across a range of nesting sites and management regimes
- *Monitoring:* Improve BBS monitoring effort in ON BCR 8
- *Habitat Management:* Promote forest management practices that retain snags and live trees in burns, wetlands and other forest openings

Key References

BBA1: Cheskey 1987.
BNA: Altman and Sallabanks 2000.
Needs: Dunn 2005.

Ovenbird

Seiurus aurocapilla

DECIDUOUS FOREST

Status

- ON BCR 8 Priority Species (Breeding)
- OMNR Evaluative Indicator Species

Reason(s) for ON BCR 8 Priority Status

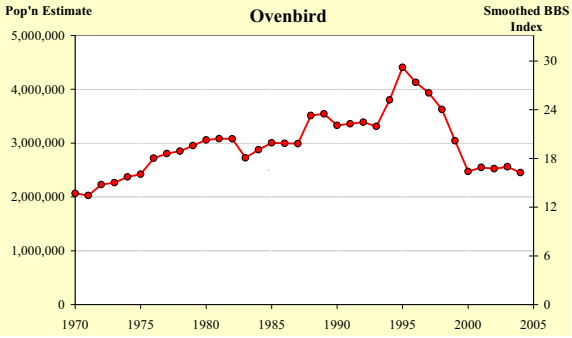
- *Regional Stewardship*: Very high relative density in BCR 8 (RD=5) and moderate regional concern (PT=3, total score=14)
- BBS trend uncertain but suggest population in BCR 8 is fairly stable
- 34% of global population in BCR 8

ON BCR 8 Population

- 15% of global population in ON BCR 8
- Current BBS Index (2000–04) of 16.66, ~2 500 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	94%	84%
West	82%	91%

- BBS trend (1969–2005) uncertain but suggests population in ON BCR 8 may be stable or increasing



Ecology

- Prefers mature, closed-canopy, deciduous or mixed forests with little or no understorey or ground vegetation and deep litter layer
- Ground-nesting
- Forest-interior, area-sensitive species that requires large tracts (>100 ha) of contiguous forest

Limiting Factors and Threats

- *Habitat Supply*: Availaiblity of closed-canopy, deciduous or mixed forest interior
- *Habitat Alteration on Wintering Grounds*: Deforestation on the wintering grounds is a concern (TN=3)

Overall Population Objective

- Maintain population abundance and distribution within the ERNV

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models

Population Objective

- Improve current population abundance monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Maintain or enhance current population monitoring effort in ON BCR 8

Key References

BBA1: Armstrong 1987.
BNA: Van Horn and Donovan 1994.
Management: Palis and Cannings 2000b.

Peregrine Falcon

Falco peregrinus

NON-FORESTED UPLAND

Status

- *anatum* subspecies (subspecies breeding in Ontario) is listed as Threatened in Canada and Ontario
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

- *Species at Risk:* Population recovering from severe regional population decline due to pesticide contamination (DDT), but faces ongoing threats, especially on wintering grounds, due to vulnerability to bioaccumulation of toxins
- Not monitored by BBS, but five-year surveys indicate population increase in BCR 8
- <1% of global population in BCR 8
- Cosmopolitan species; note that the range map does not accurately portray current distribution of *anatum* subspecies in eastern North America

ON BCR 8 Population

- <1% of global population
- Small breeding population in ON BCR 8, mostly along the shores of Lake Superior and Lake Nipigon
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	0%	1%
West	0%	2%

- Not monitored by BBS; other surveys show population increase in ON BCR 8 since mid-1980s (Rowell et al. 2003; BBA data).

Ecology

- Requires vertical faces with ledges for nesting, including cliff faces and tall buildings; most nest sites in ON BCR 8 are on cliffs, especially on or near large lakes or rivers
- Requires open area with adequate food supply (mostly birds, including landbirds, shorebirds and waterfowl) for hunting

Limiting Factors and Threats

- *Nest Site Availability:* Limited distribution of natural or human-made nest sites
- *Toxins:* Bioaccumulation of persistent toxins acquired throughout the year is an ongoing concern

Overall Population Objective

- Recovery; finalize and implement an updated SAR recovery strategy for the Threatened *anatum* subspecies

Population Objectives

- To be determined in SAR recovery strategy

Habitat Objective

- *Fine Filter; Site Level*: Protect traditional nest sites as per the Site/Stand Guide

Monitoring Objective

- Periodically assess (every 5-10 years) population status in ON BCR 8

Conservation Focus

- *Recovery Action:* Implementation of SAR national recovery strategy (update of Erickson et al. 1988, in prep.) and provincial guidelines (OMNR 1987c, OMNR in prep b)

Conservation Actions

Implement recovery strategy actions, including:

- *Monitoring:* Periodic surveys (every five years) of current and historic sites to monitor population recovery
- *Monitoring:* Monitor productivity and survivorship at select sites
- *Nest Site Protection:* Avoid destruction or disturbance of active and historic nest sites

Key References

BBA1: Weir 1987a.
BNA: White et al. 2002.
Status: Austen et al. 1994; Johnstone 1998; OMNR 2005.
Recovery: Erickson et al. 1988.
Needs: Dunn 2005.
Management: OMNR 1987c.
Other: Rowell et al. 2003.

Philadelphia Vireo

Vireo philadelphicus

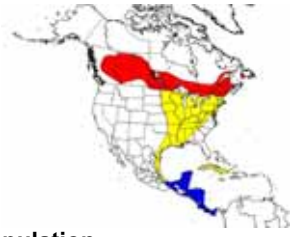
SUCCESSIONAL FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

- *Continental Stewardship*: Northern forest Stewardship species with a very high proportion of global population breeding in BCR 8 (69%); future conditions expected to remain stable (TB=2)
- *Regional Stewardship*: Very high relative density (RD=5) in BCR 8 and moderate regional vulnerability (PS=3, total score=14)
- BBS trend in BCR 8 is uncertain; suggests possible population increase
- 69% of global population in BCR 8

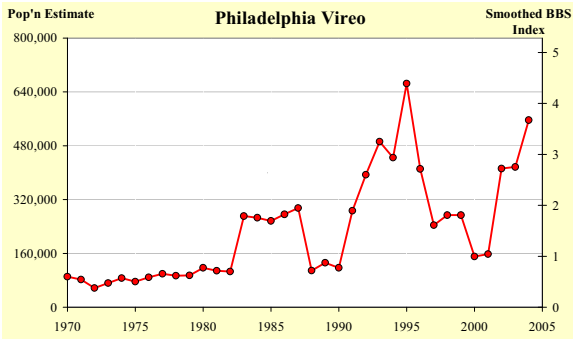


ON BCR 8 Population

- 8% of global population in ON BCR 8
- Current BBS Index (2000–04) of 2.24, ~340 000 birds (poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	62%	54%
West	44%	**58%**

- BBS trend (1969–2005) variable, but suggests possible population increase in ON BCR 8



Ecology

- Breeds in early to mid-successional deciduous or mixed forests containing aspen and birch, including regenerating burns, cutovers and forest edges; also in alder and willow thickets
- Song is very similar to that of Red-eyed Vireo

Limiting Factors and Threats

- *Monitoring*: Difficulty to monitor owing to similarity of song to that of Red-eyed Vireo
- No known threats (TB=2, TN=2)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to PIF continental population objective of maintaining current population levels

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring effort in ON BCR 8

Key References

BBA1: James 1987b.
BNA: Moskoff and Robinson 1996.
Needs: Dunn 2005.

Purple Finch

Carpodacus purpureus

CONIFEROUS FOREST

Status

- ON BCR 8 Priority Species (Breeding & Wintering)

Reason(s) for ON BCR 8 Priority Status

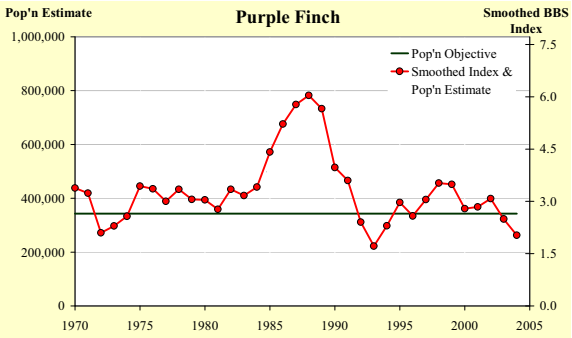
- *Regional Concern*: Regional population decline (PT=4), high relative density in BCR 8 (RD=4), moderate regional threats (TB=3) and high total regional assessment score of 16
- *Regional Stewardship*: High proportion (32%) of global population breeds in BCR 8; moderate regional threats (TB=3)
- BBS trend suggests possible moderate population decline in BCR 8
- 32% of global population in BCR 8

ON BCR 8 Population

- 13% of global population in ON BCR 8
- Current BBS Index (2000–04) of 2.65, ~340 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	85%	73%
West	48%	43%

- BBS trend (1969–2005) suggests population in ON BCR 8 fluctuates and the overall trend is uncertain



Ecology

- Year-round resident but nomadic tendencies
- Biennial fluctuation in wintering population, associated with variation in conifer cone crop production
- Preferred breeding habitat is coniferous forests but also breeds in mixed forest, edge of bogs, deciduous forests
- Feeds on buds, seeds and tree fruit

Limiting Factors and Threats

- *Unknown Threat:* Factors causing widespread population decline are unknown
- *Interspecific Competition:* Competition with House Finch on wintering grounds may contribute to declines (Wootton 1996)
- *Habitat Alteration:* Responds positively to moderate logging that opens up the forest

Overall Population Objective

- Maintain population abundance and distribution at or above current levels

Population Objectives

- Maintain breeding population abundance at or above current (2000–04) level, BBS Index of 2.65, ~340 000 birds
- Maintain breeding distribution at or above current (BBA2) levels in each subregion:

Subregion	Current	Objective
East	73%	73%
West	43%	43%

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain availability of suitable breeding and feeding (e.g., seed-bearing conifers) habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Research:* Investigate factors causing regional population decline

Conservation Actions

- *Research*: Research needed on ecology, cause of decline and irruptive movements
- *Monitoring*: Improve BBS monitoring effort in ON BCR 8
- *Evaluate Trends*: Periodically review available population data (BBS, BBA, CBC, PFW and CMMN) and evaluate population trend in ON BCR 8 relative to food and habitat availability

Key References

BBA1: Middleton 1987a.
BNA: Wootton1996.
Needs: Dunn 2005.

Ruby-crowned Kinglet

Regulus calendula

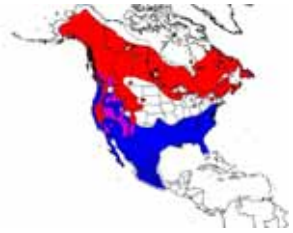
CONIFEROUS FOREST

Status

- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

- *Regional Stewardship*: Very high relative density (RD=5) and severe regional population decline (PT=5) in BCR 8 (total score=14)
- BBS long-term population trend in BCR 8 uncertain but possible large decrease
- 22% of global population in BCR 8

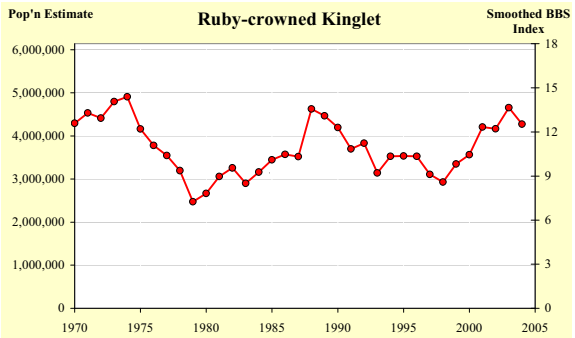


ON BCR 8 Population

- 5% of global population in ON BCR 8
- Current BBS Index (2000–04) of 12.23, ~4 200 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	91%	96%
West	74%	**97%**

- BBS trend (1969–2005) uncertain, suggests population in ON BCR 8 is variable but fairly stable



Ecology

- Breeds in immature to old conifer-dominated forest, especially lowland Black Spruce or upland pine or spruce forests; also occurs in mixed forests
- Medium to large dbh spruce trees are an important habitat feature

Limiting Factors and Threats

- Population fluctuations may relate to severe weather on wintering grounds in southern US
- No known threats on breeding grounds

Overall Population Objective

- Maintain population abundance and distribution within the ERNV

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring effort in ON BCR 8

Key References

BBA1: Klinkenberg 1987.
BNA: Ingold and Wallace 1994.
Needs: Dunn 2005.
Other: Patrikeev et al. 2004.

Ruffed Grouse

Bonasa umbellus

DECIDUOUS FOREST

Status

- ON BCR 8 Priority Species (Breeding & Wintering)

Reason(s) for ON BCR 8 Priority Status

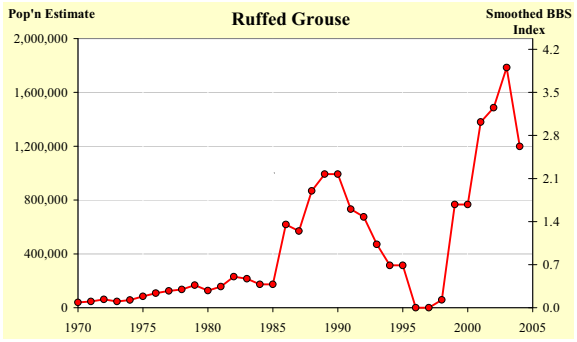
- *Regional Stewardship*: Very high relative density in BCR 8 (RD=5) and uncertain regional population trend (PT=3, total score=14)
- BBS trend uncertain but suggests a moderate to large population increase in BCR 8
- 25% of global population in BCR 8

ON BCR 8 Population

- 5% of global population in ON BCR 8
- Current BBS Index (2000–04) of 2.89, ~1 300 000 birds (very poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	79%	67%
West	56%	**76%**

- Population fluctuates; BBS trend (1969–2005) highly variable but suggests a possible large population increase in ON BCR 8



Ecology

- Year-round resident in ON BCR 8
- Population fluctuates in response to cyclical predation by Northern Goshawk and other raptors

Ecology (cont'd)

- Requires a mix of habitats for seasonal needs including early successional deciduous stands with poplar or birch as important food source, deciduous and mixed forest with dense canopy and herbaceous cover during summer and coniferous stands for winter cover
- Fallen logs for drumming sites and small clearings (<0.4 ha) are important habitat features
- Ground-nesting species

Limiting Factors and Threats

- *Direct Mortality:* Game bird that is actively hunted in Ontario
- *Monitoring*: Not well monitored by BBS owing to non-linear population fluctuations; no provincial monitoring program for this game bird

Overall Population Objective

- Maintain population abundance and distribution within the ERNV

Habitat Objective

- *Coarse Filter; Landscape Scale:* Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CBC) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring effort in ON BCR 8 and improve trend analyses

Key References

BBA1: Middleton 1987b.
BNA: Rusch et al. 2000.
Needs: Dunn 2005.
Other: Patrikeev et al. 2004.

Rusty Blackbird

Euphagus carolinus

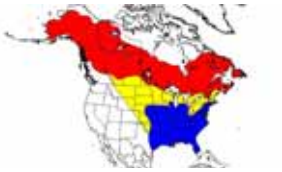
WETLAND/RIPARIAN

Status

- PIF Continental Watch List Species
- ON BCR 8 Priority Species (Breeding)
- Special Concern in Canada

Reason(s) for ON BCR 8 Priority Status

- *Continental Concern:* Severe rangewide population decline (PT=5); moderate threats due to uncertainty as to cause of decline (TB=3)
- *Special Concern:* BBS trend indicates severe population decline in BCR 8
- 8% of global population in BCR 8

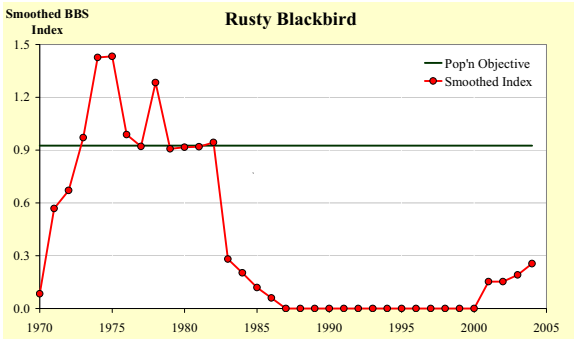


ON BCR 8 Population

- *Species at Risk:* Special Concern because of severe, widespread decline in Canada and throughout range, possibly due to blackbird control programs and loss of wintering habitat in the United States
- 3% of global population in ON BCR 8
- Current population estimate of <1000 birds based on 2000–04 BBS results
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	53%	40%
West	30%	**17%**

- BBS trend (1969–2005) in ON BCR 8 is uncertain, apparent steep decline



Ecology

- Breeds in bogs, fens, beaver meadows, wooded swamps and other open areas adjacent to water and coniferous forests
- Nests typically built in shrub thickets over or near water
- Feeds on ground or in shallow water on insects, mollusks and vegetable matter

Limiting Factors and Threats

- *Habitat Degradation on Breeding Grounds:* Breeding habitat degradation due to wetland drying (climate change), acidification (acid precipitation) and accumulation of environmental toxins (e.g., mercury) are potential concerns
- *Habitat Loss on Breeding Grounds:* Agricultural conversion, peat extraction, logging, wetland drainage and hydro-electric reservoirs have led to habitat loss in some local areas
- *Habitat Loss:* Concern that decline in beavers (and thus beaver ponds) may contribute to population decline
- *Habitat Loss on Wintering Grounds:* Dependent on wooded wetlands in eastern United States, many of which have been converted to agriculture (TN=3)
- *Direct Mortality on Wintering Grounds:* Roosts with other blackbird species and was therefore affected by blackbird control measures in the 1960s and 1970s
- *Monitoring and Research:* Not well monitored by BBS and difficult to study on breeding grounds because of poor accessibility

Overall Population Objective

- Reverse decline
- Contribute to continental objective of Increasing population by 100%

Population Objectives

- Restore population to 1970–79 level, BBS Index of 0.35, ~8400 birds
- Restore BBA distribution to 1981–85 levels in each subregion:

Subregion	Current	Objective
East	40%	53%
West	17%	30%

Habitat Objective

- *Fine Filter: Stand Scale*: Increase/maintain supply of successional forest adjacent to water.

Monitoring Objective

- Assess population status every five years using all available data (BBS, BBA, CMMN, CBC)

Conservation Focus

- *Research*: Investigate factors causing general population decline

Conservation Actions

- *Research:* Investigate potential causes of population decline and to improve understanding of breeding and wintering ecology
- *Monitoring:* Improve current population monitoring capability across ON BCR 8 through improved BBS coverage and/or off-road boreal forest/wetland bird surveys

Key References

BBA1: Flood 1987.
BNA: Avery 1995.
Status: COSEWIC 2006.
Needs: Dunn 2005; PIF 2005.
Other: Greenberg and Droege 1999; Hannah 2005; Smithsonian National Zoological Park 2005.

Sharp-shinned Hawk

Accipiter striatus

CONIFEROUS FOREST

Status
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status
- *Regional Stewardship*: Very high relative density in BCR 8 (RD=5); regional population trend unknown (PT=3)

- 9% of global population in BCR 8

ON BCR 8 Population
- 2% of global population in ON BCR 8
- No current population estimate available for ON BCR 8
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	17%	26%
West	30%	21%

- Population trend in ON BCR 8 is not known

Ecology
- Will breed in a wide range of forest types provided conifers are present
- Often nests near an edge or opening
- Mainly feeds on small landbirds

Limiting Factors and Threats
- No known threats (TB=2, TN=2)

Overall Population Objective
- Assess status

Habitat Objective
- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models
- *Fine Filter*; *Site Level:* Protect occupied nests as per direction in the Site/Stand Guide

Monitoring Objective
- Improve current population monitoring capability across ON BCR 8

Conservation Focus
- *Assess Status:* Periodically review available population data (BBS, BBA, CBC and migration monitoring data) and assess population status relative to habitat availability

Conservation Actions
- *Monitoring*: Maintain or enhance current BBS monitoring effort in ON BCR 8
- *Monitoring:* Regular analyses of hawk count data
- *Research*: Research needed on breeding and migration ecology

Key References
BBA1: Weir 1987b.
BNA: Bildstein and Meyer 2000.
Management: James 1984b.

Short-eared Owl

Asio flammeus

WETLAND/RIPARIAN

Status
- PIF Continental Watch List Species
- Special Concern in Canada and Ontario
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status
- *Continental Concern*: Population trend indicates severe decline (PT=5); threats to wintering grounds high (TN=4), and moderate threats to breeding grounds (TB=3)
- *Species at Risk:* Special Concern because of long-term, widespread decline in Canada and Ontario, possibly due to loss and alteration of preferred breeding and wintering habitat
- Population trend in BCR 8 is unknown (PT=3)
- <1% of global population breeding in BCR 8
- Cosmopolitan species

ON BCR 8 Population
- <1% of global population breeding in ON BCR 8
- Current breeding population in ON BCR 8 is unknown; recorded in 15 squares in BBA2, as compared to 4 in BBA1
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	4%	9%
West	2%	2%

- Population trend in ON BCR 8 unknown

Ecology
- Breeds in large open grasslands or wetlands including hayfields, idle pasture, wet meadows, bogs and marsh

Ecology (cont'd)
- Area-sensitive species that requires large patches (>100 ha) of suitable habitat but will use smaller patches if additional habitat nearby (Dechant et al. 2003)
- Ground-nesting species
- Nomadic behaviour in response to fluctuating food supply (voles and other prey items)

Limiting Factors and Threats
- *Monitoring*: Difficult to monitor because of low densities, low site fidelity and local fluctuations due to fluctuations in prey availability
- *Direct Mortality:* Early haying of nesting area and collisions with vehicles, fences and power lines may be factors for birds breeding in agricultural areas
- *Loss and Alteration of Wintering Habitat:* Decrease in extent of suitable hayfields, pasture and open wetland habitats with abundant food supply on wintering grounds is a concern (TN=4)

Overall Population Objectives
- Assess status; implement SAR management plan when available
- Contribute to continental objective of increasing population by 100%

Habitat Objective
- Implement SAR management plan if/when available
- *Fine Filter; Site Level*: Protect occupied nests as per direction in the Site/Stand Guide

Monitoring Objective
- Assess population status every 5–10 years

Conservation Focus
- *Assess Status:* Periodically assess population status using all available data (BBS, BBA, CMMN, CBC)

Conservation Actions
- *Research:* Research needed to increase understanding of breeding ecology and habitat use in ON BCR 8 and to identify location of wintering grounds
- *Monitoring:* Periodic surveys of suitable habitat to monitor population status in ON BCR 8

Key References

BBA1: Weir 1987e.
BNA: Holt and Leasure 1993.
Status: Cadman 1994.
Needs: Dunn 2005; PIF 2005.
Management: Tate et al. 1997; Dechant et al. 2003.

Swamp Sparrow

Melospiza georgiana

WETLAND/RIPARIAN

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

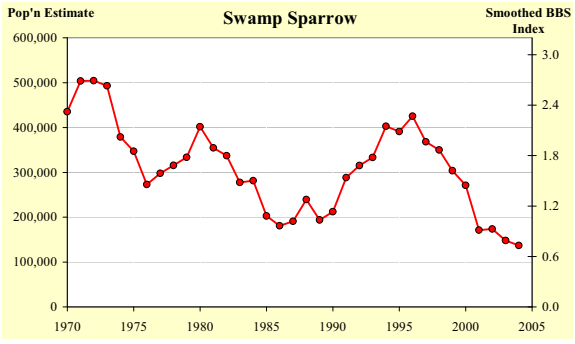
- *Continental Stewardship:* Northern forest Stewardship species with a high proportion of global population (31%) breeding in BCR 8; future conditions are expected to remain stable (TB=2)
- *Regional Stewardship*: Very high relative density in BCR 8 (RD=5) and uncertain population trend (PT=3, total score=14)
- BBS trend in BCR 8 is uncertain but suggests population may be stable or increasing
- 31% of global population in BCR 8

ON BCR 8 Population

- 4% of global population in ON BCR 8
- Current (2000–04) BBS Index of 0.96, ~180 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	70%	**86%**
West	82%	83%

- Population fluctuates; BBS trend (1969–2005) in ON BCR 8 is uncertain, possibly declining



Ecology

- Breeds in range of wetland/riparian settings including marshes, shrub thickets, bogs and fens
- Will use small wetland pockets, as well as more extensive habitat patches
- Nests in dense grasses, cattails or shrubs, often built close to ground or water surface
- Semi-colonial; can breed at high densities in preferred habitat

Limiting Factors and Threats

- *Habitat Quality:* Breeding habitat availability may be affected by seasonal or long-term fluctuations in water levels

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to PIF continental population objective of maintaining current levels

Population Objectives

- Maintain population abundance levels in ON BCR 8 within the ERNV, estimated as no lower than 80% of long-term (1966–2004) BBS average, BBS Index of 1.3, ~1 300 000 birds
- Maintain distribution in each subregion within the ERNV, estimated as above 95% of minimum distribution in BBA1 and BBA2:

Subregion	Current	Objective
East	86%	67%
West	83%	78%

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to the population objectives

Conservation Actions

- *Monitoring:* Improve BBS monitoring effort in ON BCR 8

Key References

BBA1: Rising 1987.
BNA: Mowbray 1997.

Tennessee Warbler

Vermivora peregrina

SUCCESSIONAL FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

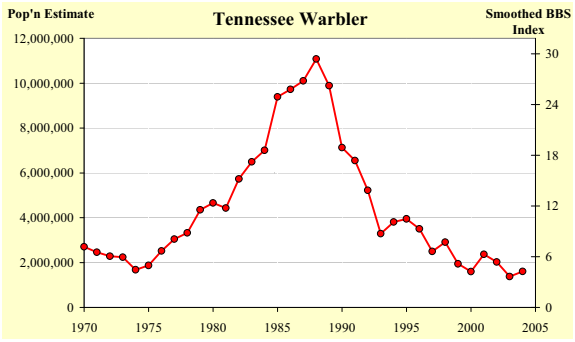
- *Continental Stewardship*: High proportion of population (30%) in BCR 8; future conditions are expected to remain stable (TB=2)
- Restricted winter range (ND=4)
- BBS trend in BCR 8 is uncertain
- 30% of global population in BCR 8

ON BCR 8 Population

- 7% of global population in ON BCR 8
- Current BBS Index (2000–04) of 4.76, ~1 800 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	89%	**76%**
West	84%	84%

- Population fluctuates, BBS trend (1969–2005) in ON BCR 8 is uncertain



Ecology

- Breeds in wide range of open successional boreal forest habitats including young clear-cuts, gaps and edges of mature forests and in riparian thickets
- Responds to spruce budworm outbreaks by immigration to area of infestation as well as increasing clutch size (Welsh 1987d)
- Nests on or near ground

Limiting Factors and Threats

- *Wintering Habitat*: Restricted winter range (ND=4), but uses wide range of habitats including coffee plantations
- No known threats (TB=2, TN=2)

Overall Population Objectives

- Contribute to PIF population objective of maintaining the current population
- Maintain population abundance and distribution within the ERNV

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to insect outbreaks and habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring effort in ON BCR 8

Key References

BBA1: Welsh 1987d.
BNA: Rimmer and McFarland 1998.
Needs: Dunn 2005.

White-throated Sparrow

Zonotrichia albicollis

SUCCESSIONAL FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)
- OMNR Evaluative Indicator Species

Reason(s) for ON BCR 8 Priority Status

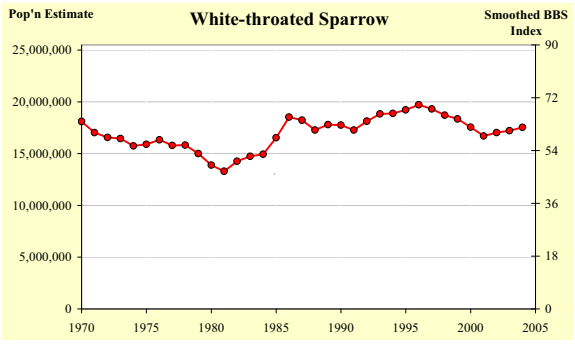
- *Continental Stewardship:* Northern forest Stewardship species with a very high relative breeding density (RD=5) in BCR 8; future conditions are expected to remain stable (TB=2)
- Rangewide population decline (PT=4)
- BBS trend in BCR 8 is uncertain but suggests population may be fairly stable (PT=3)
- 17% of global population in BCR 8

ON BCR 8 Population

- 13% of global population in ON BCR 8
- Current BBS Index (2000–04) of 60.77, ~17 000 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	100%	100%
West	96%	**100%**

- BBS trend (1969–2005) suggests population in ON BCR 8 may be fairly stable



Ecology

- Important habitat features include relatively open understorey, some coniferous vegetation and low crown closure (Patrikeev et al. 2004)
- Ground-nesting and foraging species
- Breeds in wide range of settings within coniferous and mixed forests including forest edges and gaps, young regenerating forests in burns and cutovers, semi-open older forest with low understorey layer, open bogs and edges of beaver meadows

Limiting Factors and Threats

- *Habitat:* Population tends to increase as forest opens up and to decrease as it closes (Falls and Kopachena 1994)
- *Population Fluctuations:* May respond positively to budworm outbreaks and be adversely affected by cold winters (Falls and Kopachena 1994)
- No known threats (TB=2, TN=2)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to PIF continental objective of maintaining current population

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat models

Monitoring Objective

- Maintain current population abundance monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Maintain current population monitoring capability in ON BCR 8

Key References

BBA1: Falls 1987.
BNA: Falls and Kopachena 1994.
Other: Patrikeev et al. 2004.

Winter Wren

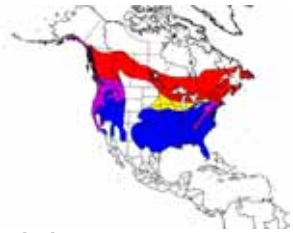
Troglodytes troglodytes

CONIFEROUS FOREST

Status
- ON BCR 8 Priority Species (Breeding)
- OMNR Evaluative Indicator Species

Reason(s) for ON BCR 8 Priority Status

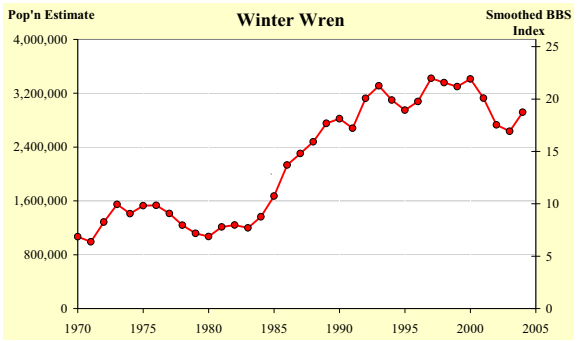
- *Regional Stewardship*: Very high relative density (RD=5) in BCR 8 and moderate regional threats (TB=3)
- BBS trend in BCR 8 is uncertain but suggests population may be stable or increasing
- 17% of global population in BCR 8
- Cosmopolitan species



ON BCR 8 Population
- 9% of global population in ON BCR 8
- Current BBS Index (2000–04) of 19.04, ~3 000 000 birds
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	85%	**97%**
West	72%	**96%**

- BBS trend (1969–2005) indicates probable large population increase in ON BCR 8 (5.0%/yr, P=0.099)



Ecology
- Breeds in mature, moist coniferous forests, especially spruce bogs and cedar swamps
- Low, dense ground cover, downed woody debris, large trees and snags are important habitat features
- Often associated with open water, streams, lakes, swamps and bogs

Limiting Factors and Threats
- *Direct or Indirect Mortality*: Population adversely affected by severe weather on breeding and wintering grounds
- *Habitat Availability*: Requires mature forest, dense ground cover and downed woody debris
- *Threats on Non-breeding Grounds*: No known threats (TN=2)

Overall Population Objective
- Maintain population abundance and distribution within the ERNV

Habitat Objective
- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models

Monitoring Objective
- Improve current population monitoring capability across ON BCR 8

Conservation Focus
- *Evaluate Trends*: Periodically review available population data (BBS, BBA, CMMN and CBC) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions
- *Monitoring*: Improve BBS monitoring effort in ON BCR 8

Key References

BBA1: Richard 1987.
BNA: Hejl et al. 2002.

Yellow-bellied Flycatcher

Empidonax flaviventris

CONIFEROUS FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

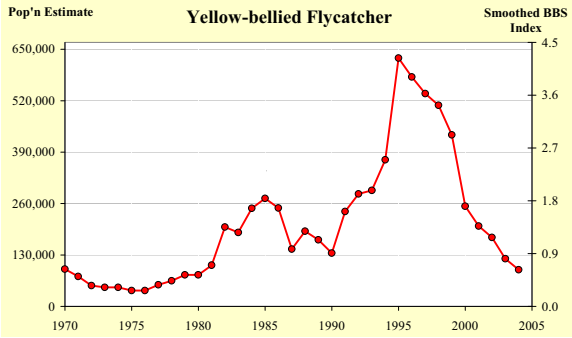
- *Continental Stewardship*: Northern forest Stewardship species with a very high proportion of global population (76%) breeding in BCR 8; future conditions are expected to remain stable (TB=2)
- *Regional Stewardship*: Very high relative density in BCR 8 (RD=5) and moderate regional concern (PT=3, total score=14)
- BBS trend in BCR 8 is uncertain but suggests possible moderate population decline
- 76% of global population in BCR 8

ON BCR 8 Population

- 6% of global population in ON BCR 8
- Current BBS Index (2000–04) of 1.14, ~170 000 birds (poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	32%	**93%**
West	32%	**89%**

- BBS trend (1969–2005) shows large population fluctuation and suggests a possible increase (3.6%/yr, P=0.3) in ON BCR 8



Ecology

- Breeds in damp coniferous forest, swamps and bogs with dense understorey layer; also associated with talus slopes and rocky hillsides
- Breeding habitat with multi-layered structure of open canopy, saplings and seedlings, shrubs and abundant, thick moss cover
- Nests on or near the ground

Limiting Factors and Threats

- *Habitat Supply*: Requires damp coniferous forest
- *Food Supply:* Acid precipitation affecting coniferous forest habitat and food supply
- *Wintering Habitat:* Moderate threat of habitat alteration in restricted wintering range (ND=4, TN=3)

Overall Population Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to PIF continental population objective to maintain the current population

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable nest trees (e.g., snags and diseases trees) as per the 'wildlife tree direction' in the Site/Stand Guide

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA and CMMN) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Improve BBS monitoring effort in ON BCR 8

Key References

BBA1: Prescott 1987b.
BNA: Gross and Lowther 2001.
Needs: Dunn 2005.

Yellow-bellied Sapsucker

Sphyrapicus varius

DECIDUOUS FOREST

Status

- PIF Continental Stewardship Species
- ON BCR 8 Priority Species (Breeding)

Reason(s) for ON BCR 8 Priority Status

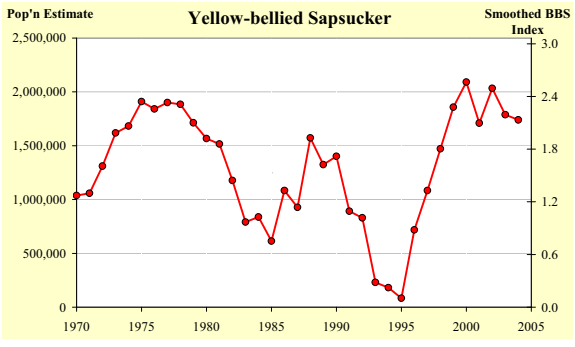
- *Continental Stewardship:* Northern forest Stewardship species with a high proportion of global population (26%) breeding in BCR 8; future conditions are expected to remain stable (TB=2)
- *Regional Stewardship*: High relative density in BCR 8 (RD=5) and moderate regional concern due to rangewide and regional population declines (PT=4, total score=14)
- BBS trend indicates a possible large population decline in BCR 8
- 26% of global breeding population in BCR 8

ON BCR 8 Population

- 9% of global breeding population in ON BCR 8
- Current BBS Index (2000–04) of 2.30, ~1 900 000 birds (poor accuracy, Appendix G)
- BBA distribution (effort adjusted):

Subregion	BBA1	BBA2
East	66%	77%
West	46%	**62%**

- Population fluctuates, BBS trend (1969–2005) uncertain



Ecology

- Breeds in deciduous or mixed forests, particularly stands with poplar and birch
- Cavity nester, excavates nest in living tree (often poplar), >25 dbh, with heart-rot

Limiting Factors and Threats

- *Monitoring:* Not well monitored by BBS owing to population fluctuations and low detection rate during BBS survey window
- No known threats (TN=2, TB=2)

Overall Population I Objectives

- Maintain population abundance and distribution within the ERNV
- Contribute to PIF continental population objective of maintaining the current population

Habitat Objective

- *Coarse Filter; Landscape Scale*: Maintain the availability of suitable breeding habitat across the landscape within the ERNV as per the Landscape Guide and/or as predicted by OMNR habitat supply models
- *Coarse Filter; Stand Scale:* Maintain availability of suitable diseased nest trees and live foraging trees by following Pileated Woodpecker guidelines (James 1984a)

Monitoring Objective

- Improve current population monitoring capability across ON BCR 8

Conservation Focus

- *Evaluate Trends*: Periodically review available population data (BBS, BBA, CMMN and CBC) and evaluate population trend in ON BCR 8 relative to habitat availability

Conservation Actions

- *Monitoring*: Improve current BBS monitoring effort in ON BCR 8
- *Research*: Investigate causes of apparent population fluctuations

Key References

BBA1: Biro 1987.
BNA: Walter et al. 2002.
Needs: Dunn 2005.
Management: James 1984a.

Appendix G: BBS-based Indices of Abundance, Precision, Population Estimates and Accuracy Ratings for Priority Species Breeding in ON BCR 8

Count data from all Breeding Bird Survey (BBS) routes within the Ontario portion of BCR 8 (ON BCR 8) were used to assess changes in population abundance for 28 of the 37 priority species (Table G1) and to set population objectives for eight priority species (see priority species accounts, Appendix F). All population indices were converted to population estimates to show the magnitude of population changes observed. These estimates were derived from BBS indices using methods described in Appendix B of Rich et al. (2004).

BBS-based abundance indices and population estimates were not available for nine priority species, most of which occur at low or very low densities in ON BCR 8:

- Six of these species (Bald Eagle, Golden Eagle, Peregrine Falcon, Great Gray Owl, Short-eared Owl and Rusty Blackbird) are listed as Species at Risk federally and/or in Ontario, and their population status is periodically assessed.
- Two of the remaining three species (Sharp-shinned Hawk and Boreal Owl) have also been assessed but are currently listed as "Not at Risk." Boreal Owl is monitored by the Ontario Nocturnal Owl Survey (Crewe and Badzinski 2006).
- Black-backed Woodpecker is a widespread species in ON BCR 8 that is currently not adequately sampled by the very limited BBS coverage in this region (see Appendix H).

Table G1 presents BBS sample sizes, abundance indices, standard errors (precision) of the indices, estimated population sizes and an accuracy rating of the population estimate for the 28 priority species, with at least six routes of BBS trend data in ON BCR 8.

Accuracy ratings (Moderate, Fair, Poor, Very Poor) for the estimated population sizes at abundance objectives were assigned using the methods outlined in Appendix B of Rich et al. (2004) and are based on species-specific survey sample sizes, number of birds detected on surveys, variance in counts across BBS routes within ON BCR 8 and diurnal activity level.

Explanatory Notes for Table G1:

BBS Routes:

- **70–04:** Number of BBS routes in ON BCR 8 with trends for the 1970–2004 period
- **1990s:** Number of BBS routes in ON BCR 8 with abundance data for 1990s

BBS Index Averages:

- **1970s:** BBS abundance index averaged across years for the 1970–1979 period
- **1990s:** BBS abundance index averaged across years for the 1990–1999 period
- **00–04:** BBS abundance index averaged across years for the 2000–2004 period

SE of BBS Indices:

- **1970s:** Standard Error of BBS indices across years in the 1970–1979 period
- **1990s:** Standard Error of BBS indices across years in the 1990–1999 period
- **00–04:** Standard Error of BBS indices across years for the 2000–2004 period

Estimated Population Size

- **1970s:** BBS-based estimate of the number of breeding birds in ON BCR 8 in the first decade of BBS (1970–1979)
- **2000–04:** BBS-based estimate of the current number of breeding birds in ON BCR 8 (2000–2004)
- **Accuracy:** A rating of the accuracy of the population estimate

Table G1: BBS sample size, BBS objective and standard error, estimated population size and accuracy rating for 28 of 37 priority species in ON BCR 8.

Priority Species	BBS Routes		BBS Index Averages			SE of BBS Indices			Estimated Population Size		
	70–04	1990s	1970s	1990s	00–04	1970s	1990s	00–04	1970s	2000–04	Accuracy
Ruffed Grouse	13	7	0.19	0.95	2.89	0.21	1.71	2.91	90 000	1 300 000	Very Poor
Belted Kingfisher	14	11	0.75	0.38	0.47	0.52	0.23	0.41	200 000	120 000	Poor
Yellow-bellied Sapsucker	13	13	1.96	1.07	2.30	1.27	1.29	1.37	1 600 000	1 900 000	Poor
Northern Flicker	16	16	3.20	2.93	3.84	1.04	0.88	1.79	520 000	620 000	Fair
Olive-sided Flycatcher	14	9	2.11	0.45	0.06	1.49	0.55	0.18	200 000	6 000	Very Poor
Yellow-bellied Flycatcher	13	10	0.40	2.70	1.14	0.35	1.13	0.81	60 000	170 000	Poor
Alder Flycatcher	16	15	12.99	16.59	18.33	4.13	8.08	18.88	1 300 000	1 900 000	Fair
Blue-headed Vireo	15	14	1.34	0.96	1.80	1.02	1.01	1.37	790 000	1 100 000	Poor
Philadelphia Vireo	13	12	0.56	2.38	2.24	0.46	1.50	2.45	84 000	340 000	Poor
Winter Wren	16	17	8.44	20.00	19.04	2.08	10.62	12.60	1 300 000	3 000 000	Fair
Ruby-crowned Kinglet	16	16	11.75	10.21	12.23	1.69	3.93	8.63	4 000 000	4 200 000	Fair
Tennessee Warbler	16	16	7.03	10.83	4.76	2.86	2.85	5.04	2 700 000	1 800 000	Fair
Nashville Warbler	16	17	6.36	15.35	23.84	2.36	5.30	19.75	2 000 000	7 600 000	Fair
Chestnut-sided Warbler	16	17	10.37	6.88	16.07	2.56	6.38	24.51	2 500 000	3 900 000	Poor
Magnolia Warbler	16	17	9.59	17.71	13.99	2.55	6.08	5.87	3 100 000	4 500 000	Fair
Cape May Warbler	12	12	0.26	1.34	0.13	0.25	0.77	2.05	100 000	48 000	Poor
Black-throated Green Warbler	14	15	3.38	7.04	6.95	1.65	2.66	2.07	1 100 000	2 200 000	Fair
Blackburnian Warbler	14	13	1.06	2.02	1.59	0.84	1.07	0.95	340 000	520 000	Poor
Bay-breasted Warbler	15	12	0.26	5.17	1.89	0.22	3.98	0.86	69 000	500 000	Poor
Black-and-white Warbler	16	16	1.17	4.71	4.14	0.43	1.56	2.19	450 000	1 600 000	Fair
Ovenbird	16	17	16.39	24.09	16.66	2.74	5.61	6.68	2 500 000	2 500 000	Moderate
Connecticut Warbler	12	6	1.10	0.24	0.68	0.88	0.16	2.82	220 000	140 000	Poor
Mourning Warbler	15	15	12.40	9.28	9.83	2.87	4.48	5.63	2 100 000	1 700 000	Fair
Canada Warbler	14	8	1.22	1.92	1.49	0.97	0.89	1.97	140 000	170 000	Poor
Swamp Sparrow	14	13	2.07	1.81	0.96	0.87	0.82	1.61	390 000	180 000	Fair
White-throated Sparrow	16	17	57.46	65.72	60.77	7.57	9.86	6.46	16 000 000	17 000 000	Moderate
Purple Finch	16	13	2.98	2.96	2.65	1.01	1.64	1.56	390 000	340 000	Fair
Evening Grosbeak	13	12	4.57	8.72	1.19	3.18	6.47	33.42	500 000	130 000	Poor

Appendix H: Evaluation of Current Monitoring Coverage for Landbirds in Ontario BCR 8 and Recommended Monitoring-related Actions

Trend Monitoring Objectives

Objective 1: For at least 80% of landbirds breeding regularly in ON BCR 8 (Relative Density > 1):

- **Develop ≥80% power to detect 50% decline over 20 years within ON BCR 8; or**
- **Develop ≥80% power to detect 50% decline over 20 years in eastern BBS range AND less precise trend available for ON BCR 8 (df>5).**

The objective of attaining 80% power to detect a 50% decline at P<0.05 (1-tailed) incorporates a 0.8%/year estimate of potential bias, following the approach suggested by Bart et al. 2004.

Evaluation: Current monitoring coverage of all landbirds regularly breeding in ON BCR 8 was evaluated using BBS data from this region and for eastern North America (Table H1). Power estimates used species-specific variance from past BBS trends as the basis for predicting trend variance and power of future trends. Variance for eastern North America was taken from 1966–2004 BBS trends; for ON BCR 8 we used 1985–2004 BBS trends.

Of the 104 breeding landbirds with Relative Density (RD) scores of 2 or more in ON BCR 8, only 44 species (42%) have trends of sufficient power, including:

- Two species with ≥80% power to detect 50% decline in 20 years in ON BCR 8;
- Five species with 50–80% power to detect 50% decline in 20 years in ON BCR 8; and
- 37 species that have trends with <50% power in ON BCR 8, but ≥80% power in eastern North America.

Objective 1 is clearly not met by current BBS coverage in ON BCR 8 (where only 42% of regularly occurring breeding species have sufficient power). Moreover, of the 44 species that do have sufficient power, only seven species have sufficient data from within ON BCR 8. The statistical power for the other 37 species depends on data from elsewhere in eastern North America.

Low statistical power in ON BCR 8 results not only from the relatively small number of routes that have being surveyed (see Figure B1), but also from inconsistent coverage of those routes (Figure B2). In addition, there are large geographic gaps in BBS coverage where there are few roads and volunteers, including the entire northwestern half of this region (Figure B1).

Proposed Actions:

- *Increase frequency of coverage of existing BBS routes in ON BCR 8, so that at least 15 routes are surveyed each year at a level that would ensure the ability to calculate trends for common species.*
- *Continue active recruitment and training of new BBS volunteers to replace retiring participants and cover existing routes.*
- *Add new BBS routes in any uncovered degree blocks (especially in northeastern ON BCR 8) with suitable roads where there is the potential for volunteer and/or paid surveyors.*
- *Measure bias in landscape/habitat coverage by BBS routes across BCR 8.*

Of the 60 species (58%) not meeting the Objective 1 power criteria:

- Twenty-seven species have good coverage in eastern North America as a whole (80% power to detect 50% decline, including bias) but do not have sufficient BBS data to calculate 20-year trends in ON BCR 8. The majority of these species (e.g., Broad-winged Hawk, Belted Kingfisher, Hairy Woodpecker, Olive-sided Flycatcher, Gray Jay, Northern Parula, Connecticut Warbler, Pine Siskin) are detected on several ON BCR 8 routes, and would have trend values if existing routes were surveyed more consistently.
- Six are owls, including:
  - Three species (Great Gray, Boreal and Northern Saw-whet Owls) that are detected by the Ontario Nocturnal Owl Survey and are potentially adequately monitored; and
  - Three species (Northern Hawk, Long-eared and Short-eared Owls) that are not monitored by the owl survey but whose migratory or irruptive numbers may be tracked over the long term by migration counts, winter surveys such as Christmas Bird Counts, or possibly checklist counts such as eBird.

- Nine are hawks (Osprey, Bald Eagle, Northern Harrier, Sharp-shinned Hawk, Northern Goshawk, Broad-winged Hawk, Red-tailed Hawk, American Kestrel, Merlin) that are counted at migration hawk watch sites in southern Ontario and farther south;
- Thirty-three are small landbirds that are detected by stations in the Canadian Migration Monitoring Network (CMMN) as they pass through southern Ontario, and thus have potential to be monitored there (Badzinski and Francis 2000); and
- Red Crossbill is a finch species whose migratory or irruptive numbers may be tracked over the long term by migration counts, winter surveys such as Christmas Bird Counts, or possibly checklist counts such as eBird.

A new boreal survey of breeding birds is recommended as the first or second choice to fill monitoring gaps for 44 of these species at continental (Dunn et al. 2005) and/or Canadawide scales (Dunn, CWS, pers. comm. 2005). Migration monitoring is recommended as the first or second choice to fill monitoring gaps at continental and/or Canadawide scales for a further 18 small landbird species (Dunn et al. 2005, pers. comm. 2005).

Proposed Actions:

- *Put in place a new borealwide breeding season bird monitoring survey, together with neighbouring jurisdictions, as a high continental priority that addresses monitoring needs for many species.*
- *Continue to track migrants breeding in central and northern Ontario at southern Ontario migration monitoring stations, and report regularly on their status.*
- *Evaluate the power of migration monitoring, including migration hawk watches, to detect trends of 50% over 20 years for breeding species not well monitored in the boreal.*
- *Evaluate the power of existing owl surveys in ON BCR 8 and eastern North America to detect trends of 50% over 20 years for breeding owl species not well monitored in the boreal.*
- *Rely on Breeding Bird Atlases at 20-year intervals to track long-term changes in populations of all the above species, and to validate population changes in species with trends from BBS, migration monitoring and other surveys.*
- *Support sampling in remote locations during future BBAs.*

Objective 2: Assess status of all priority species at least every five years.

Evaluation: BBS-based population trends and indices are available for 25 of the 37 priority species, though only four of these species meet minimum power criteria in ON BCR 8. The current precision of these indices (and the accuracy of associated population estimates) is presented in Appendix G.

Of the 12 priority landbirds without BBS-based population trends in ON BCR 8:

- Two species (Golden Eagle and Peregrine Falcon) are listed as Endangered or Threatened federally and/or in Ontario, with objectives set through SAR recovery programs as required;
- Four species (Bald Eagle, Great Gray Owl, Short-eared Owl, Rusty Blackbird) are currently listed as Special Concern federally and/or in Ontario; and
- Six other species (Sharp-shinned Hawk, Boreal Owl, Belted Kingfisher, Black-backed Woodpecker, Olive-side Flycatcher, Connecticut Warbler) are not currently listed federally or in Ontario.

Proposed Actions:

- *Improve consistency of BBS coverage in ON BCR 8, initiate development of a new boreal survey and report regularly on trends from migration monitoring (as above).*
- *Ensure that all these species are assessed regularly (at least every five years) to track changes in population status as well as threats.*

<u>Distribution Objective</u>

Objective 3: For all landbirds breeding in ON BCR 8:

- **Develop ability to detect 15% decline in proportion of Breeding Bird Atlas squares occupied, at intervals of 20 years, for at least 80% of landbirds with Relative Density > 1 (15% decline matches PIF PT = 4 criterion); and**

- **Develop ability to detect 50% decline in proportion of Breeding Bird Atlas squares occupied [PT = 5] for all priority species, including those with Relative Density = 1 (relatively rare in ON BCR 8).**

Evaluation: A comparison of the preliminary results of the current Breeding Bird Atlas (BBA2) (2001–05 data) with the results of the first atlas (1981–85) indicates that of the 104 breeding landbird species with RD>1:

- 15% declines would have been detected at P<0.05 in 55 species in ON BCR 8.

Of the 37 priority landbirds, 34 meet the distribution monitoring objective, as follows:

- 15% declines could be detected at P<0.05 in 23 species;
- 50% declines could be detected at P<0.05 in an additional 11 species; and
- 50% declines could not be detected at P<0.05 in three species (Golden Eagle, Peregrine Falcon, Short-eared Owl). Each of these is a listed Species at Risk.

If we assume that coverage in a future atlas will be similar to that in BBA2, then neither part of Objective 3 is met, as distribution changes can be detected for only 53% (55/104) of regularly breeding species (see Table H1) and 92% (34/37) of priority species in ON BCR 8.

Proposed Actions:

- *Continue to repeat Breeding Bird Atlases at 20-year intervals, aiming to increase coverage of boreal atlas squares in subsequent atlases.*
- *Conduct additional periodic distributional surveys to supplement information on rare priority species, those for which 15% declines would not be detected.*

Demographic Objective

Objective 4: Productivity, survival and fidelity to be tracked for species or study areas of high management concern/interest.

This plan does not set any demographic objectives, but demographic research is a proposed conservation action for several of the priority species (see priority species accounts in Appendix F).

Proposed Actions:

- *Assess the value and feasibility of setting demographic objectives for priority species or study areas of high management concern/interest.*

Habitat Monitoring Objective

Objective 5: Measure and report changes in forest cover, general land cover and land use for the entire planning area at regular intervals (approx. five years), ensuring that data are directly comparable among time periods.

This plan identifies those priority species for which habitat objectives will be determined once information is available from forest habitat simulation models being developed by OMNR. The geographic scale (landscape, stand, site) of the objectives is indicated, as well as whether fine filter objectives (e.g., spatial habitat supply analyses) are needed (see species accounts in Appendix F). Habitat objectives could be established for wetland and non-forest upland species if suitable information on the availability of non-forest habitats is available.

Proposed Actions:

- *Identify or develop forest cover, land cover, land use and habitat monitoring programs (e.g., Forest Resource Inventory, Ontario Land Cover mapping, Agricultural Census data) that could be used to set and measure habitat objectives for priority species and guilds.*

Explanatory Notes for Table H1:

Bold = Priority species in Ontario BCR 8; **[species in square brackets]** = Introduced species

ON BCR 8 RD > 1 – **Yes:** Indicates Relative Density (RD) score of 2 or higher in ON BCR 8; these species are the target of monitoring objectives

ON BCR 8 BBS Trend: Power of the Breeding Bird Survey (1985–2004) to measure population trends within BCR 8 in Ontario
Yes: ≥80% power to detect 50% decline in 20 years at P≤0.1 in ON BCR 8; **Y:** ≥50% power; **(y):** trend calculated, but with <50% power to detect 50% decline in 20 years in Ontario

East N. Am. BBS Trend: Power of the Breeding Bird Survey (1966–2004) to measure population trends within eastern North America
Yes: ≥80% power to detect 50% decline in 20 years at P≤0.1 in eastern North America, including bias; **(y):** trend calculated, but with <80% power to detect 50% decline in 20 years in eastern North America

ON BCR 8 Atlas Dist.: Power of the Breeding Bird Atlases (1981–85 and 2001–05) to measure changes in breeding distribution within BCR 8 in Ontario
Yes: ≤15% increase and/or decrease in squares with breeding evidence detectable between atlases in ON BCR 8; **Y:** ≤50% increase and/or decrease detectable; **(y):** larger increases/decreases may be detectable

Table H1: Monitoring coverage of landbirds breeding in Ontario BCR 8.

Common Name	ON BCR 8 RD > 1	ON BCR 8 BBS Trend	East. N. Am. BBS Trend	ON BCR 8 Atlas Dist.
Ruffed Grouse	Yes	(y)	Yes	Yes
Spruce Grouse	Yes			Y
Sharp-tailed Grouse				(y)
Turkey Vulture			Yes	Y
Osprey	Yes		Yes	Y
Bald Eagle	Yes		(y)	Yes
Northern Harrier	Yes			Y
Sharp-shinned Hawk	Yes		(y)	Y
Northern Goshawk	Yes			Y
Broad-winged Hawk	Yes		Yes	Yes
Red-tailed Hawk	Yes		Yes	Y
Golden Eagle				(y)
American Kestrel	Yes		Yes	Yes
Merlin	Yes		(y)	Y
Peregrine Falcon				(y)
[Rock Pigeon]			Yes	(y)
Mourning Dove			Yes	Y
Black-billed Cuckoo	Yes		Yes	(y)
Great Horned Owl	Yes		Yes	Y
Northern Hawk Owl	Yes			Y

Common Name	ON BCR 8 RD > 1	ON BCR 8 BBS Trend	East. N. Am. BBS Trend	ON BCR 8 Atlas Dist.
Barred Owl	Yes		Yes	Y
Great Gray Owl	Yes			Y
Long-eared Owl	Yes			(y)
Short-eared Owl	Yes			(y)
Boreal Owl	Yes			Y
Northern Saw-whet Owl	Yes			Y
Common Nighthawk	Yes		Yes	Y
Whip-poor-will				(y)
Chimney Swift			Yes	(y)
Ruby-throated Hummingbird	Yes		Yes	Y
Belted Kingfisher	Yes		Yes	Yes
Yellow-bellied Sapsucker	Yes	(y)	Yes	Yes
Downy Woodpecker	Yes	(y)	Yes	Y
Hairy Woodpecker	Yes		Yes	Yes
American Three-toed Woodpecker	Yes			Y
Black-backed Woodpecker	Yes		(y)	Y
Northern Flicker	Yes	Y	Yes	Yes
Pileated Woodpecker	Yes		Yes	Yes
Olive-sided Flycatcher	Yes		Yes	Y
Eastern Wood-Pewee	Yes		Yes	Y
Yellow-bellied Flycatcher	Yes	(y)	Yes	Yes
Alder Flycatcher	Yes	Y	Yes	Yes
Least Flycatcher	Yes	Y	Yes	Yes
Eastern Phoebe	Yes		Yes	(y)
Great Crested Flycatcher				(y)
Eastern Kingbird	Yes		Yes	Y
Blue-headed Vireo	Yes	(y)	Yes	Yes
Warbling Vireo			Yes	(y)
Philadelphia Vireo	Yes	(y)	(y)	Yes
Red-eyed Vireo	Yes	Y	Yes	Yes
Gray Jay	Yes		Yes	Yes
Blue Jay	Yes	(y)	Yes	Yes
American Crow	Yes	(y)	Yes	Yes
Common Raven	Yes	(y)	Yes	Yes
Tree Swallow	Yes	(y)	Yes	Yes
Bank Swallow	Yes		Yes	(y)
Cliff Swallow	Yes		Yes	Y
Barn Swallow	Yes		Yes	Y
Black-capped Chickadee	Yes	(y)	Yes	Yes

Common Name	ON BCR 8 RD > 1	ON BCR 8 BBS Trend	East. N. Am. BBS Trend	ON BCR 8 Atlas Dist.
Boreal Chickadee	Yes		(y)	Yes
Red-breasted Nuthatch	Yes	(y)	Yes	Yes
White-breasted Nuthatch			Yes	(y)
Brown Creeper	Yes		(y)	Yes
House Wren			Yes	(y)
Winter Wren	Yes	(y)	(y)	Yes
Sedge Wren				(y)
Golden-crowned Kinglet	Yes	(y)	(y)	Yes
Ruby-crowned Kinglet	Yes	(y)	Yes	Yes
Eastern Bluebird			Yes	(y)
Veery	Yes	(y)	Yes	Y
Swainson's Thrush	Yes	(y)	Yes	Yes
Hermit Thrush	Yes	(y)	Yes	Yes
Wood Thrush				(y)
American Robin	Yes	Y	Yes	Yes
Gray Catbird			Yes	(y)
Brown Thrasher			Yes	(y)
[European Starling]	Yes	(y)	Yes	Y
Cedar Waxwing	Yes	(y)	Yes	Yes
Tennessee Warbler	Yes	(y)	(y)	Yes
Orange-crowned Warbler	Yes			Y
Nashville Warbler	Yes	Yes	(y)	Yes
Northern Parula	Yes		Yes	Y
Yellow Warbler	Yes	(y)	Yes	Y
Chestnut-sided Warbler	Yes	(y)	Yes	Yes
Magnolia Warbler	Yes	(y)	Yes	Yes
Cape May Warbler	Yes	(y)	(y)	Y
Black-throated Blue Warbler	Yes		Yes	Y
Yellow-rumped Warbler	Yes	(y)	Yes	Yes
Black-throated Green Warbler	Yes	(y)	(y)	Y
Blackburnian Warbler	Yes	(y)	Yes	Yes
Pine Warbler			Yes	(y)
Palm Warbler	Yes		(y)	Y
Bay-breasted Warbler	Yes	(y)	(y)	Yes
Blackpoll Warbler			(y)	(y)
Black-and-white Warbler	Yes	(y)	Yes	Yes
American Redstart	Yes	(y)	Yes	Yes
Ovenbird	Yes	(y)	Yes	Yes
Northern Waterthrush	Yes	(y)	Yes	Yes

Common Name	ON BCR 8 RD > 1	ON BCR 8 BBS Trend	East. N. Am. BBS Trend	ON BCR 8 Atlas Dist.
Connecticut Warbler	Yes		Yes	Y
Mourning Warbler	Yes	(y)	Yes	Yes
Common Yellowthroat	Yes	(y)	Yes	Yes
Wilson's Warbler	Yes		(y)	Yes
Canada Warbler	Yes	(y)	Yes	Y
Scarlet Tanager	Yes		Yes	(y)
Chipping Sparrow	Yes	(y)	Yes	Yes
Clay-colored Sparrow			Yes	(y)
Vesper Sparrow			Yes	(y)
Savannah Sparrow	Yes	(y)	Yes	Y
Le Conte's Sparrow	Yes		(y)	Y
Fox Sparrow				Y
Song Sparrow	Yes	(y)	Yes	Yes
Lincoln's Sparrow	Yes	(y)	(y)	Yes
Swamp Sparrow	Yes	(y)	Yes	Yes
White-throated Sparrow	Yes	Yes	Yes	Yes
Dark-eyed Junco	Yes	(y)	Yes	Yes
Rose-breasted Grosbeak	Yes		Yes	Y
Indigo Bunting			Yes	(y)
Bobolink			Yes	(y)
Red-winged Blackbird		(y)	Yes	Y
Rusty Blackbird	Yes		(y)	Y
Common Grackle	Yes	(y)	Yes	Yes
Brown-headed Cowbird	Yes		Yes	(y)
Pine Grosbeak	Yes		(y)	(y)
Purple Finch	Yes	(y)	Yes	Yes
Red Crossbill	Yes		(y)	(y)
White-winged Crossbill	Yes		(y)	Yes
Pine Siskin	Yes		Yes	Yes
American Goldfinch	Yes	(y)	Yes	Y
Evening Grosbeak	Yes	(y)	(y)	Y
[House Sparrow]			Yes	(y)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