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Bird Conservation Strategy for Bird Conservation Region 7 in Ontario: Taiga Shield and Hudson Plains

August 2013



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Preface

Environment Canada led the development of bird conservation strategies in each of Canada's Bird Conservation Regions (BCRs) by drafting new strategies and integrating new and existing strategies into an all-bird framework. These integrated all-bird conservation strategies will serve as a basis for implementing bird conservation across Canada, and will also guide Canadian support for conservation work in other countries important to Canada's migrant birds. Input to the strategies from Environment Canada's conservation partners is as essential as their collaboration in implementing their recommendations.

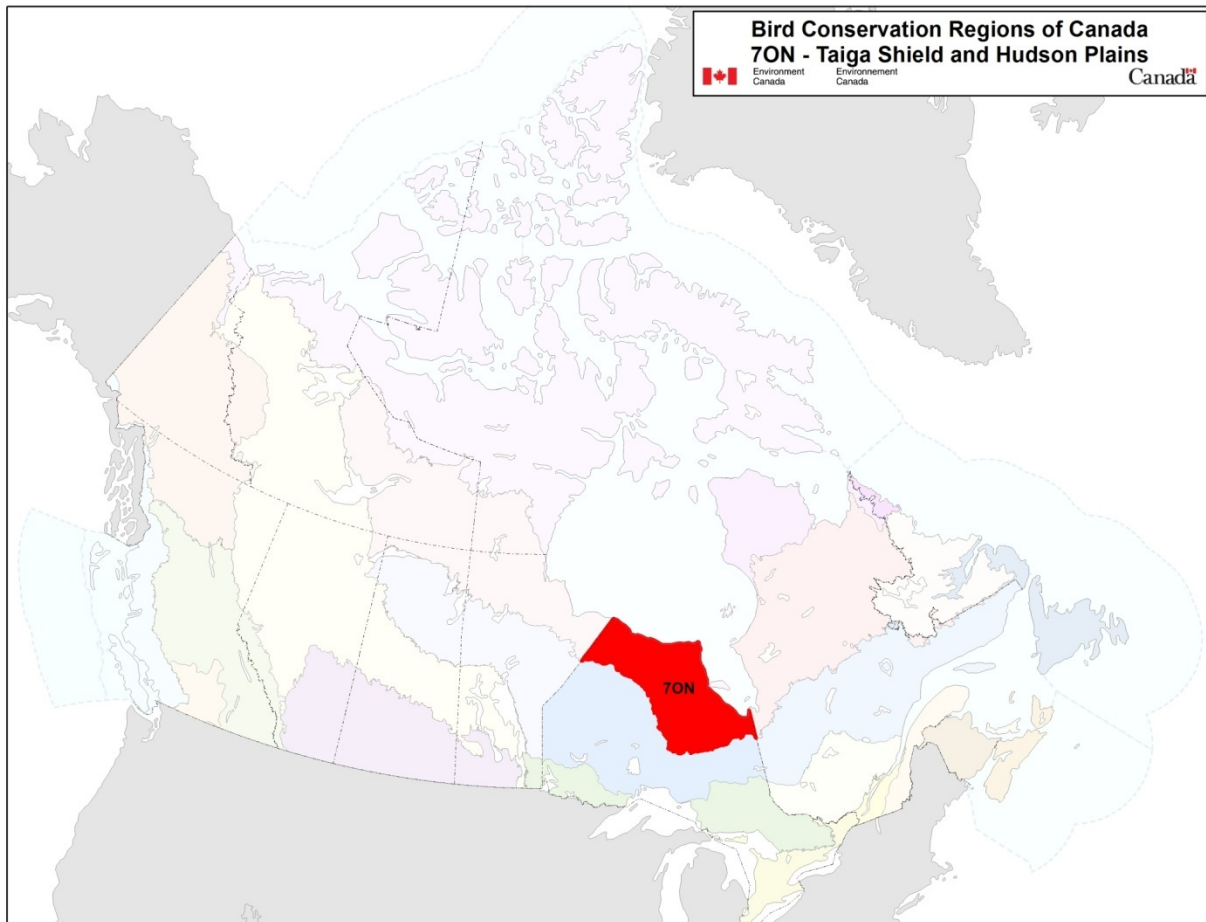
Environment Canada has developed national standards for strategies to ensure consistency of approach across BCRs. Bird Conservation Strategies will provide the context from which specific implementation plans can be developed for each BCR, building on the programs currently in place through Joint Ventures or other partnerships. Landowners including Aboriginal peoples will be consulted prior to implementation.

Conservation objectives and recommended actions in the conservation strategies will be used as the biological basis to develop guidelines and beneficial management practices that support compliance with regulations under the *Migratory Birds Convention Act, 1994*. Furthermore, these strategies will guide conservation action in support of *The State of Canada's Birds 2012* (North American Bird Conservation Initiative Canada 2012), which points to the strong influence of human activity on bird populations, both positive and negative, and presents solutions towards keeping common birds common and restoring populations that are in decline.

Acknowledgements

Brigitte Collins and Paul Smith were the main authors of this document which follows templates developed by Elaine Camfield, Judith Kennedy and Elsie Krebs with the help of the BCR planners in each of Environment Canada's Canadian Wildlife Service regions throughout Canada. However, work of this scope cannot be accomplished without the contribution of other colleagues and individuals who provided or validated technical information, commented on earlier draft versions of the strategy, provided maps, and supported the overall planning process. We would like to thank the following for their contributions to this strategy: Elaine Camfield, Judith Kennedy and Marie-France Noel from CWS-National Office; Graham Bryan, Mike Cadman, Lesley Davy, Christian Friis, Krista Holmes, Jack Hughes, Shawn Meyer, Michele Rodrick, Daniel Rokitnicki Wojcik, Chris Sharp, Paul Watton, and D.V. Weseloh from CWS-Ontario Region; Sarah Mainguy, North-South Environmental Inc.; and Chris Wedeles, ArborVitae Environmental Services Ltd.

Bird Conservation Strategy for BCR 7 in Ontario: Taiga Shield and Hudson Plains



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Executive Summary

The Taiga Shield and Hudson Plains, Bird Conservation Region 7 (BCR 7), cover almost 260 000 km² or about 25% of the province of Ontario. Beyond Ontario, BCR 7 extends across roughly 1 700 000 km² in eight provinces and territories. This immense region shares characteristics with the boreal habitats to the south and the arctic habitats to the north. In Ontario, BCR 7 is dominated by a vast network of marshes, fens and bogs draining across a low-lying plain that skirts Hudson Bay and James Bay.

This conservation strategy for BCR 7 ON builds on existing bird conservation plans and complements those created for the other BCRs across Canada. These strategies will serve as a framework for implementing bird conservation nationally, and also identify international conservation issues for Canada's priority birds. This strategy is not intended to be prescriptive, but rather is intended to guide future implementation efforts undertaken by various partners and stakeholders.

BCR 7 offers several habitats that are unique in Ontario, including the province's only marine coastline and the world's most southerly located mainland tundra. Thirty-five species of Ontario's breeding birds nest only within the Hudson Bay Lowlands. The rich coastal marshes of Hudson and James Bay are also crucial habitat for millions of waterfowl and shorebirds that stop here to stage before continuing their migrations over continental North America. Indeed, a majority of the bird species present in BCR 7 ON are migratory, and some will travel as far south as South America to their wintering grounds. Consequently, the conservation of birds and their habitats in BCR 7 ON is of critical importance not only for Ontarians, but for countries throughout the Western Hemisphere.

We evaluated 196 bird species that occur in the region,¹ and 66 were determined to qualify as priority species. All bird groups were represented, with 36% of the priority species list consisting of landbirds, 32% shorebirds, 18% waterfowl and 14% waterbirds. Consistent with the prevalence of wetlands across the landscape, a majority of species (60%) used wetland habitats extensively. In comparison, closed-canopy forest, which is not a dominant habitat type in the region, was used by comparatively few species (18%). Tundra along the Hudson and James Bay coasts was used by one quarter of the priority species in the sub-region (25%).

Population objectives were set on the basis of observed trends, but inadequate monitoring information was a pervasive issue in BCR 7 Ontario. Consequently, nearly 70% of priority species were assigned an objective to "assess" population status while "maintaining" current levels in the interim. For 21% of species, population levels were deemed to be at or near the objective. These results do not imply that bird populations in BCR 7 ON have not changed in

¹ Species occurrence was determined using Ontario's Breeding Bird Atlas (Cadman et al. 2007), [Wildspace](#) range maps, [Birds of North America](#) online, and expert opinion ([Appendix 1](#)).

abundance in recent decades, but rather that a lack of rigorous monitoring information for the region precludes an assessment of status and assignment of quantitative objectives.

An assessment of threats identified a number of conservation issues facing priority species in the various habitats of BCR 7 Ontario. Consistent with the comparatively natural state of the region, a majority of these threats were considered to have only low magnitude effects on populations. Both the number and magnitude of threats to birds in this region are lower than other BCRs in the province. Exceptions were the high to very high magnitude threats resulting from habitat degradation due to overabundant geese, and the current and projected impacts of climate change. Importantly, mining, renewable energy development and the associated infrastructure were determined to have low magnitude effects at present, but the cumulative effects of these threats may become more significant in the future. For the majority of priority species, a lack of knowledge of population status and limiting factors was a significant impediment to determining their conservation priority.

Actions are recommended to address these conservation issues, and an incomplete understanding of populations' status meant that knowledge acquisition dominated these actions. Much of this region is difficult to access, and survey coverage is sparse and sporadic. An improved understanding of species' status and the factors limiting their populations is a prerequisite for effective management of priority birds in this sub-region. Recommendations are provided to address the information gaps.

Much of BCR 7 ON remains in a natural state, and this presents a unique opportunity to pursue future development in the context of conservation, rather than vice versa. The "conservation matrix" approach advocated by Ontario's Far North Science Advisory panel (Far North Science Advisory Panel 2010) holds significant promise to achieve this. However, achieving conservation successes in this region, through implementation of the recommendations contained within this and other strategies, will require broad collaboration among First Nations, provincial and federal agencies, and a number of other stakeholders.

Introduction: Bird Conservation Strategies

Context

This document is one of a suite of Bird Conservation Region strategies (BCR strategies) that have been drafted by Environment Canada for all regions of Canada. These strategies respond to Environment Canada's need for integrated and clearly articulated bird conservation priorities to support the implementation of Canada's migratory birds program, both domestically and internationally. This suite of strategies builds on existing conservation plans for the four "bird groups" (waterfowl,¹ waterbirds,² shorebirds,³ and landbirds⁴) in most regions of Canada, as well as on national and continental plans, and includes birds under provincial/territorial jurisdiction. These new strategies also establish standard conservation planning methods across Canada and fill gaps, as previous regional plans do not cover all areas of Canada or all bird groups.

These strategies present a compendium of required actions based on the general philosophy of achieving scientifically based desired population levels as promoted by the four pillar initiatives of bird conservation. Desired population levels are not necessarily the same as minimum viable or sustainable populations, but represent the state of the habitat/landscape at a time prior to recent dramatic population declines in many species from threats known and unknown. The threats identified in these strategies were compiled using currently available scientific information and expert opinion. The corresponding conservation objectives and actions will contribute to stabilizing populations at desired levels.

The BCR strategies are not highly prescriptive. In most cases, practitioners will need to consult additional information sources at local scales to provide sufficient detail to implement the recommendations of the strategies. Tools such as beneficial management practices will also be helpful in guiding implementation. Partners interested in participating in the implementation of these strategies, such as those involved in the habitat Joint Ventures established under the North American Waterfowl Management Plan (NAWMP), are familiar with the type of detailed implementation planning required to coordinate and undertake on-the-ground activities.

¹ NAWMP Plan Committee 2004

² Milko et al., 2003

³ Donaldson, 2000

⁴ Rich et al., 2005

Strategy Structure

Section 1 of this strategy presents general information about the BCR and the sub-region (i.e., Ontario's portion of the BCR), with an overview of the six elements¹ that provide a summary of the state of bird conservation at the sub-regional level. Section 2 provides more detail on the threats, objectives and actions for priority species grouped by each of the broad habitat types in the sub-region. Section 3 presents additional widespread conservation issues that are not specific to a particular habitat or were not captured by the threat assessment for individual species, as well as research and monitoring needs, and threats to migratory birds while they are outside of Canada. The approach and methodology are summarized in the appendices, but details are available in a separate document (Kennedy et al. 2012). A national database houses all the underlying information summarized in this strategy and is available from [Environment Canada](#).

¹ The six elements are: Element 1 – priority species assessment; Element 2 – habitats important to priority species; Element 3 – population objectives; Element 4 – threat assessment; Element 5 – conservation objectives; Element 6 – recommended actions

Characteristics of Bird Conservation Region 7: Taiga Shield and Hudson Plains

The Taiga Shield and Hudson Plains Bird Conservation Region, BCR 7, encompasses an area of more than 1 700 000 km² and spans eight provinces and territories. This region marks the transition from temperate to arctic habitats, bordered by boreal forests to the south and treeless tundra to the north. With a total area of roughly 260 000 km² (Table 1), BCR 7 ON covers almost 25% of the province (Fig. 1, 2).

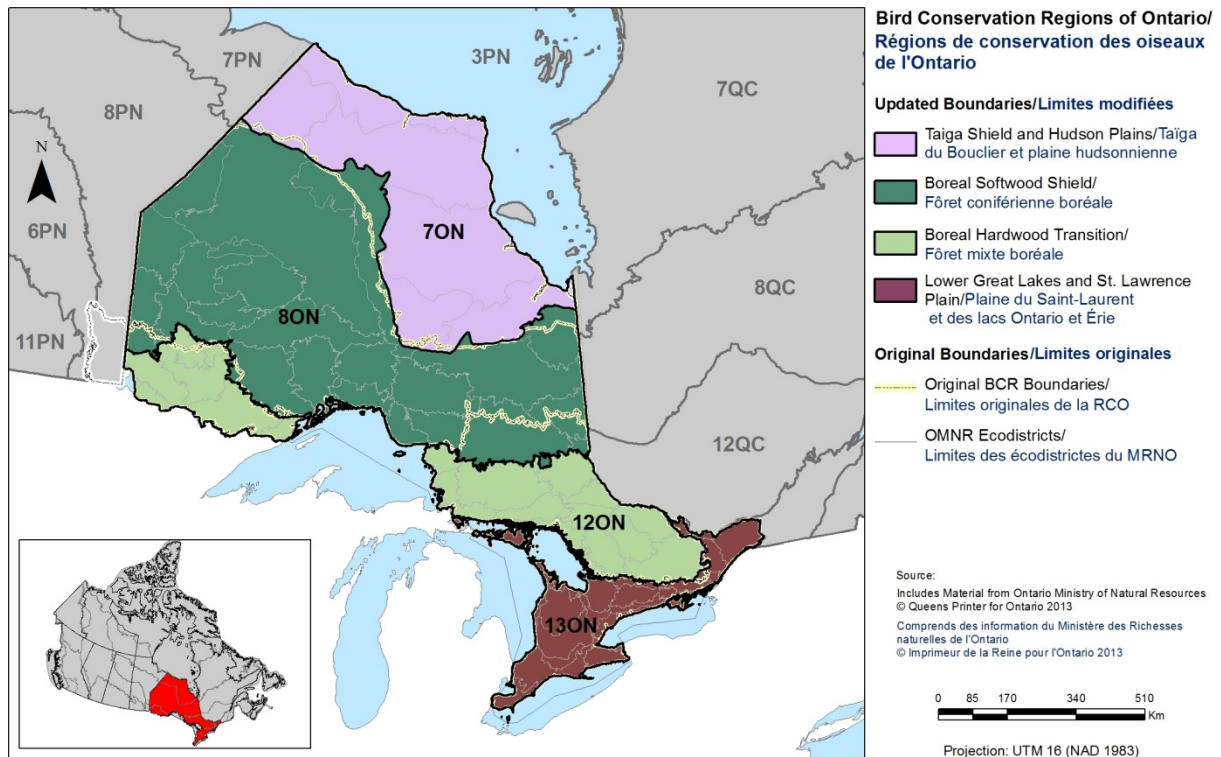


Figure 1. Map of Boundary Changes to Ontario's Bird Conservation Region 7: Taiga Shield and Hudson Plains.

For conservation planning purposes, the original NABCI-defined boundaries of Ontario BCRs have been updated to be consistent with the Ontario Ministry of Natural Resources Ecodistrict boundaries.

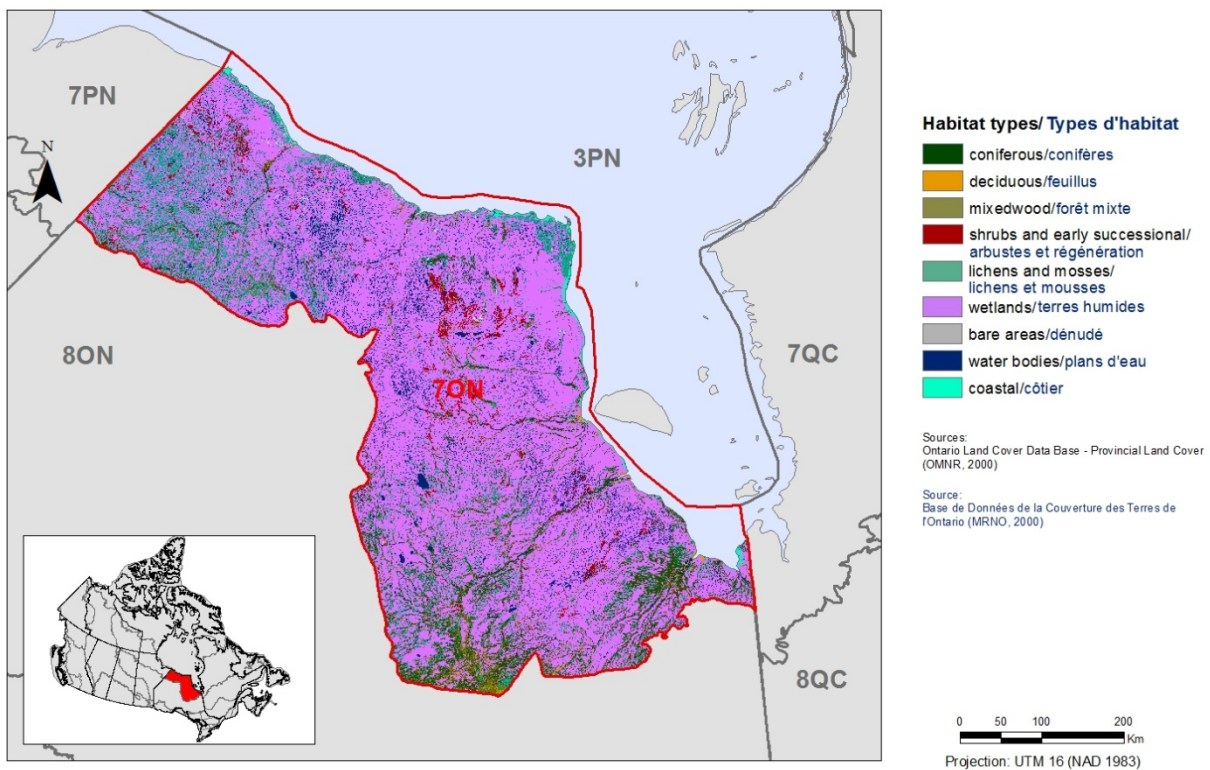


Figure 2. Map of landcover in BCR 7 Ontario.

Note: Riparian habitat areas are not depicted on this map because they represent a “zone” and are not a true land-cover class. A map depicting the extent of derived riparian areas for illustration purposes can be found in the Riparian section of this strategy.

To the east and west, BCR 7 ON is dominated by sparsely treed taiga underlain by the igneous rock of the Canadian Shield. Within Ontario, this BCR is dominated by the low-lying plain skirting the Hudson and James Bay coastlines, a distinct physiographic and ecological region known as the Hudson Bay Lowlands. This plain of impermeable clays was laid down by the shallow sea that covered the area some 6000 years ago, following the most recent glaciation. Over the millennia, peat has accumulated, and this vast and poorly drained plain now supports an immense network of marshes, fens and bogs; the third-largest continuous wetland in the world (Keddy 2000). Physiographic change is ongoing in the region. The rate of uplift since the retreat of the glaciers is the greatest in North America, with some coastal areas emerging from Hudson and James Bays at >1 m per century (Riley 2003).

At 77% of the total area, wetlands predominate in BCR 7 Ontario, with treed bogs and fens the most common habitat type (Table 1). Sedge fens are extensive along the coast and among coniferous forests in inland areas. Highly productive intertidal marshes are also common along the James and Hudson Bay coasts. Forested habitats are less extensive by comparison; only approximately 10% of BCR 7 ON is closed-canopy forest, with an additional 10% classified as sparse forest. These forests form in better-drained areas, such as palsa plateaus, beach ridges

and river corridors. Tundras of lichen and heath are found in drier areas in the north of the region, where permafrost is continuous.

Table 1. Major categories of land-cover in BCR 7 ON and their proportions on the landscape.

| BCR Habitat Class | Provincial Land-cover (PLC 27) Class(es) | Area (ha) | % of Total Area |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|
| Coniferous Forest | Forest – Dense Coniferous | 1 853 509 | 7.14% |
| Deciduous Forest | Forest – Dense Deciduous | 68 885 | 0.27% |
| Mixed Forest | Forest – Dense Mixed | 710 661 | 2.74% |
| Shrub/Early Successional | Forest Depletion – Cuts, Forest Depletion – Burns, Forest – Regenerating Depletion | 534 567 | 2.06% |
| Herbaceous | Agriculture –Pasture/Abandoned Fields | 0 | 0% |
| Lichens/Mosses | Tundra Heath | 291 354 | 1.12% |
| Bare Areas | Sand/Gravel/Mine Tailings, Bedrock | 59 646 | 0.23% |
| Wetlands | Marsh – Inland, Swamp - Deciduous, Swamp – Coniferous, Fen – Open, Fen – Treed, Bog – Open, Bog – Treed Forest – Sparse ¹ | 19 964 698 | 76.92% |
| Waterbodies | Water – deep clear, Water – shallow/sedimented | 2 198 473 | 8.47% |
| Coastal | Marsh – Intertidal, Marsh – Supertidal, Mudflats | 268 823 | 1.04% |
| Riparian* | Area within 30m of shoreline | 1 044 712 | N/A |
| Other/Unknown | Unknown, Cloud/Shadow, Settlement/Infrastructure | 3 337 | 0.01% |
| Total Area | | 25 953 953 | 100% |

¹ Sparse forest land-cover in the Hudson Bay–James Bay Lowland can be broadly interpreted to include bogs with a dense tree cover (Spectranalysis 2004, page 27) and based on expert opinion has been attributed to the BCR Habitat Class of wetlands.

* Riparian areas are not included in the total area because they represent a “zone” and not a true land-cover class.
Data source: Spectranalysis Inc., 2004 (Provincial Land-cover 27).

The region is physiographically unique, and with Ontario's most northerly habitats and only marine coastline, the region also supports a unique component of the province's biodiversity. Among birds, 35 species breed in Ontario only within the Hudson Bay Lowlands (Far North Science Advisory Panel 2010). This includes primarily arctic-breeding species of shorebirds such as the Dunlin and Semipalmated Sandpiper, and waterfowl such as the Lesser Snow Goose. Some species that also breed in more southerly habitats achieve their highest density in Ontario's BCR 7.

The rich coastal marshes of Hudson and James Bay provide globally significant habitat for migrants passing to and from their arctic breeding grounds. Millions of waterfowl including Canada Geese, Lesser Snow Geese and Atlantic Brant moult and stage in these marshes. For arctic breeding birds migrating south over continental North America, these habitats represent the final intertidal marine habitats before the Gulf of St. Lawrence or the Atlantic or Pacific coasts. A significant fraction, perhaps most, of the endangered *rufa* Red Knot population stages along the coast of James Bay prior to undertaking their long-distance migration to South America (Morrison et al. 1980).

The region is also unique for its ecological integrity. BCR 7 ON is sparsely populated, with approximately 12 000 human inhabitants spread among 8 communities (Far North Science Advisory Panel 2010). At present, no all-weather roads link the area to the South. The region holds little potential for commercial forestry or hydrocarbon development (Zhang and Barnes 2007; Far North Science Advisory Panel 2010). While mineral exploration is rapidly intensifying (e.g., Ring of Fire), currently there is a single active mine, the Victor Diamond mine 90 km west of Attawapiskat. A vast majority of the region remains in a natural state; rivers flow unimpeded to the sea and fire, succession, isostatic rebound and other natural drivers of ecological change remain the dominant forces shaping the land-cover. However, global environmental change and regional socio-economic forces mean that BCR 7 ON may face dramatic changes in the years to come.

Climate change models predict that polar regions will experience the greatest warming, and in Ontario the largest anomalies for both temperature and precipitation are predicted to occur in the most northern portion of the province, along the Hudson Bay coast in BCR 7 ON (Colombo et al. 2007). A longer ice-free season on Hudson and James Bays, alteration of precipitation regimes and peatland hydrology, and potentially increased severity or frequency of fires are all predicted to occur in the region as a consequence of anthropogenic climate change, and all may have dramatic consequences for resident and migratory birds of the region in the years to come. The future also holds potentially dramatic changes as a result of development; pressure is mounting from both within and outside the region to develop resources and encourage economic growth. In response to this mounting pressure, the Ontario Ministry of Natural Resources introduced legislation to guide development in a sustainable manner, with proactive consideration of environmental issues.

The [Far North Act](#), which received Royal Assent in October of 2010, provides a framework for community-based land use planning in BCR 7 ON and elsewhere in Ontario's North. This

important piece of legislation is intended to ensure a significant role for First Nations in land-use planning in the region, to preserve the region's ecological and cultural assets within a large network of protected areas (totalling more than 50% of the region's area), to protect biodiversity and ecosystem services throughout the region, and to foster sustainable economic growth that benefits First Nations. These goals are met through the development and implementation of community-based land use plans, guided by a larger-scale Far North Land Use Plan. Conservation of birds and their habitats is likely best accomplished by recognizing the important role that these land use plans will play in guiding the region's future.

At present, approximately 10% of BCR 7 ON is protected within provincial parks, including the 2.3 million hectare Polar Bear Provincial Park, Ontario's largest park (Fig. 3). Two migratory bird sanctuaries have been established along the James Bay coast, at Hannah Bay and the mouth of the Moose River. Additionally, Polar Bear Provincial Park and the southern James Bay coast are considered Ramsar Wetlands of International Importance. In Ontario's Far North, all of the areas designated as [Important Bird Areas](#) (IBAs) occur within BCR 7 Ontario, with 7 along the Hudson Bay coast and 11 along the James Bay coast.

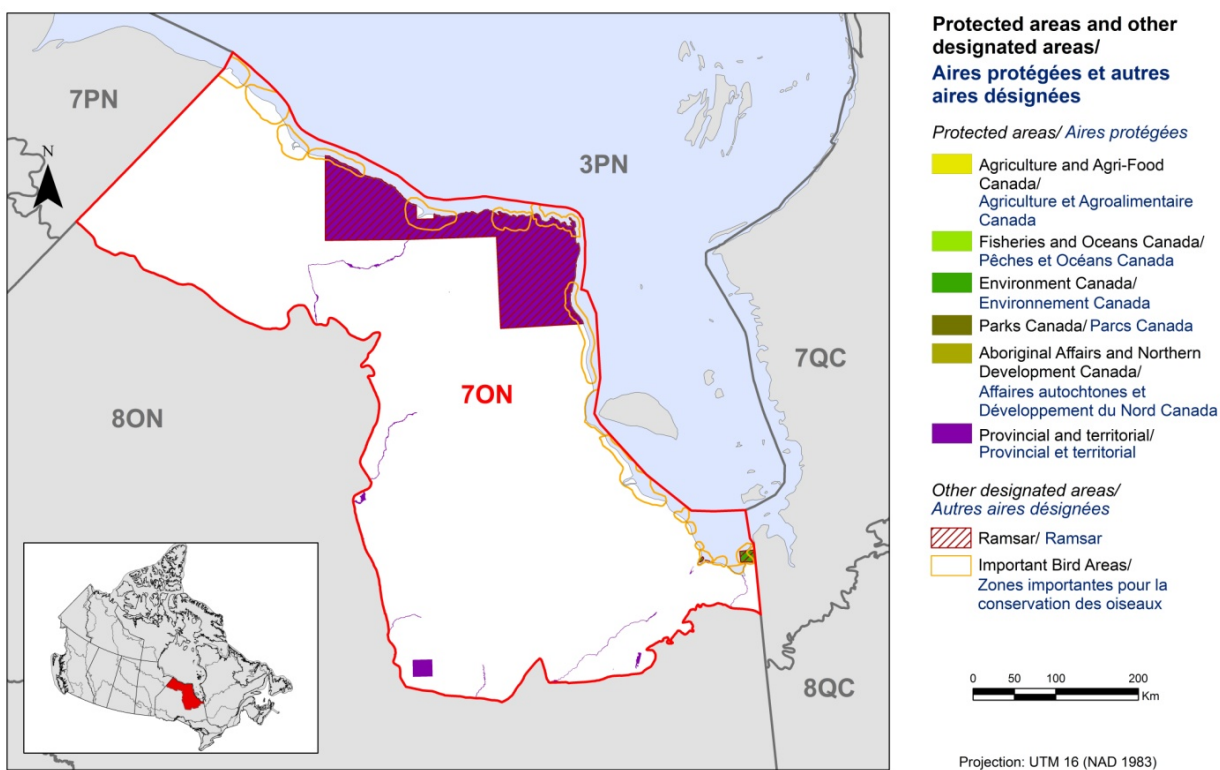


Figure 3. Map of protected and other designated areas in BCR 7 Ontario.

Ontario's *Far North Act* has established a goal for the development of a significant network of new protected areas. Because much of BCR 7 ON remains in a natural state, a unique opportunity exists to define first the matrix of conservation lands needed to maintain biodiversity, ecosystem services, and natural and cultural heritage, and then the areas where development can be sustainably pursued. This "conservation matrix" approach, advocated by the Far North Science Advisory Panel (Far North Science Advisory Panel 2010), holds significant promise for the conservation of migratory birds and their habitats within BCR 7 Ontario. Moreover, this opportunity underscores the need for collaboration between First Nations, provincial and federal agencies, and other stakeholders to achieve the conservation objectives identified in this strategy.

Section 1: Summary of Results – All Birds, All Habitats

Element 1: Priority species assessment

These Bird Conservation Strategies identify “priority species” from all regularly occurring bird species in each BCR sub-region (see Appendix 1). Species that are vulnerable due to population size, distribution, population trend, or threats are included because of their “conservation concern”. Some widely distributed and abundant “stewardship” species are also included. Stewardship species are included because they typify the national or regional avifauna and/or because they have a large proportion of their range and/or continental population in the sub-region; many of these species have some conservation concern, while others may not require specific conservation effort at this time. Species of management interest are also included as priority species when they are at (or above) their desired population objectives but require ongoing management because of their socio-economic importance as game species or because of their impacts on other species or habitats (see Appendix 2).

In Ontario, significant efforts to define priority species have already been undertaken for shorebirds, waterbirds, waterfowl and landbirds. The results of these bird group-specific planning efforts form the foundation of this integrated bird priority species list for BCR 7 Ontario. The priority species list was compiled using information from Ontario Partners in Flight (2010) for landbirds, the North American Waterfowl Management Plan (NAWMP Plan Committee 2004) and the Ontario Eastern Habitat Joint Venture Implementation Plan (2007) for waterfowl, the Ontario Waterbird Conservation Plan Version 1.0 (Zeran et al. 2009) for waterbirds and from the Ontario Shorebird Conservation Plan (Ross et al. 2003) for shorebirds. In addition, species that occur regularly within the BCR and that have been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and/or appear in Schedule 1 of the federal *Species at Risk Act* (SARA) and/or are listed under the Species at Risk in Ontario list (SARO) in the categories of Endangered, Threatened and Special Concern were added to the priority species list.¹ Further details on priority species assessment are found in Appendix 2.

The purpose of the prioritization exercise is to focus implementation efforts on the species and issues of greatest significance for Ontario’s avifauna. As with any priority-setting exercise, some important species may be excluded, but the issues of importance to any excluded species are usually captured by addressing the threats identified for species that are included on the priority list. With this in mind, species present in the region only as migrants were included as priority species only when their inclusion introduced new regional conservation issues, such as for the protection of migratory staging sites. Otherwise, we rely on conservation actions arising from threats to other priority species to address more general conservation concerns for migrants. Tables 2–4 summarize the number of priority species in BCR 7 ON by bird group and by the reasons for priority status.

¹ Current to February 2013.

Landbirds exhibit the greatest diversity in BCR 7 Ontario, representing nearly 60% of the species considered (Appendix 1); however, only 24 species qualified for the priority species list (Tables 2, 3). Among the 66 priority species identified, 11 are listed under federal and/or provincial species at risk legislation (Tables 2, 4). Among landbirds, more than 50% of the species on the priority list were included as “stewardship species”; species that may not be declining or face significant threats, but for which the BCR contains a high proportion of the global population (Table 4). In contrast, more than two thirds of the shorebirds present (as breeders or migrants) qualified for priority status, and shorebirds made up a similar fraction of the priority species list despite their lower diversity (Table 3). Waterbirds and waterfowl contributed an additional 21 species to the priority list (Table 3).

Table 2. Priority species in BCR 7 Ontario, population objective and reasons for priority status. All assessments, listings and designations are current to February 2013.

| Priority Species | Population Objective | COSEWIC ¹ | SARA ² | SARO ³ | Regional/Sub-regional Concern ⁴ | Regional/Sub-regional Stewardship ⁵ | National/Continental Concern | National/Continental Stewardship |
|-------------------------|------------------------------|----------------------|-------------------|-------------------|--------------------------------------------|------------------------------------------------|------------------------------|----------------------------------|
| Landbirds | | | | | | | | |
| Alder Flycatcher | Assess/Maintain | | | | | Y | | Y |
| Bald Eagle | Assess/Maintain | | | SC | Y | | | Y |
| Bay-breasted Warbler | Assess/Maintain | | | | Y | | Y | |
| Black-backed Woodpecker | Maintain current | | | | | Y | | Y |
| Boreal Chickadee | Maintain current | | | | | Y | | Y |
| Canada Warbler | Assess/Maintain [†] | T | T | SC | Y | | Y | |
| Common Nighthawk | Assess/Maintain [†] | T | T | SC | Y | | Y | |
| Golden Eagle | Assess/Maintain | | | E | Y | | | |
| Gray Jay | Maintain current | | | | | Y | | Y |
| Harris's Sparrow | Assess/Maintain | | | | Y | | Y | |
| Lincoln's Sparrow | Maintain current | | | | | Y | Y | Y |
| Nelson's Sparrow | Assess/Maintain | | | | Y | Y | Y | |
| Northern Hawk Owl | Assess/Maintain | | | | | Y | | |
| Northern Shrike | Assess/Maintain | | | | | Y | | Y |
| Olive-sided Flycatcher | Assess/Maintain [†] | T | T | SC | Y | | Y | |
| Palm Warbler | Maintain current | | | | | Y | Y | Y |
| Pine Grosbeak | Assess/Maintain | | | | | Y | Y | Y |
| Rusty Blackbird | Assess/Maintain [†] | SC | SC | | Y | | Y | |

¹ Assessed by COSEWIC ([Committee on the Status of Endangered Wildlife in Canada](#)) as: E, Endangered; T, Threatened; SC, Special Concern.

² Species listed on Schedule 1 of the *Species at Risk Act* as E, Endangered; T, Threatened; SC, Special Concern ([Species at Risk Public Registry](#)).

³ [Ontario Species at Risk List](#) as as E, Endangered; T, Threatened; SC, Special Concern; Exp, Extirpated.

⁴ Regional refers to BCR-wide (i.e., all jurisdictional data were used for the entire BCR 7) while sub-regional refers to the Ontario portion of BCR 7 only (i.e., Ontario BCR data were used).

⁵ Only the landbird group distinguishes stewardship species from other priority species (see [Partners in Flight Handbook on Species Assessment](#)).

[†] This interim population objective for this species will be replaced with the official recovery objective once recovery documents are published under the *Species at Risk Act*.

Table 2 continued

| Priority Species | Population Objective | COSEWIC ¹ | SARA ² | SARO ³ | Regional/Sub-regional Concern ⁴ | Regional/ regional Stewardship ⁵ | National/ Continental Concern | National/ Continental Stewardship |
|-------------------------|------------------------------|----------------------|-------------------|-------------------|-----------------------------------------------|---------------------------------------------------|-------------------------------------|-----------------------------------------|
| Short-eared Owl | Assess/Maintain [†] | SC | SC | SC | Y | | Y | |
| Smith's Longspur | Maintain current | | | | Y | Y | Y | |
| Spruce Grouse | Assess/Maintain | | | | | Y | | Y |
| Swamp Sparrow | Maintain current | | | | | Y | Y | Y |
| Tennessee Warbler | Maintain current | | | | | Y | | Y |
| White-winged Crossbill | Assess/Maintain | | | | | Y | Y | Y |
| Shorebirds | | | | | | | | |
| American Golden-Plover | Migrant | | | | Y | | Y | |
| Black-bellied Plover | Migrant | | | | Y | | Y | |
| Buff-breasted Sandpiper | Migrant | SC | | | Y | | Y | |
| Dunlin | Assess/Maintain | | | | Y | | Y | |
| Eskimo Curlew | Recovery not feasible | E | E | Exp | Y | | Y | |
| Greater Yellowlegs | Maintain current | | | | Y | | Y | |
| Hudsonian Godwit | Assess/Maintain | | | | Y | | Y | |
| Least Sandpiper | Maintain current | | | | Y | | | |
| Lesser Yellowlegs | Assess/Maintain | | | | Y | | | |
| Marbled Godwit | Assess/Maintain | | | | Y | | Y | |
| Pectoral Sandpiper | Assess/Maintain | | | | Y | | | |
| Red Knot (rufa) | Migrant | E | E | E | Y | | Y | |
| Ruddy Turnstone | Migrant | | | | Y | | Y | |
| Sanderling | Migrant | | | | Y | | Y | |
| Semipalmated Plover | Assess/Maintain | | | | Y | | | |
| Semipalmated Sandpiper | Assess/Maintain | | | | Y | | Y | |
| Short-billed Dowitcher | Assess/Maintain | | | | Y | | Y | |
| Solitary Sandpiper | Assess/Maintain | | | | Y | | Y | |
| Whimbrel | Assess/Maintain | | | | Y | | Y | |
| White-rumped Sandpiper | Migrant | | | | Y | | | |
| Wilson's Snipe | Assess/Maintain | | | | Y | | | |

Table 2 continued

| Priority Species | Population Objective | COSEWIC ¹ | SARA ² | SARO ³ | Regional/Sub-regional Concern ⁴ | Regional/ regional Stewardship ⁵ | National/Continental Concern | National/Continental Stewardship |
|-----------------------------------|------------------------------|----------------------|-------------------|-------------------|-----------------------------------------------|---------------------------------------------------|---------------------------------|-------------------------------------|
| Waterbirds | | | | | | | | |
| American Bittern | Maintain current | | | | Y | | Y | |
| Arctic Tern | Assess/Maintain | | | | Y | | Y | |
| Black Tern | Assess/Maintain | | | SC | Y | | Y | |
| Little Gull | Assess/Maintain | | | | Y | | Y | |
| Pacific Loon | Assess/Maintain | | | | Y | | Y | |
| Parasitic Jaeger | Assess/Maintain | | | | Y | | | |
| Red-throated Loon | Assess/Maintain | | | | Y | | | |
| Sandhill Crane | Maintain current | | | | Y | | | |
| Yellow Rail | Assess/Maintain [†] | SC | SC | SC | Y | | Y | |
| Waterfowl | | | | | | | | |
| American Black Duck | Assess/Maintain | | | | Y | | Y | |
| Black Scoter | Assess/Maintain | | | | Y | | Y | |
| Atlantic Brant | Migrant | | | | Y | | Y | |
| Canada Goose (Mississippi Valley) | Maintain current | | | | Y | | Y | |
| Canada Goose (Southern James Bay) | Maintain current | | | | Y | | Y | |
| Common Goldeneye | Assess/Maintain | | | | Y | | | |
| Green-winged Teal | Assess/Maintain | | | | Y | | | |
| Long-tailed Duck | Assess/Maintain | | | | Y | | Y | |
| Mallard | Assess/Maintain | | | | Y | | | |
| Ring-necked Duck | Assess/Maintain | | | | Y | | | |
| Snow Goose ⁶ | Decrease | | | | Y | | Y | |
| Surf Scoter | Assess/Maintain | | | | Y | | Y | |

⁶ A species of management interest due to its overabundance.

Table 3. Summary of priority species, by bird group, in BCR 7 Ontario.

| Bird Group | Total Species | Priority Species | % Priority Within Bird Group | Percent of Priority List |
|--------------|---------------|------------------|------------------------------|--------------------------|
| Landbirds | 118 | 24 | 20% | 36% |
| Shorebirds | 29 | 21 | 72% | 32% |
| Waterbirds | 19 | 9 | 47% | 14% |
| Waterfowl | 30 | 12 | 40% | 18% |
| Total | 196 | 66 | – | 100% |

Table 4. Number of priority species in BCR 7 ON by reason for priority status. All assessments, listings and designations are current to February 2013.

| Priority Listing ¹ | Landbirds | Shorebirds | Waterbirds | Waterfowl |
|-----------------------------------------------|-----------|------------|------------|-----------|
| COSEWIC ² | 5 | 3 | 1 | 0 |
| Federally Listed under SARA ³ | 5 | 2 | 1 | 0 |
| Provincially Listed under SARO ⁴ | 6 | 2 | 2 | 0 |
| National/Continental Concern | 14 | 15 | 6 | 8 |
| National/Continental Stewardship ⁵ | 13 | N/A | N/A | N/A |
| Regional/Sub-regional ⁶ Concern | 11 | 21 | 9 | 12 |
| Regional/Sub-regional Stewardship | 15 | N/A | N/A | N/A |
| Management Interest ⁷ | 0 | 0 | 0 | 1 |

¹ A single species can be on the priority list for more than one reason.

² Assessed by COSEWIC ([Committee on the Status of Endangered Wildlife in Canada](#)) as: E, Endangered; T, Threatened; SC, Special Concern. Current to February 2013.

³ Species listed on Schedule 1 of SARA as E, Endangered; T, Threatened; SC, Special Concern ([Species at Risk Public Registry](#)).

⁴ [Ontario Species at Risk List](#)

⁵ Only the landbird group distinguishes stewardship species from other priority species (see [Partners in Flight Handbook on Species Assessment](#)).

⁶ Regional refers to BCR-wide (i.e., all jurisdictional data were used for the entire BCR 7) while sub-regional refers to the Ontario portion of the BCR only (i.e., Ontario BCR data were used).

⁷ Snow Goose is a species of management interest due to its overabundance.

Element 2: Habitats Important to Priority Species

Identifying the broad habitat requirements for each priority species within the BCR allowed species to be grouped by shared habitat-based conservation issues and actions (see Appendix 2 for details on how species were assigned to standard habitat categories). If many priority species associated with the same habitat face similar conservation issues, then conservation action in that habitat may support populations of several priority species. BCR strategies use a modified version of the standard land-cover classes developed by the United Nations (Food and Agriculture Organization 2000) to categorize habitats, and species were often assigned to more than one habitat class.

A majority of the priority species (60%) in BCR 7 ON use wetland habitats (Fig. 4), consistent with the importance of this habitat type in the region's land-cover (77%). Similarly, closed-canopy forest, especially deciduous forest, is used by comparatively few species because it is not a dominant component of the land-cover. Coastal habitats are used by 18% of priority species. The region has nearly 1300 km of marine coastline, and coastal habitats at several locations constitute key staging sites for shorebirds such as the Red Knot and Sanderling, and waterfowl such as Snow Geese and Atlantic Brant. Lichen and moss tundra, used by 25% of priority species, is restricted in Ontario to BCR 7; indeed, Ontario BCR 7's tundra is the most southerly mainland tundra in the world (Ontario Parks 2010).

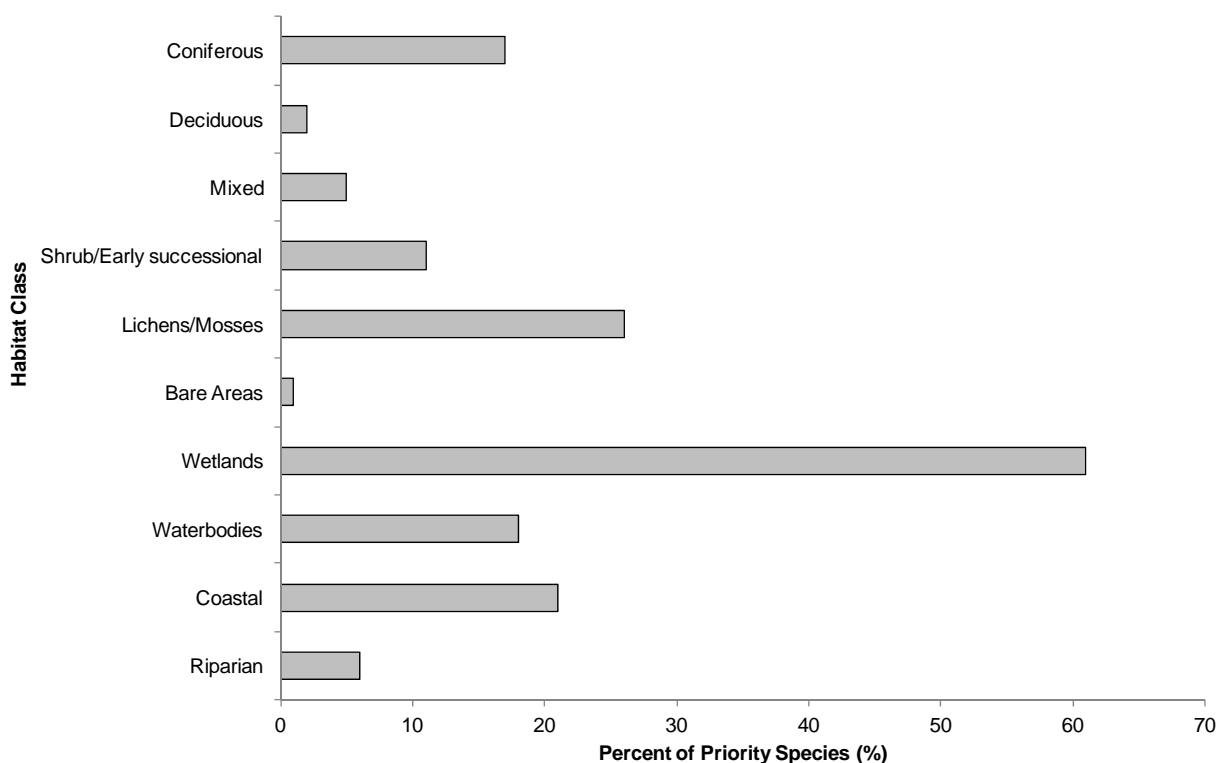


Figure 4. Percent of priority species that are associated with each habitat type in BCR 7 Ontario.

Note: The total exceeds 100% because each species may use more than one habitat.

Element 3: Population Objectives

Population objectives allow us to measure and evaluate conservation success. The objectives in this strategy are assigned to categories and are based on a quantitative or qualitative assessment of species' population trends. If the population trend of a species is unknown, the objective is set as "assess and maintain", and a monitoring objective is given (see Appendix 2). For any species listed under the *Species at Risk Act* (SARA) or under provincial/territorial endangered species legislation, Bird Conservation Strategies defer to population objectives in available Recovery Strategies and Management Plans. If recovery documents are not available, objectives are set using the same approach as for other species within that bird group and are considered as interim objectives. Once recovery objectives are available, they will replace interim objectives. For more details on methodology, refer to Appendix 2. The ultimate measure of conservation success will be the extent to which population objectives have been reached within the timeframes set by national and continental pillar plans.

A lack of monitoring information is a pervasive issue in BCR 7 Ontario. Consequently, nearly 65% of priority species, with representatives from all bird groups, were assigned an objective to "assess" population status while "maintaining" current levels in the interim. For 21% of priority species, population levels (typically at a scale larger than BCR 7 Ontario) were deemed to be at or near the objective, and an objective of "maintaining current" population levels was assigned (Fig. 5). A single taxon, the Mid-Continent population of Lesser Snow Goose, was deemed to be overabundant such that an objective of "decreasing" their abundance was appropriate. The general lack of quantitative objectives does not imply that bird populations in Ontario's portion of the BCR have not changed in abundance, but rather that a lack of rigorous monitoring information for the region precludes assignment of quantitative objectives.

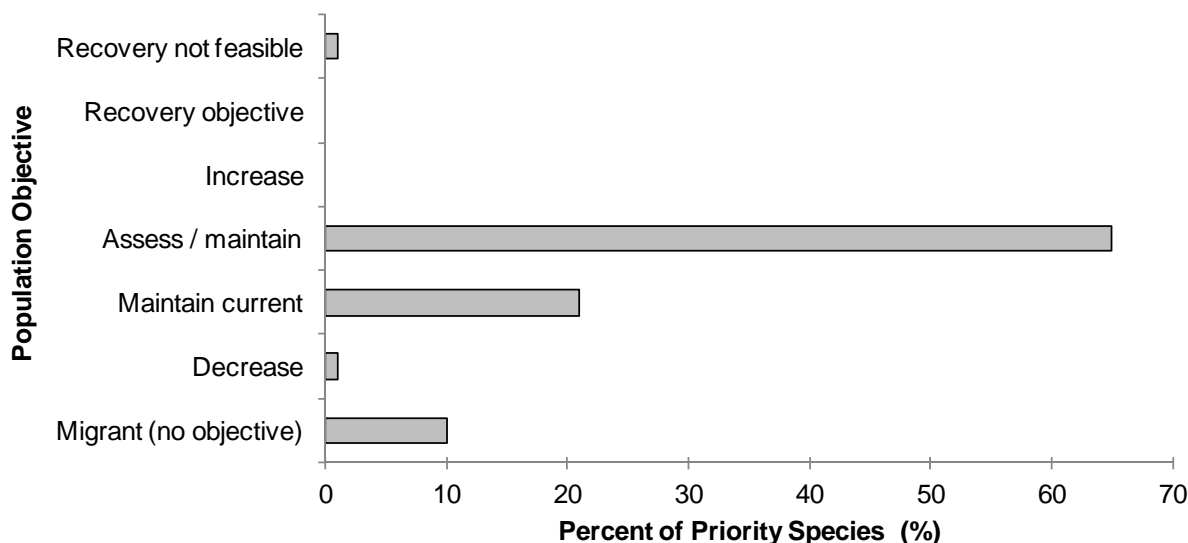


Figure 5. Percent of priority species that are associated with each population objective category in BCR 7 Ontario.

Note: Many species have "Assess/Maintain" because of the paucity of monitoring data from within the BCR. Recovery objectives were not available given the absence of published recovery documents for those priority species and as such were assigned to the Assess/Maintain category.

Element 4: Threat Assessment for Priority Species

Bird population trends are driven by factors that affect either their reproduction or survival during any point in their annual cycle. Threats that can reduce survival include, for example, reduced food availability at migratory stopovers or exposure to toxic compounds. Examples of threats that can reduce reproductive success may include high levels of nest predation or reduced quality or quantity of breeding habitat. The threats assessment process (see Appendix 2) identifies threats believed to have a population-level effect on individual priority species. These threats are assigned a relative magnitude (Low, Medium, High, Very High) based on their scope (the proportion of the species' range within the sub-region that is impacted) and severity (the relative impact on the priority species' population). This allows us to target conservation actions towards threats with the greatest effects on suites of species or in broad habitat classes. Some well-known conservation issues may not be identified in the literature as significant threats to populations of an individual priority species and therefore may not be captured in the threat assessment. However, they merit attention in conservation strategies because of the large numbers of individual birds affected in many regions of Canada. Usually these issues transcend habitat types and are considered "widespread," and these issues are addressed in a separate section (see Section 3: Additional Issues).

The results of the threat assessment are consistent with the comparatively natural state of BCR 7 Ontario. The lack of information on the status of many priority species and their habitats was perhaps most prevalent in this BCR, and while not considered a threat *per se*, this lack of information was considered alongside threats in order to establish appropriate monitoring and conservation objectives for priority species in this strategy. A majority of the threats facing priority species within the BCR are of a low magnitude (Fig. 6; Table 5), and the number and magnitude of threats facing bird species in this region are lower than for more southerly BCRs in Ontario. Importantly, a majority of threats were found to have low magnitude effects at present, but may threaten priority species to a greater degree in the future. For example, mining exploration and the limited active production within the BCR currently have low magnitude effects on populations of 17 priority species (25%), but the interest in development of mineral resources is increasing in this region. With resource development comes the strong potential for an expanded network of all-weather and winter roads, rail lines and transmission corridors in BCR 7 Ontario; the threats to priority species from these linear features are low at present (considered a widespread issue; see Section 3: Additional Issues) but will likely increase as development proceeds in the Far North.

At present, the highest magnitude threats identified were related to habitat degradation from overabundant geese and from anthropogenic climate change (Fig. 6). For 41 priority species, a lack of knowledge of population status and limiting factors was a significant impediment to their conservation. These issues are discussed in subsequent sections of the strategy.

Cumulative Effects of Threats to Priority Species

For several of the threats related to development identified in this strategy, the long-term impact of several activities is greater than the sum of the impacts of individual activities. There

is no standardized method for assessing these “cumulative effects”. The threat ranking and roll-up procedures (Table 5) demonstrate the sum of effects for threats within and among threat categories, and are useful for identifying the most important threats within a habitat class. These procedures also identify whether a large number of low-level threats may be affecting a species. However, it is important to consider that threats might interact in unanticipated ways, or that, in aggregate, threats might exceed some ecological threshold and produce cumulative effects of an unanticipated magnitude. Cumulative effects studies assessing population responses to multiple stressors are an important tool to better understand the long-term consequences of some of the threats described in this strategy.

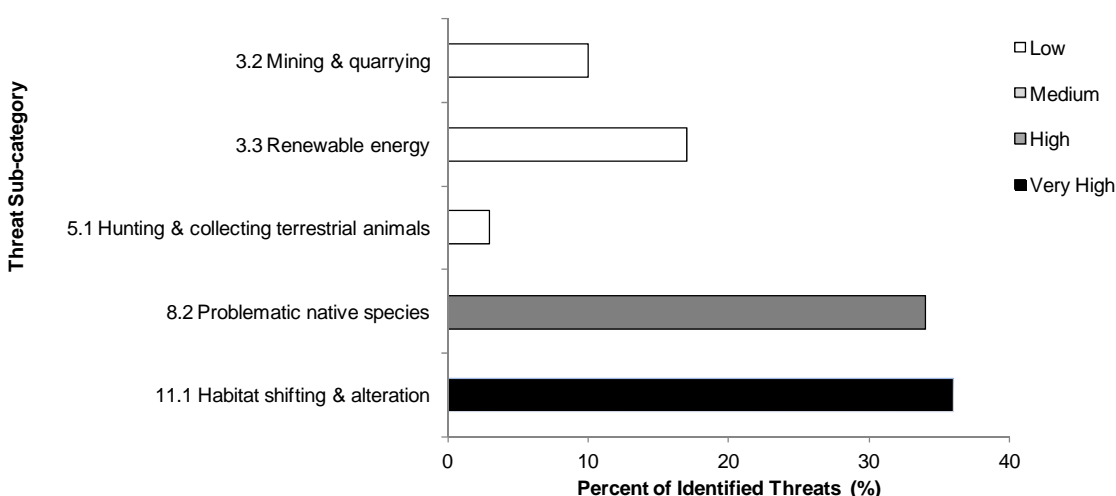


Figure 6. Percent of identified threats to priority species within BCR 7 ON by threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat sub-category in BCR 7 ON (for example, if 100 threats were identified in total for all priority species in BCR 7, and 10 of those threats were in the category 11.1 Habitat shifting & alteration, the bar on the graph would represent this as 10%). Shading in the bars (VH = very high, H = high, M = medium and L = low) represents the rolled-up magnitude of all threats in each threat sub-category in the BCR.

Note: 5.1 Hunting and collecting terrestrial animals refers to legal hunting and lead poisoning of waterfowl from lead shot, but also includes illegal harvest. See Element 4 in Appendix 2 for details on how magnitude was assessed.

Overall threats were summarized for the sub-region in Table 5. Like the data presented above, 8. Invasive & Other Problematic Species & Genes and 11. Climate Change and Severe Weather are the two main threats. However, the table demonstrates that both of these threats occur in most habitat classes and, in some cases, also varied in rank by habitat class. The overall threat ranking in each habitat is in the top row, while the overall threat ranking for each threat is in the last column.

Table 5. Relative magnitude of identified threats to priority species within BCR 7 ON by threat category and broad habitat class.

Only threats with a population-level effect were considered, and overall ranks were generated through a roll-up procedure described in Kennedy et al. (2012). L represents Low Magnitude threats, M: Medium, H: High, VH: Very High. Blank cells indicate that no priority species had threats identified in the threat category/habitat combination.

| Threat Category | Habitat Class | | | | | | | | | | Overall Rank |
|--------------------------------------------------|---------------|-----------|------------|--------------------------|----------------|------------|----------|-------------|----------|----------|--------------|
| | Coniferous | Deciduous | Mixed Wood | Shrub/Early successional | Lichens/Mosses | Bare Areas | Wetlands | Waterbodies | Coastal | Riparian | |
| Overall Rank | L | L | L | M | H | L | H | H | H | L | |
| 01. Residential & Commercial Development | | | | | | | | | | | |
| 02. Agriculture & Aquaculture | | | | | | | | | | | |
| 03. Energy Production & Mining | L | L | L | L | L | L | L | L | L | L | L |
| 04. Transportation & Service Corridors | | | | | | | | | | | |
| 05. Biological Resource Use | | | | | | | L | L | | | L |
| 06. Human Intrusions & Disturbance | | | | | | | | | | | |
| 07. Natural System Modifications | | | | | | | | | | | |
| 08. Invasive & Other Problematic Species & Genes | | | | | H | | H | | H | | H |
| 09. Pollution | | | | | | | | | | | |
| 11. Climate Change & Severe Weather | L | L | L | H | H | | VH | VH | H | L | VH |

Threats to priority species while they are outside of Canada during the non-breeding season were also assessed and are presented in the section Threats Outside Canada.

Element 5: Conservation Objectives

Conservation objectives were designed to address threats and information gaps that were identified for priority species. They describe the environmental conditions and research and monitoring that are thought to be necessary for progress towards population objectives and to understand underlying conservation issues for priority bird species. As conservation objectives are reached, they will collectively contribute to achieving population objectives. Whenever possible, conservation objectives were developed to benefit multiple species, and/or respond to more than one threat (see Appendix 2).

For BCR 7 Ontario, a majority of objectives relate to increasing the understanding of population status and limiting factors (Fig. 7). Objectives in this category attempt to address the significant gaps in population monitoring programs in BCR 7 Ontario, as well as improve understanding of the effects of climate change on bird populations.

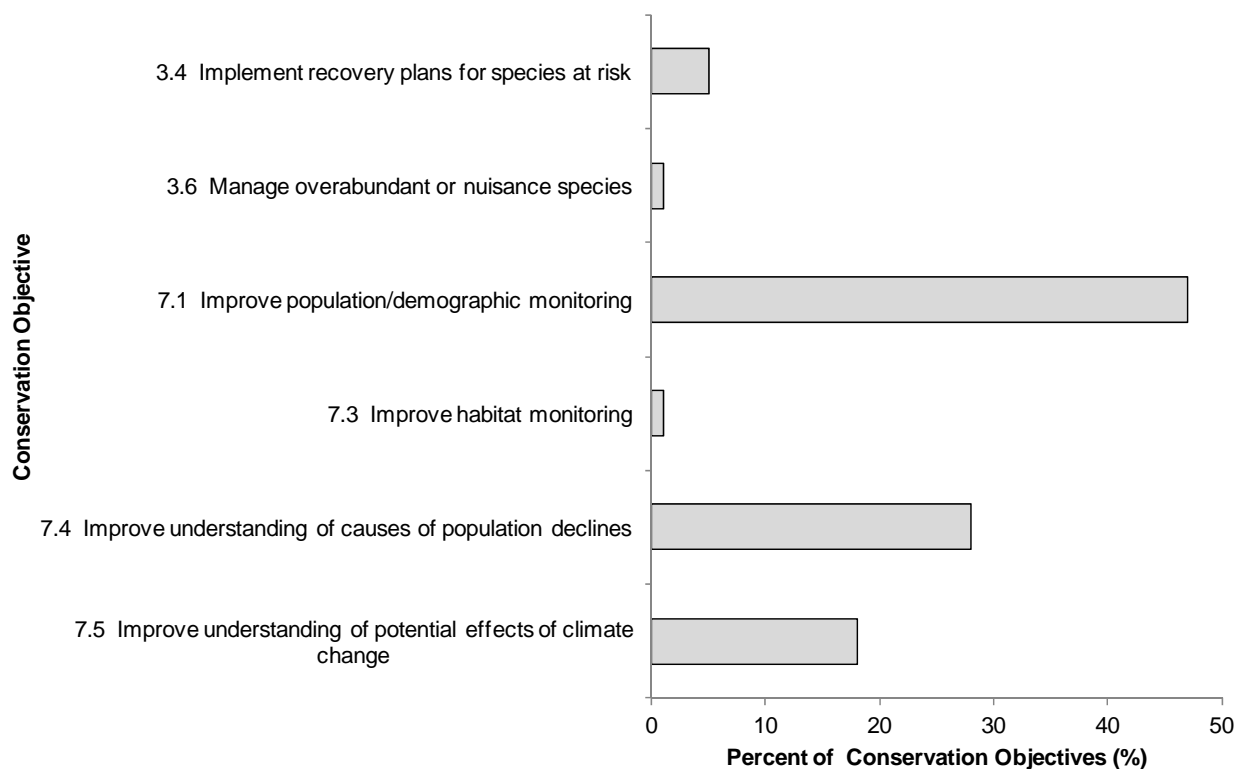


Figure 7. Percent of all conservation objectives assigned to each conservation objective category in BCR 7 Ontario.

Element 6: Recommended Actions

Recommended actions indicate on-the-ground activities that will help to achieve the conservation objectives (Fig. 8). Actions are strategic rather than highly detailed and prescriptive (see Appendix 2). This BCR strategy is directed at multiple species, and the actions proposed here will often benefit a variety of species, including those at risk. However, for detailed recommendations for species at risk, readers should consult recovery documents when available. Similarly, some landbird species included in this strategy are “Stewardship Species” as defined by Partners in Flight (Rich et al. 2004). These are species with stable populations for which no specific conservation issues have been identified, but which depend BCR 7 ON Ontario to such an extent that the region has a high responsibility for their protection. These species may not appear prominently in the threats, objectives and actions described herein, but should benefit from the implementation of actions that target multiple species.

In BCR 7 Ontario, many of the recommended actions relate to knowledge acquisition (Fig. 8). Even basic understanding of distribution and abundance of bird species is lacking for much of this sub-region. Bird surveys in the Hudson Bay Lowlands have been mainly conducted along access routes such as rivers and coastlines. Very few surveys have been conducted in inland habitats (Mainguy and Wedeles 2010). Even in areas where surveys have been carried out, the high cost and logistical difficulties mean that coverage is limited. For example, during the 2001–2005 Ontario Breeding Bird Atlas, search effort in the Hudson Bay Lowlands was mostly within 60–100 km of the coast, and almost all 10 x 10 km squares received less than 20 hours of search effort, as compared to atlas squares in southern Ontario, which often received over 100 hours of search effort (Cadman et al. 2007). An improved understanding of the population status of birds and the anthropogenic activities affecting their status is a prerequisite for effective conservation in BCR 7 Ontario.

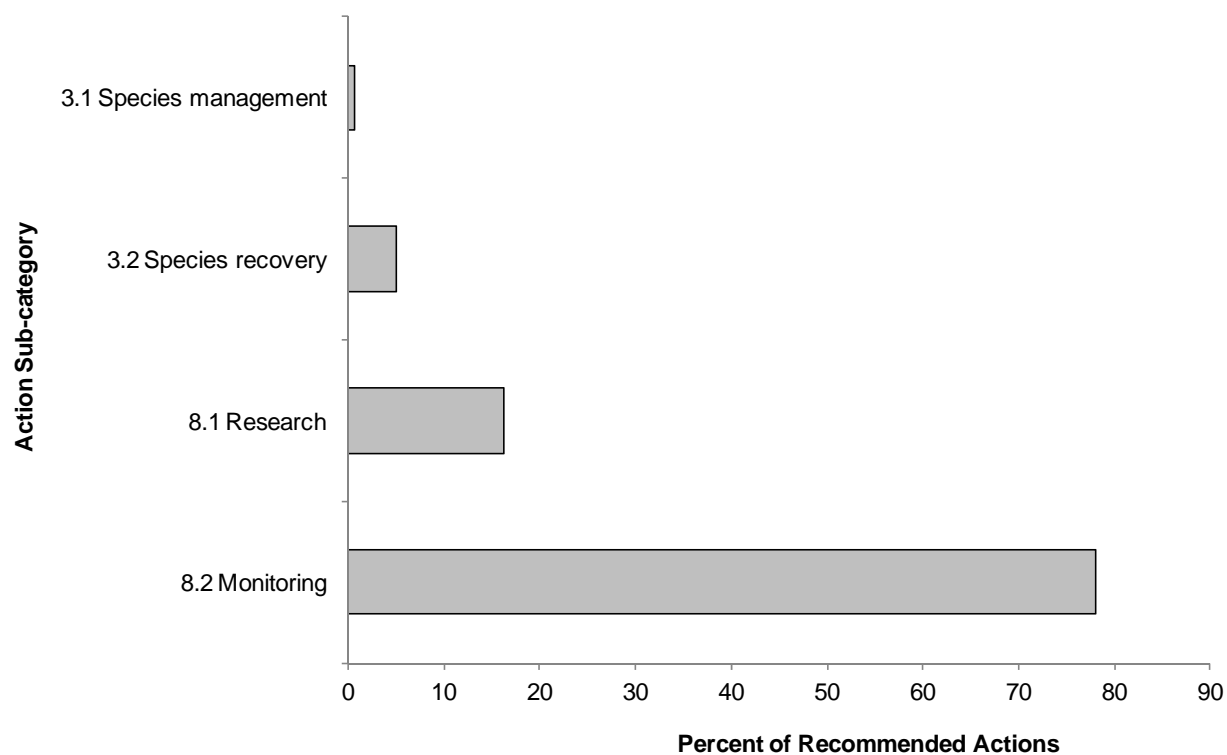


Figure 8. Percent of recommended actions assigned to each sub-category in BCR 7 Ontario.

“Research and monitoring” refers to specific species where information is required. For a discussion of broad-scale research and monitoring requirements, see the section on Research and Population Monitoring Needs.

Section 2: Conservation Needs by Habitat

The following sections provide more detailed information on priority species, their threats and objectives and habitat specific issues within each of the broad habitat classes that occur in BCR 7 Ontario. Conservation objectives and corresponding actions have been developed to address only those threats to priority species that have a magnitude of “medium” or greater. Some species do not appear in the threats table because their low-level threats have not been assigned objectives or actions and/or identified threats are addressed in the Widespread Issues section of the strategy.

At present, BCR 7 ON remains in a largely natural state, and many of the most significant conservation concerns are best described as emerging issues. Development of renewable energy or mineral resources, and the associated expansion of the currently limited network of roads, rail lines and transmission lines are all such emerging issues. Because of the limited current scope of these types of development within BCR 7 Ontario, these issues have low magnitude effects on priority bird species and their habitats at present. However, the region holds significant potential for these types of developments, and effects may increase markedly in the years to come. Although potentially desirable from a perspective of economic growth, these developments could have a broad range of effects on birds and other wildlife in a wide variety of habitats.

Emerging Issue: Renewable Energy

There are currently no large-scale hydro-electric developments in BCR 7 Ontario, but tributaries of the Moose River have been developed outside of the BCR, and the region holds significant potential for further development. Thirty-seven sites have been identified as having the potential for hydroelectric generation in the Hudson Bay Lowlands, including some with capacities in excess of 100 MW (OMNR Renewable Energy Atlas 2011). Large scale hydro-electric developments can affect bird populations through direct loss of habitat to flooding, erosion and scouring of river channels, and altered sediment dynamics in the rich estuarine environments so critical for staging migrants (Drinkwater et al. 1994). Moreover, hydrological data are insufficient to predict the ecological consequences of development; indeed, Ontario’s Hudson Bay watershed has been identified as having among the poorest monitoring of streamflow and regional hydrology in Canada (Far North Science Advisory Panel 2010).

Although there is considerable interest in developing hydro-electric resources in the region, large-scale development of the Albany, Winisk and Severn Rivers and their tributaries is controlled by the Northern Rivers Commitment, which states that there will be no developments in excess of 25 MW within these basins (OMNR 2007, Far North Science Advisory Panel 2010).

The area has significant potential for wind energy as well. Although potential is greatest in coastal and offshore areas of Hudson and James Bays, a lack of transmission infrastructure currently limits the commercial potential of any large-scale developments (Far North Science Advisory Panel 2010). Expansion of transmission corridors in the future may alter this, but, in

the near term, smaller-scale wind power developments offer a potentially significant opportunity for local power generation for the coastal communities of BCR 7 Ontario. Wind-turbines are known to result in direct mortality of birds through collision, and reduce habitat suitability because birds avoid areas of development (Winkleman 1994). Even small-scale wind power development in coastal areas could lead to loss of important staging habitat.

Renewable energy developments could therefore have a variety of negative effects on priority bird species in BCR 7 Ontario. However, it is important to note that communities of the region currently depend largely on diesel generation for electricity, so small-scale renewable energy developments may have net environmental benefits in terms of reductions in air pollution and potential fuel spills.

Emerging Issue: Mineral Exploration and Mining

In 2007–2008, the discovery of some of the richest deposits of chromite in the world sparked an intense rush to stake claims in an area dubbed the “Ring of Fire,” which straddles BCR 7 ON and BCR 8 Ontario. In the three years that followed, the number of unpatented mining claims in Ontario’s Far North tripled. At the time of writing, a proposal for the world’s largest chromite mine is under consideration for proceeding to environmental assessment. Presently, the supply of chromite, an important ingredient in stainless steel, is controlled by a small number of countries, all outside of North America. Because of this strategic importance, and because of the world-class grade and tonnage of the deposit, there is significant interest in developing this resource (Far North Science Advisory Panel 2010).

Intensive exploration, drilling and bulk sampling in the region is ongoing. Under the current proposal, chromite ore would be extracted from a large open-pit mine in the McFauld’s Lake area, just inside the boundary of BCR 7 Ontario. It would then be crushed and transported by rail or heavy-duty road, possibly to Nakina, 300 km to the south. The Ring of Fire holds other deposits of nickel, copper, platinum, vanadium, titanium, gold and diamond-bearing kimberlites. The significant infrastructure necessary to support the chromite mine’s operations may make subsequent mine developments economically feasible. Although impacts of any single development may be modest, the cumulative effects on the priority birds and habitats of BCR 7 ON may be substantial.

Mining activities affect a variety of habitat types, and open-pit mining and associated infrastructure leads to a direct loss of these habitats. Disruption of permafrost and surface-water flow from resource extraction or exploration activities can adversely affect hydrological characteristics of wetland habitats (e.g., Blodgett and Kuipers 2002). Diamond-bearing kimberlite pipes are sometimes underneath shallow lakes, which must be drained to access the deposit. Mining for diamonds at Victor Lake, which began in 2008, involves large-scale pumping of water from the open pits, disrupting local hydrology and potentially leading to the release of mercury stored in the peatlands (AMEC 2007, Far North Science Advisory Panel 2010).

Habitats can also be degraded by the road dust and disturbance that mining creates; however, studies to document the severity of these effects show mixed results. Vegetation characteristics

and schedules of snowmelt can be noticeably altered by road dust (e.g., Auerbach et al. 1997), but a study in the Northwest Territories documented few negative effects of mining activities on birds beyond 1 km of the mine footprint (Smith et al. 2005). Some birds of prey nest on rock faces or infrastructure from mining activities, and appear resilient to moderate levels of human disturbance (Swem 1996). Indeed, some birds of prey may benefit from the artificial lighting, food subsidies and nesting substrate offered by resource extraction infrastructure. Further study is needed to better understand the effects of disturbance and habitat degradation related to mining at local and regional scales.

Significant mining developments require large-scale infrastructure including roads, rail lines and electrical transmission corridors. Indeed, the lack of an all-weather road network is perceived as a major impediment to the economic development of northern Ontario (Far North Science Advisory Panel). These linear features act as ecological barriers, disrupt surface water flows, and provide new corridors of transport for diseases and invasive species. Also, birds frequently collide with vehicles or power lines. Importantly, roads and electrical transmission corridors open a region to numerous forms of resource development that may be economically unfeasible without the infrastructure in place. Large-scale infrastructure projects commonly lead to cascading, often unpredictable, cumulative environmental effects. In BCR 7 ON, major infrastructure projects that are in advanced stages of planning include a 350 km railroad linking the mineral deposits at McFauld's Lake to the south, and an all-weather road linking Moosonee and four other communities to Highway 11.

In order to respond to these emerging threats for the benefit of birds and their habitats, the establishment of a network of protected areas is paramount. To support this outcome, an improved baseline of information is needed and forms the focus of the stated conservation objectives and actions in this strategy. Estimates of relative abundance within and outside proposed development areas are lacking for most species, so that determining the scale of environmental effects would be difficult. The Ontario Breeding Bird Atlases provide valuable information for a small portion of the region, and some areas of importance to birds have been identified along the Hudson and James Bay coasts. However, significant habitats elsewhere in the region have not been adequately mapped. To implement the provincial *Far North Act's* vision of responsible and sustainable development, the environmental impacts of development must be carefully considered. However, from the perspective of birds and their habitats, this consideration is hampered by an inadequate understanding of even basic distribution and abundance. Moreover, designating a network of protected areas identified through community based land-use plans requires a detailed understanding of the distribution of natural heritage features. For birds and their habitats, an enhanced understanding of distribution and abundance is needed.

Coniferous

The coniferous forest across much of this region consists of stunted tamarack and black spruce growing along riverbanks and other well-drained areas (Riley 2003, OMNR 2006). Under the Land-cover Classification System (LCCS; Food and Agriculture Organization 2000), coniferous habitats are vegetated habitats with a coniferous forest cover of >75%. This habitat type accounts for approximately 7% of the land-cover in BCR 7 ON (Fig. 9), and is used by a comparatively small number of priority species. Eleven priority species, 10 of which are landbirds, use coniferous habitats to a significant degree (Table 6). Among these, 5 species are included as stewardship species with a population objective of “maintain current”, which indicates that although their population status is secure at present, this region bears an important responsibility for their protection.

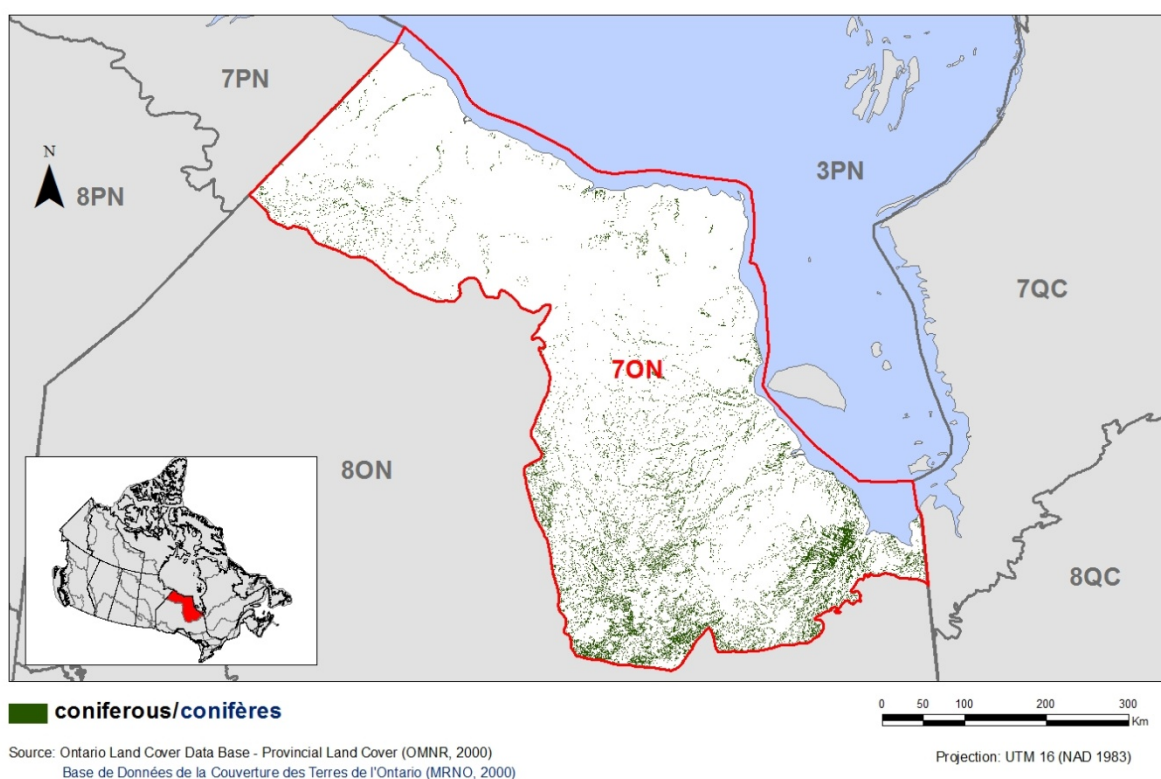


Figure 9. Map of coniferous forests in BCR 7 Ontario.

All threats to species in this habitat were determined to be of a low magnitude. These included threats related to mining (threat sub-category 3.2; Fig. 10) and hydro-electric development (threat sub-category 3.3 Renewable energy) and habitat modification from anthropogenic climate change (sub-category 11.1). Although included as a threat, considerable uncertainty remains about how forested habitats in BCR 7 ON will respond to climatic changes. Increased temperatures and longer growing seasons may lead to increased rates of tree growth and a northward progression of the treeline. However, temperature-induced drought, increased frequency and severity of fires, and increased severity of insect outbreaks are all predicted

outcomes of climate change over the next 100 years with negative effects on forest habitats (ACIA 2005, Far North Science Advisory Panel 2010).

Because no threats in coniferous forest habitat exceeded a low-level magnitude, no habitat-specific conservation objectives or actions are provided.

Table 6. Priority species that use coniferous habitat in BCR 7 Ontario, habitat description, population objectives and reasons for priority status.

| Priority Species | Habitat Description ¹ | Population Objective | COSEWIC ² | SARA ³ | SARO ⁴ | Regional/Sub-regional Concern ⁵ | Regional/Sub-regional Stewardship ⁶ | National/Continental Concern | National/Continental Stewardship |
|-------------------------|------------------------------------------------------------------------------------------|----------------------|----------------------|-------------------|-------------------|--------------------------------------------|------------------------------------------------|------------------------------|----------------------------------|
| Bay-breasted Warbler | needle-leaved evergreen medium-high forest; needle-leaved evergreen low forest | Assess/Maintain | | | | Y | | Y | |
| Black-backed Woodpecker | needle-leaved evergreen medium-high forest | Maintain current | | | | | Y | | Y |
| Boreal Chickadee | needle-leaved evergreen forests | Maintain current | | | | | Y | | Y |
| Gray Jay | needle-leaved evergreen medium-high forest; needle-leaved evergreen medium-high woodland | Maintain current | | | | | Y | | Y |
| Northern Hawk Owl | needle-leaved evergreen low woodland | Assess/Maintain | | | | | Y | | |
| Palm Warbler | needle-leaved evergreen scattered low trees | Maintain current | | | | | Y | Y | Y |
| Pine Grosbeak | needle-leaved evergreen medium-high woodland | Assess/Maintain | | | | | Y | Y | Y |
| Short-billed Dowitcher | sedge-dominated bogs and fens within coniferous forest | Assess/Maintain | | | | Y | | Y | |
| Spruce Grouse | needle-leaved evergreen low woodland | Assess/Maintain | | | | | Y | | Y |
| Tennessee Warbler | low to medium-high coniferous woodlands and forests | Maintain current | | | | | Y | | Y |
| White-winged Crossbill | spruce, tamarack, balsam fir | Assess/Maintain | | | | | Y | Y | Y |

¹ Habitat descriptions, in most cases, follow definitions under the Land-cover Classification System (LCCS; see Kennedy et al. 2012). Forest is defined as >65% crown closure; woodlands have 15–65% closure; height ranges from high = 30–14 m; medium-high = 14–7 m and low = 7–3 m.

² Assessed by COSEWIC ([Committee on the Status of Endangered Wildlife in Canada](#)) as: E, Endangered; T, Threatened; SC, Special Concern.

³ Species listed on Schedule 1 of SARA as E, Endangered; T, Threatened; SC, Special Concern ([Species at Risk Public Registry](#)).

⁴ [Ontario Species at Risk](#) List.

⁵ Regional refers to BCR-wide (i.e., all jurisdictional data were used for the entire BCR 7) while sub-regional refers to the Ontario portion of BCR 7 only (i.e., Ontario BCR data were used).

⁶ Only the landbird group distinguishes stewardship species from other priority species (see [Partners in Flight Handbook on Species Assessment](#)).

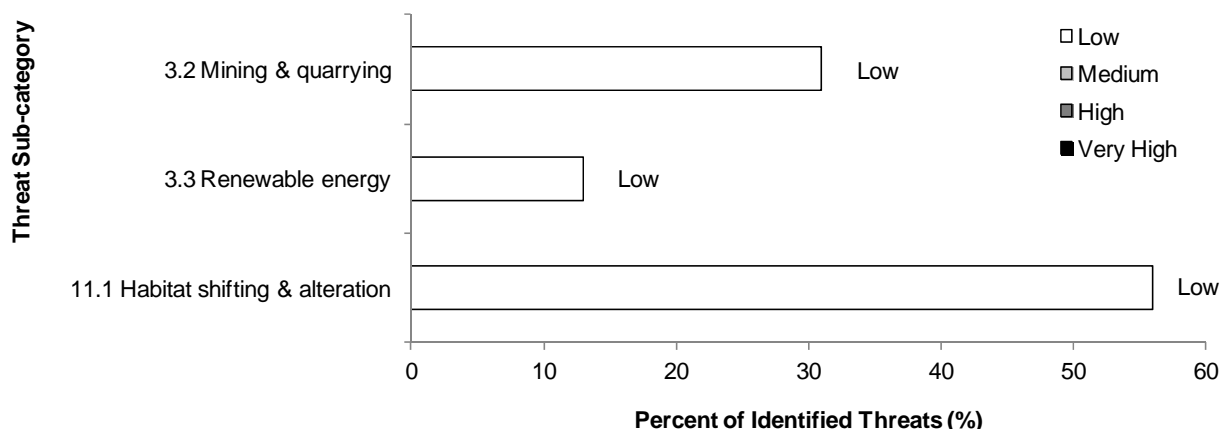


Figure 10. Percent of identified threats to priority species using coniferous habitats in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat sub-category in coniferous habitat (for example, if 100 threats were identified in total for all priority species in coniferous habitat, and 10 of those threats were in the category 11.1 Habitat shifting & alteration, the bar on the graph would represent this as 10%). The bars are divided to show the distribution of Low (L), Medium (M), High (H) and Very High (VH) rankings of individual threats within each threat sub-category. For example, the same threat may have been ranked H for one species and L for another; the shading illustrates the proportion of L, M, H and VH rankings in the sub-category). The overall magnitude of the sub-threat in coniferous habitat is shown at the end of each bar (also presented in Table 5: Relative magnitude of identified threats to priority species within BCR 7 ON by threat category and broad habitat class). Only threats with a magnitude of medium or higher are typically assigned habitat-specific conservation objectives.

Deciduous

Deciduous forest consisting of white birch (*Betula papyrifera*), dwarf birch (*Betula nana*), willow (*Salix spp.*) and trembling aspen (*Populus tremuloides*) is rare in BCR 7 Ontario, constituting roughly 0.3% of the land-cover (Fig. 11). Accordingly, the Tennessee Warbler is the only species considered to be a priority in BCR 7 ON that uses deciduous habitats to a significant degree (Table 7). As for other forest birds of the region, threats associated with habitat loss, fragmentation and disturbance from resource development (threat sub-categories 3.2 and 3.3; Fig. 12), and climate change (sub-category 11.1) were considered to have low-level effects at the scale of populations. In light of the species' apparently secure population status, and because these threats were all assessed as having low-magnitude effects, no conservation objectives or actions were assigned.

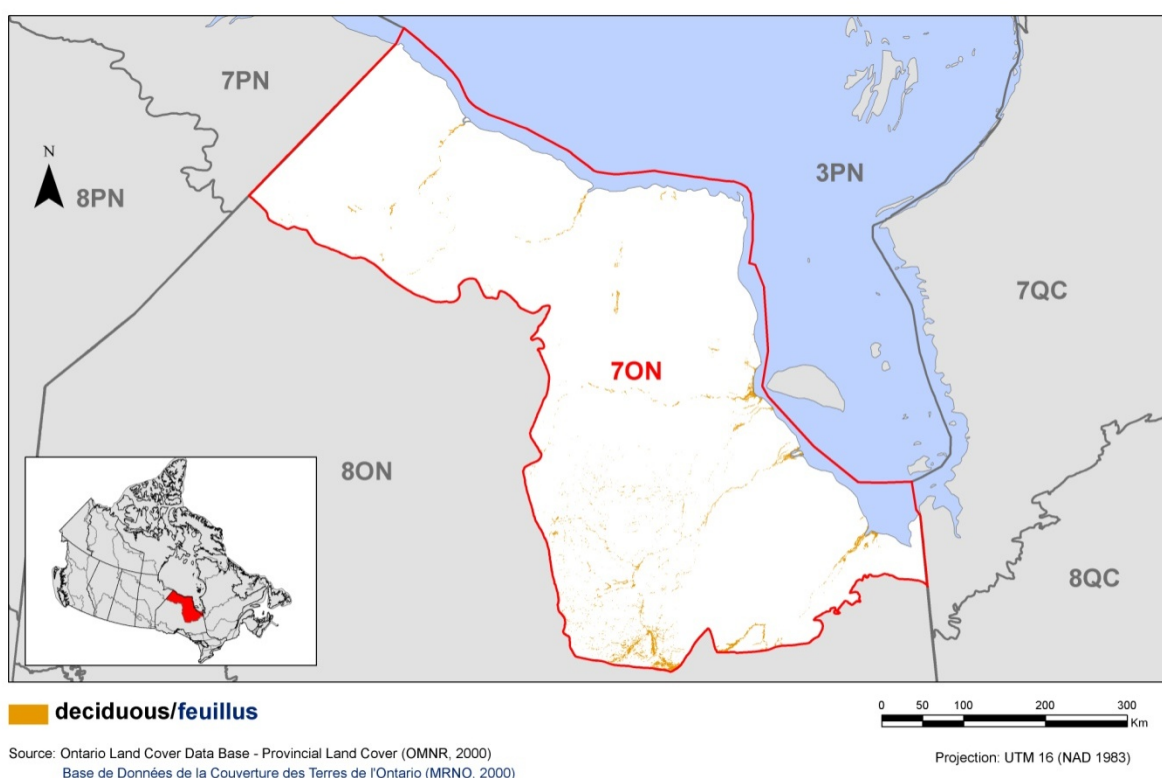


Figure 11. Map of deciduous forests in BCR 7 Ontario.

Table 7. Priority species that use deciduous habitat in BCR 7 Ontario, habitat description, population objectives and reasons for priority status.

| Priority Species | Habitat Description ¹ | Population Objective | COSEWIC ² | SARA ³ | SARO ⁴ | Regional/Sub-regional Concern ⁵ | Regional/Sub-regional Stewardship ⁶ | National/Continental Concern | National/Continental Stewardship |
|-------------------|----------------------------------------------------|----------------------|----------------------|-------------------|-------------------|--------------------------------------------|------------------------------------------------|------------------------------|----------------------------------|
| Tennessee Warbler | low to medium-high deciduous woodlands and forests | Maintain current | | | | | Y | | Y |

¹ Habitat descriptions, in most cases, follow definitions under the Land-cover Classification System (LCCS; see Kennedy et al. 2012). Forest is defined as >65% crown closure; woodlands have 15–65% closure; height ranges from high = 30–14 m; medium-high = 14–7 m and low = 7–3 m.

² Assessed by COSEWIC ([Committee on the Status of Endangered Wildlife in Canada](#)) as: E, Endangered; T, Threatened; SC, Special Concern.

³ Species listed on Schedule 1 of SARA as E, Endangered; T, Threatened; SC, Special Concern ([Species at Risk Public Registry](#)).

⁴ [Ontario Species at Risk List](#).

⁵ Regional refers to BCR-wide (i.e., all jurisdictional data were used for the entire BCR 7) while sub-regional refers to the Ontario portion of BCR 7 only (i.e., Ontario BCR data were used).

⁶ Only the landbird group distinguishes stewardship species from other priority species (see [Partners In Flight Handbook on Species Assessment](#)).

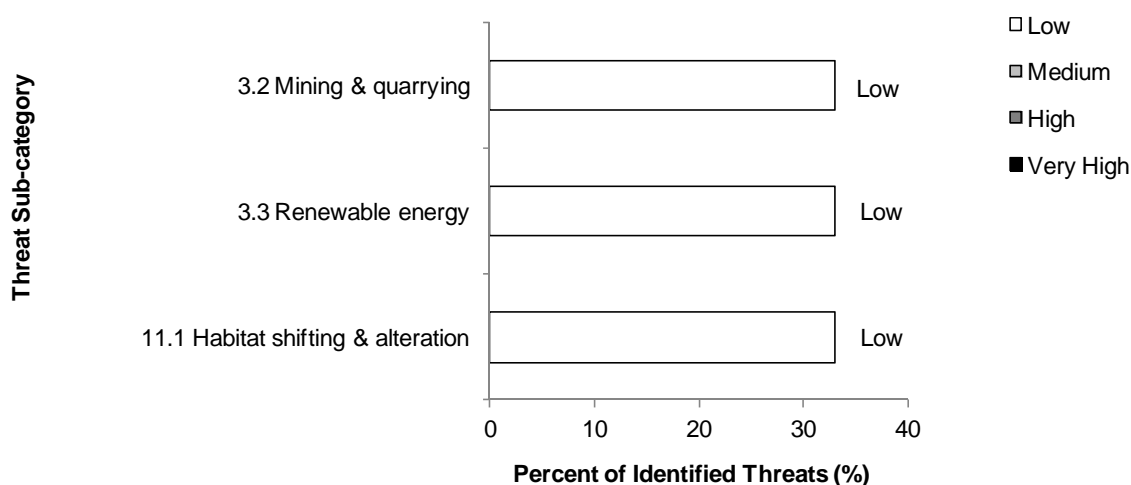


Figure 12. Percent of identified threats to priority species using deciduous habitats in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat sub-category in deciduous habitat (for example, if 100 threats were identified in total for all priority species in deciduous habitat, and 10 of those threats were in the category 11.1 Habitat shifting & alteration, the bar on the graph would represent this as 10%). The bars are divided to show the distribution of Low (L), Medium (M), High (H) and Very High (VH) rankings of individual threats within each threat sub-category. For example, the same threat may have been ranked H for one species and L for another; the shading illustrates the proportion of L, M, H and VH rankings in the sub-category). The overall magnitude of the sub-threat in deciduous habitat is shown at the end of each bar (also presented in Table 5: Relative magnitude of identified threats to priority species within BCR 7 ON by threat category and broad habitat class). Only threats with a magnitude of medium or higher are typically assigned habitat-specific conservation objectives.

Mixed Wood

Mixed wood forest, consisting of at least 25% coniferous and at least 25% deciduous vegetation, is a rare habitat type in BCR 7 Ontario, amounting to 2.7% of the land-cover (Fig. 13). Three priority species, all landbirds, utilize mixed forest habitats in BCR 7 ON (Table 8). Included in this list is the Canada Warbler, a species considered by COSEWIC and SARA to be threatened nationally, and listed as “special concern” in the province. All threats in this habitat type were determined to have low-magnitude effects on populations of priority species, and are shared with other forest habitats (Fig. 14); as a result, no habitat-specific conservation objectives or actions are provided. Mining and renewable energy developments and climate change (threat sub-categories 3.2, 3.3 and 11.1) all influence the availability and quality of mixed forest habitats. Recommended actions to help address climate change are provided in the Widespread Issues section.

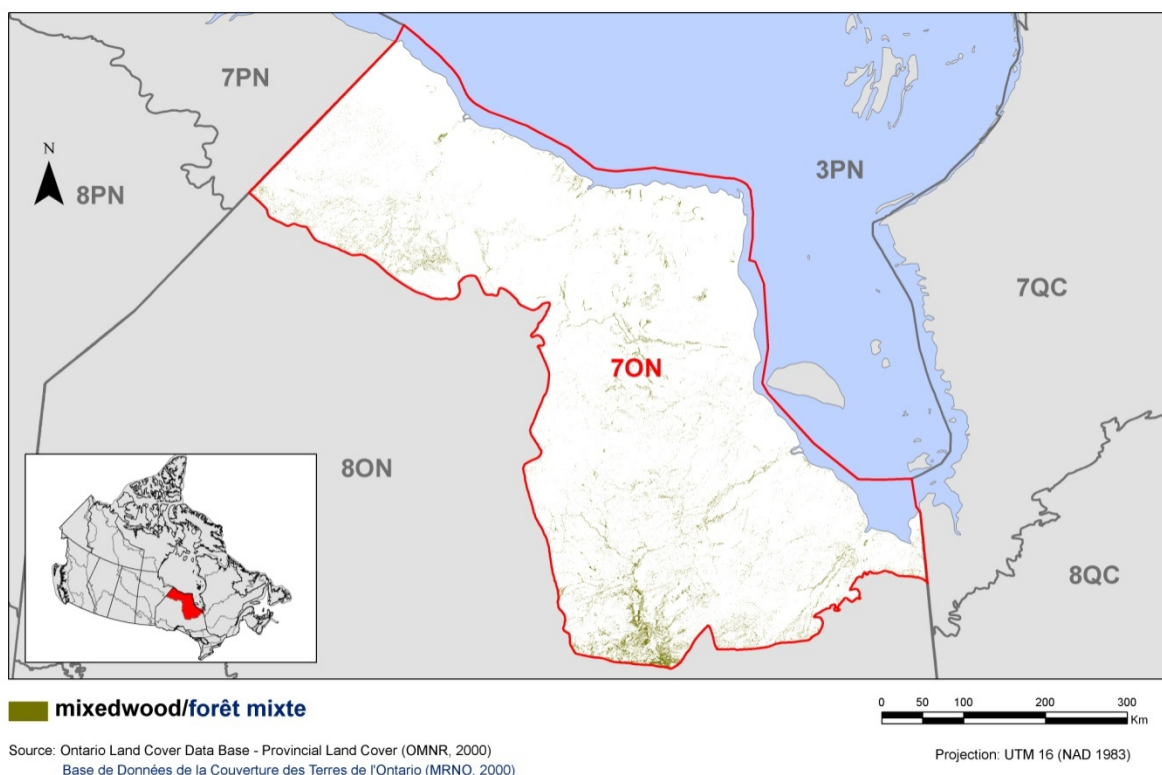


Figure 13. Map of mixed wood forests in BCR 7 Ontario.

Table 8. Priority species associated with mixed wood habitats in BCR 7 Ontario, habitat description, population objectives and reasons for priority status.

| Priority Species | Habitat Description ¹ | Population Objective | COSEWIC ² | SARA ³ | SARO ⁴ | Regional/Sub-regional Concern ⁵ | Regional/Sub-regional Stewardship ⁶ | National/Continental Concern | National/Continental Stewardship |
|-------------------------|------------------------------------------------|-------------------------------|----------------------|-------------------|-------------------|--------------------------------------------|------------------------------------------------|------------------------------|----------------------------------|
| Black-backed Woodpecker | mixed (evergreen) medium-high forest | Maintain current | | | | | Y | | Y |
| Canada Warbler | mixed (primarily deciduous) forest | Assess/Main tain [†] | Y | Y | Y | Y | | Y | |
| Tennessee Warbler | low to medium-high mixed woodlands and forests | Maintain current | | | | | Y | | Y |

¹Habitat descriptions, in most cases, follow definitions under the Land-cover Classification System (LCCS; see Kennedy et al. 2012). Forest is defined as >65% crown closure; woodlands have 15–65% closure; height ranges from high = 30–14 m; medium-high = 14–7 m and low = 7–3 m.

²Assessed by COSEWIC ([Committee on the Status of Endangered Wildlife in Canada](#)) as: E, Endangered; T, Threatened; SC, Special Concern.

³Species listed on Schedule 1 of SARA as E, Endangered; T, Threatened; SC, Special Concern ([Species at Risk Public Registry](#)).

⁴[Ontario Species at Risk List](#).

⁵Regional refers to BCR-wide (i.e., all jurisdictional data were used for the entire BCR 7) while sub-regional refers to the Ontario portion of BCR 7 only (i.e., Ontario BCR data were used).

⁶Only the landbird group distinguishes stewardship species from other priority species (see [Partners in Flight Handbook on Species Assessment](#)).

[†] This interim population objective for this species will be replaced with the official recovery objective once recovery documents are published under the *Species at Risk Act*.

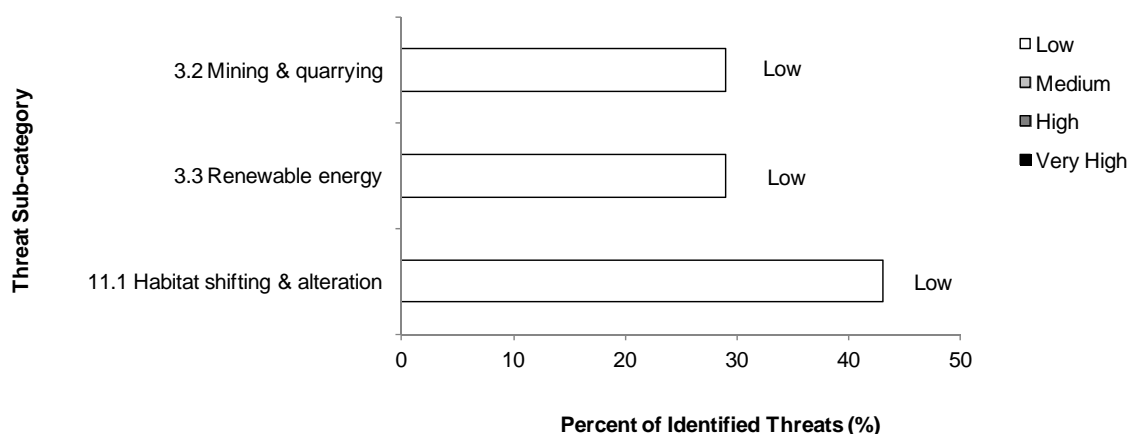


Figure 14. Percent of identified threats to priority species using mixed wood habitats in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat sub-category in mixed forest habitat (for example, if 100 threats were identified in total for all priority species in mixed forest habitat, and 10 of those threats were in the category 11.1 Habitat shifting & alteration, the bar on the graph would represent this as 10%). The bars are divided to show the distribution of Low (L), Medium (M), High (H) and Very High (VH) rankings of individual threats within each threat sub-category. For example, the same threat may have been ranked H for one species and L for another; the shading illustrates the proportion of L, M, H and VH rankings in the sub-category). The overall magnitude of the sub-threat in mixed forest habitat is shown at the end of each bar (also presented in Table 5: Relative magnitude of identified threats to priority species within BCR 7 ON by threat category and broad habitat class). Only threats with a magnitude of medium or higher are typically assigned habitat-specific conservation objectives

Shrub/Early Successional

Habitats classified as shrub/early successional under the LCCS have no direct analogue in existing land-cover classifications for the region, but are captured within the category of disturbed/regenerating forest habitats (2% of the land-cover; Fig. 15). Seven priority species, all landbirds, use shrub/early successional habitats within the region, including the Common Nighthawk, recognised by SARA as “Threatened” and SARO as “Special Concern” (Table 9). A majority of the threats in these habitats were determined to have low magnitude effects on priority species (Fig. 16), and relate to habitat degradation and loss from development (threat sub-categories 3.2 and 3.3) and climate change (sub-category 11.1), as discussed previously. However, the risk of habitat alteration from climate change was determined to be a threat of high magnitude to Northern Shrike, Harris’ Sparrow and Smith’s Longspur. These landbird species have extremely restricted breeding ranges in Ontario: Northern Shrike in shrub habitats or spruce-lichen woodlands, and the latter two in dwarf shrub habitats in the northernmost portion of the province. Because of their small ranges in Ontario, even small-scale alteration of habitat quantity or quality as a result of, for example, a northward progression of the treeline could dramatically alter the abundance of these species in the province. Conservation objectives and actions relating to climate change are discussed in the Widespread Issues section of the strategy, but no habitat-specific conservation objectives or actions are provided for low-magnitude threats.

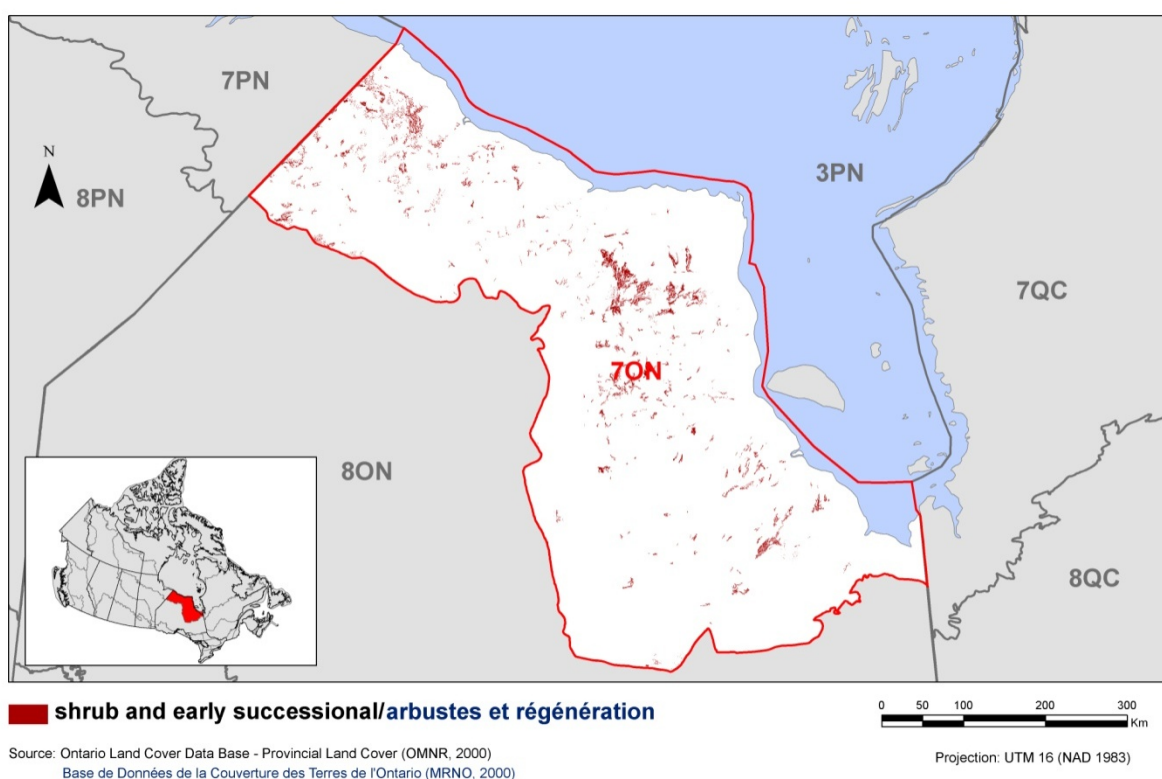


Figure 15. Map of shrub and early successional habitat in BCR 7 Ontario.

Table 9. Priority species associated with shrub/early successional habitats in BCR 7 Ontario, habitat description, population objectives and reasons for priority status.

| Priority Species | Habitat Description ¹ | Population Objective | COSEWIC ² | SARA ³ | SARO ⁴ | Regional/Sub-regional Concern ⁵ | Regional/Sub-regional Stewardship ⁶ | National/Continental Concern | National/Continental Stewardship |
|-------------------|----------------------------------|------------------------------|----------------------|-------------------|-------------------|--------------------------------------------|------------------------------------------------|------------------------------|----------------------------------|
| Alder Flycatcher | thicket; shrubland | Assess/Maintain | | | | | Y | | Y |
| Common Nighthawk | thicket; shrubland | Assess/Maintain [†] | Y | Y | Y | Y | | Y | |
| Harris's Sparrow | thicket; shrubland | Assess/Maintain | | | | Y | | Y | |
| Lincoln's Sparrow | thicket; shrubland | Maintain current | | | | | Y | Y | Y |
| Northern Hawk Owl | thicket; shrubland | Assess/Maintain | | | | | Y | | |
| Northern Shrike | thicket; shrubland | Assess/Maintain | | | | | Y | | Y |
| Smith's Longspur | thicket; shrubland | Maintain current | | | | Y | Y | Y | |

¹ Habitat descriptions, in most cases, follow definitions under the Land-cover Classification System (LCCS; see Kennedy et al. 2012).

² Assessed by COSEWIC ([Committee on the Status of Endangered Wildlife in Canada](#)) as: E, Endangered; T, Threatened; SC, Special Concern.

³ Species listed on Schedule 1 of SARA as E, Endangered; T, Threatened; SC, Special Concern ([Species at Risk Public Registry](#)).

⁴ [Ontario Species at Risk List](#).

⁵ Regional refers to BCR-wide (i.e., all jurisdictional data were used for the entire BCR 7) while sub-regional refers to the Ontario portion of BCR 7 only (i.e., Ontario BCR data were used).

⁶ Only the landbird group distinguishes stewardship species from other priority species (see [Partners in Flight Handbook on Species Assessment](#)).

[†] This interim population objective for this species will be replaced with the official recovery objective once recovery documents are published under the *Species at Risk Act*.

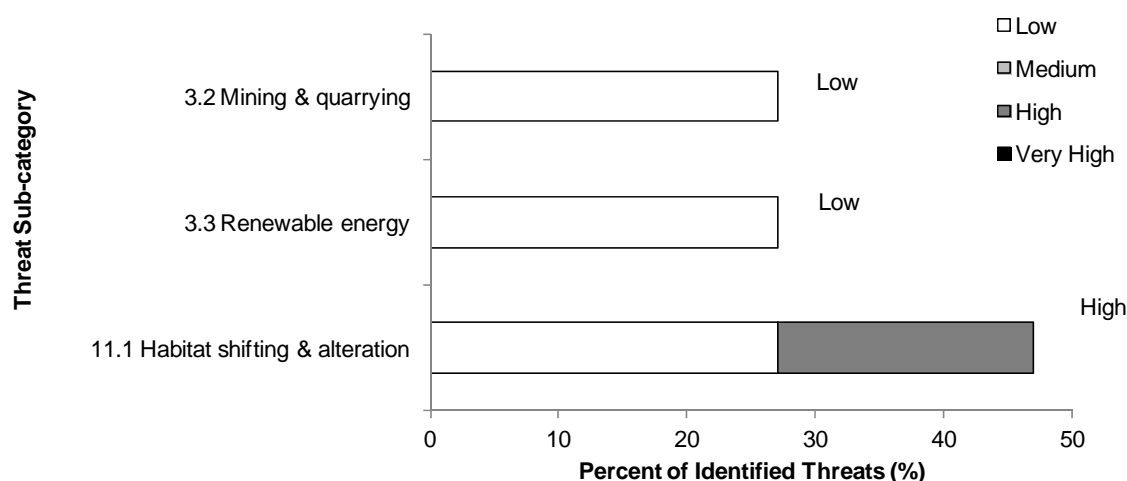


Figure 16. Percent of identified threats to priority species using shrub/early successional habitats in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat sub-category in shrub/early successional habitat (for example, if 100 threats were identified in total for all priority species in shrub/early successional habitat, and 10 of those threats were in the category 11.1 Habitat shifting & alteration, the bar on the graph would represent this as 10%). The bars are divided to show the distribution of Low (L), Medium (M), High (H) and Very High (VH) rankings of individual threats within each threat sub-category. For example, the same threat may have been ranked H for one species and L for another; the shading illustrates the proportion of L, M, H and VH rankings in the sub-category). The overall magnitude of the sub-threat in shrub/early successional habitat is shown at the end of each bar (also presented in Table 5: Relative magnitude of identified threats to priority species within BCR 7 ON by threat category and broad habitat class). Only threats with a magnitude of medium or higher are typically assigned habitat-specific conservation objectives.

Lichens/Mosses

In BCR 7 Ontario, the habitat most commonly assigned to the LCCS category “Lichens/Mosses” is tundra heath. Tundra habitats make up a small fraction of the entire BCR, just over 1%, and within Ontario occur only in BCR 7 (Fig. 17). Despite their relative rarity, tundra habitats are used by 25% of priority species (Fig. 4; Table 10). This southern extension of tundra habitat is restricted in Ontario, but also globally; it is considered the most southerly mainland tundra in the northern hemisphere (Ontario Parks 2010). Because this habitat type occurs along the Hudson Bay coast in the northernmost portion of the province, climatic warming and a northward shift of habitats could eliminate it from the province. Consequently, habitat shifting due to climate change (threat sub-category 11.1; Fig. 18) is considered a threat of high magnitude for populations of priority species using tundra habitats in BCR 7 Ontario.

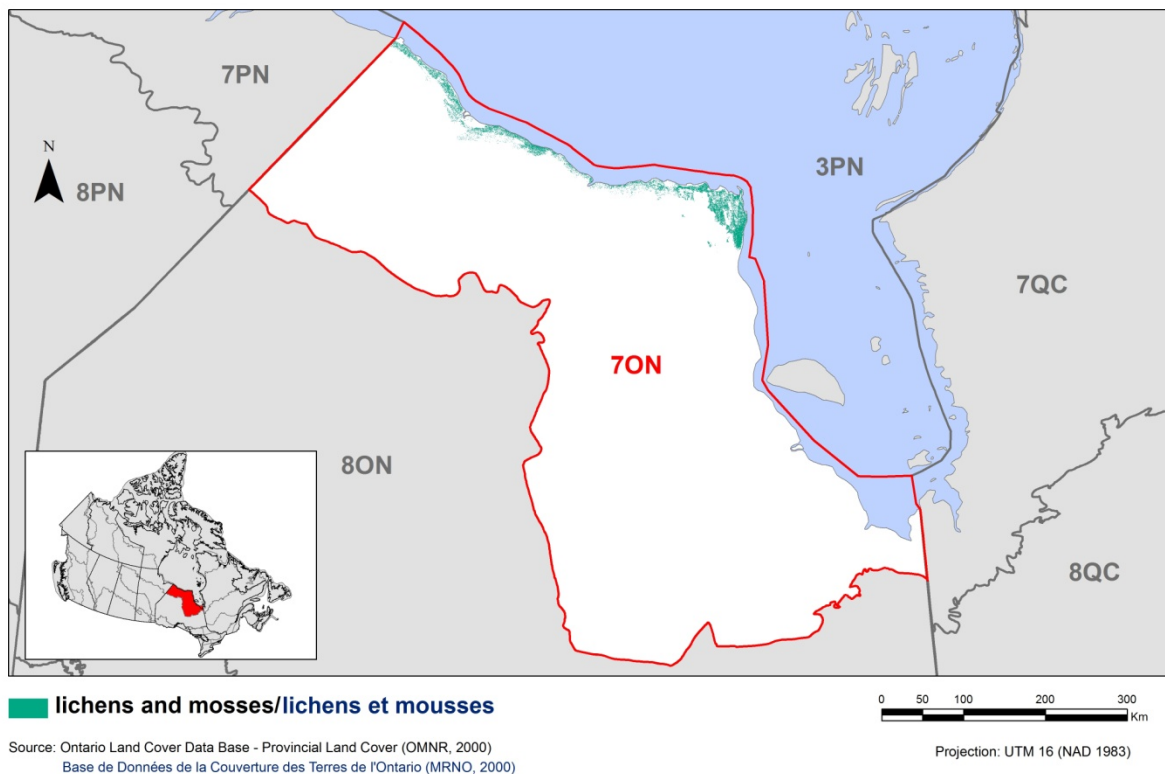


Figure 17. Map of lichens and mosses habitat in BCR 7 Ontario.

An additional serious threat to species in this habitat is related to an increased abundance of Snow Geese and the consequent degradation of habitat (sub-category 8.2). Mid-continent Lesser Snow Geese have benefitted from access to abundant farm crops in the United States during the non-breeding season, and some populations have increased dramatically since the 1970s (Arctic Goose Joint Venture 2008). Populations are now sufficiently abundant that they degrade habitats at some key breeding and staging locations in BCR 7 Ontario. The heavy grazing and grubbing by overabundant Snow Geese leads to reduced plant richness and diversity and more exposed substrate (Alisauskas et al. 2006). For the geese themselves, the

degraded habitat can lead to reduced gosling size and potentially reduced reproductive success (Pezzanite et al. 2005). The effects of this habitat degradation on other birds are largely unknown. Small-scale and moderate degradation of habitats had variable effects on habitat use by shorebirds (Sammler et al. 2008), but large-scale, severe degradation could lead to reduced shorebird densities and reduced foraging success (e.g., Hines et al. 2010). A reduced sward height may make the nests and chicks of small birds more visible to avian and mammalian predators (Klima and Jehl 1998). The elevated snow goose populations could also attract predators, with potential negative effects on other birds nesting in the area. Although the effects of overgrazing are most pronounced in coastal wetlands, other adjacent tundra habitats including lichens/mosses are also affected.

In addition to Snow Geese, temperate-breeding Canada geese have also increased dramatically since the 1970s. Among these geese are the Mississippi Flyway Giant Canada Geese. This population breeds in more southerly locations, but a portion of the population migrates to BCR 7 ON to moult. The increasing abundance of these temperate-breeding geese in tundra and coastal wetlands of BCR 7 ON is a potential conservation concern, but this population was not included as a priority in this strategy at this time (J. Hughes, pers. comm. 2011).

Identifying the carrying capacity and managing population sizes of arctic geese for the benefit of all priority birds is a critical conservation need in lichen/moss tundra, wetlands and coastal habitats of BCR 7 Ontario. Considering that habitat degradation is mainly due to staging Snow Geese from more northerly breeding populations, the majority of recommended actions are found in the Prairie and Northern Region BCR 3 Strategy (Arctic Plains and Mountains). Consequently, the recommended conservation actions for BCR 7 ON focus heavily on information needs (Table 11). At present, the carrying capacity for arctic goose breeding areas has not been established (Arctic Goose Joint Venture 2008). Moreover, population objectives for waterfowl are intended to accommodate other species, but a lack of detailed information on the habitat needs of the birds sharing habitats with geese hampers efforts to define waterfowl population objectives that accommodate all birds.

Table 10. Priority species that use lichens/mosses habitats in BCR 7 Ontario, habitat description, population objectives and reasons for priority status.

| Priority Species | Habitat Description ¹ | Population Objective | COSEWIC ² | SARA ³ | SARO ⁴ | Regional/Sub-regional Concern ⁵ | Regional/Sub-regional Stewardship ⁶ | National/Continental Concern | National/Continental Stewardship |
|-------------------------|----------------------------------|------------------------------|----------------------|-------------------|-------------------|--------------------------------------------|------------------------------------------------|------------------------------|----------------------------------|
| Black-bellied Plover | lichen/moss tundra | Migrant | | | | Y | | Y | |
| Buff-breasted Sandpiper | lichen/moss tundra | Migrant | Y | Y | | Y | | Y | |
| Dunlin | lichen/moss tundra | Assess/Maintain | | | | Y | | Y | |
| Golden Eagle | lichen/moss tundra | Assess/Maintain | | | Y | Y | | | |
| Harris's Sparrow | lichen/moss tundra | Assess/Maintain | | | | Y | | Y | |
| Hudsonian Godwit | lichen/moss tundra | Assess/Maintain | | | | Y | | Y | |
| Least Sandpiper | lichen/moss tundra | Maintain current | | | | Y | | | |
| Pacific Loon | lichen/moss tundra | Assess/Maintain | | | | Y | | Y | |
| Parasitic Jaeger | lichen/moss tundra | Assess/Maintain | | | | Y | | | |
| Pectoral Sandpiper | lichen/moss tundra | Assess/Maintain | | | | Y | | | |
| Red-throated Loon | lichen/moss tundra | Assess/Maintain | | | | Y | | | |
| Semipalmated Plover | lichen/moss tundra | Assess/Maintain | | | | Y | | | |
| Semipalmated Sandpiper | lichen/moss tundra | Assess/Maintain | | | | Y | | Y | |
| Short-eared Owl | lichen/moss tundra | Assess/Maintain [†] | Y | Y | Y | Y | | Y | |
| Smith's Longspur | lichen/moss tundra | Maintain current | | | | Y | Y | Y | |
| Whimbrel | lichen/moss tundra | Assess/Maintain | | | | Y | | Y | |
| White-rumped Sandpiper | lichen/moss tundra | Migrant | | | | Y | | | |

¹ Habitat descriptions, in most cases, follow definitions under the Land-cover Classification System (LCCS; see Kennedy et al. 2012).

² Assessed by COSEWIC ([Committee on the Status of Endangered Wildlife in Canada](#)) as: E, Endangered; T, Threatened; SC, Special Concern.

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⁴ [Ontario Species at Risk List](#).

⁵ Regional refers to BCR-wide (i.e., all jurisdictional data were used for the entire BCR 7) while sub-regional refers to the Ontario portion of BCR 7 only (i.e., Ontario BCR data were used).

⁶ Only the landbird group distinguishes stewardship species from other priority species (see [Partners In Flight Handbook on Species Assessment](#)).

[†] This interim population objective for this species will be replaced with the official recovery objective once recovery documents are published under the *Species at Risk Act*.

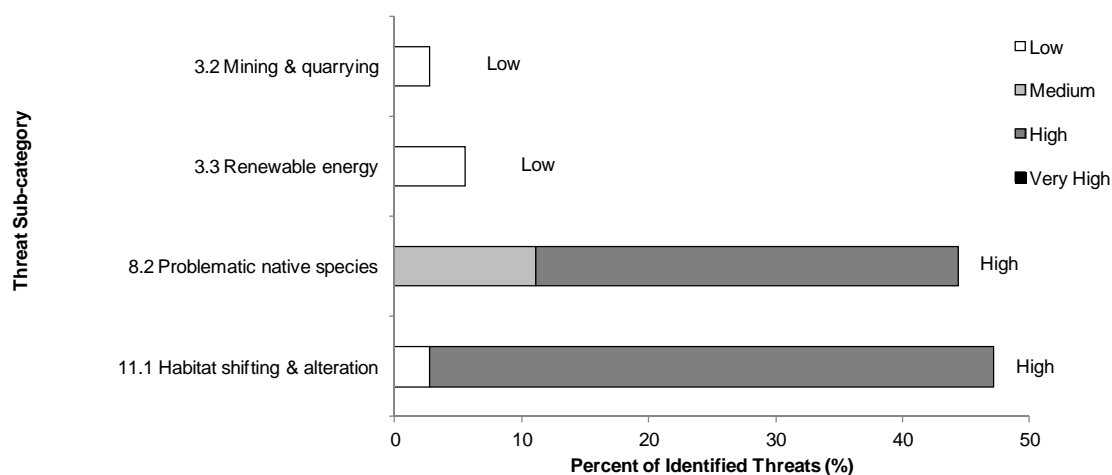


Figure 18. Percent of identified threats to priority species using lichens/mosses habitats in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat sub-category in lichen/moss habitat (for example, if 100 threats were identified in total for all priority species in lichens/mosses habitat, and 10 of those threats were in the category 11.1 Habitat shifting & alteration, the bar on the graph would represent this as 10%). The bars are divided to show the distribution of Low (L), Medium (M), High (H) and Very High (VH) rankings of individual threats within each threat sub-category. For example, the same threat may have been ranked H for one species and L for another; the shading illustrates the proportion of L, M, H and VH rankings in the sub-category). The overall magnitude of the sub-threat in lichens/mosses habitat is shown at the end of each bar (also presented in Table 5: Relative magnitude of identified threats to priority species within BCR 7 ON by threat category and broad habitat class). Only threats with a magnitude of medium or higher are typically assigned habitat-specific conservation objectives.

Table 11. Threats, conservation objectives, recommended actions, and list of priority species affected in lichen and moss habitat in Ontario's BCR 7.

Note: Issues such as climate change and pollution are not addressed in this table; instead, they are addressed in the Widespread Issues section.

| Threat Addressed | Threat Sub-category | Objective | Objective Category | Recommended Actions | Action Sub-category | Priority Species Affected ¹ |
|---------------------------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Heavy grazing by Snow Geese causing habitat loss/degradation. | 8.2 Problematic native species | Determine the effects of Lesser Snow Geese on other birds and ecosystem components (Arctic Goose Joint Venture, 2008) | 7.4. Improve understanding of causes of population declines | Monitor the nature and rate of recovery of previously damaged areas | 8.2 Monitoring | Black-bellied Plover Buff-breasted Sandpiper Dunlin Harris's Sparrow Hudsonian Godwit Least Sandpiper Pacific Loon Parasitic Jaeger Pectoral Sandpiper Red-throated Loon Semipalmated Plover Semipalmated Sandpiper Short-eared Owl Smith's Longspur Whimbrel White-rumped Sandpiper |
| | | | | Conduct research to determine effects of heavy grazing by Snow Geese on habitat and resource availability for other species | 8.1 Research | |

¹ Golden Eagle is not mentioned in this table because its identified threats (climate change) are discussed in the Widespread Issues section.
Bird Conservation Region Strategy for BCR 7 Ontario

Bare Areas

In the context of BCR 7 Ontario, the habitat class “bare areas” refers to rock outcrops with cliff faces (Fig. 19). Bare areas near the coast, such as intertidal flats, are included under Coastal Habitats. Although cliffs are a rare feature in the predominantly flat landscape, they are present in the Sutton Ridges area, where a small population of Golden Eagles, the only priority species associated with this habitat type, breed (Table 12). This species is endangered in Ontario, and perhaps as few as six pairs breed in the BCR (Austen et al. 1994). Although the small population size places the species at risk of extirpation, it faces only low-magnitude anthropogenic threats from potential collisions with wind turbines in its range within the BCR (threat sub-category 3.3; Fig. 20), and no habitat-specific conservation objectives or actions are provided.

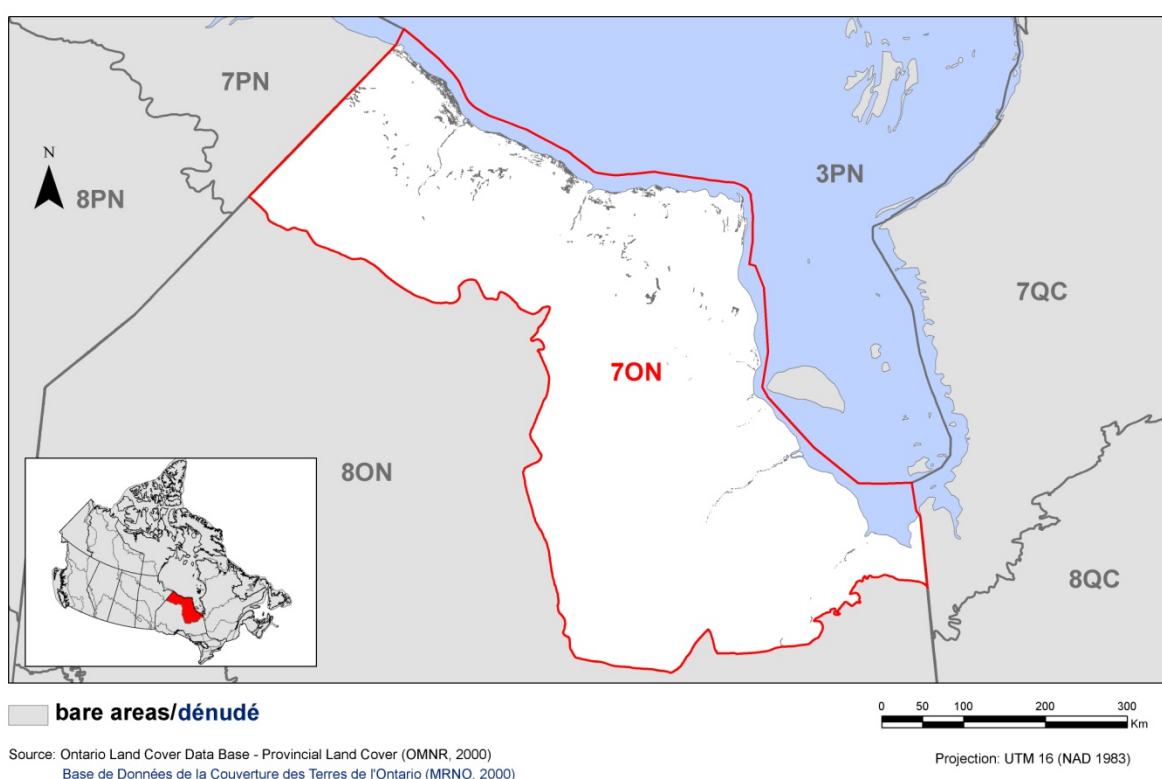


Figure 19. Map of bare areas in BCR 7 Ontario.

Table 12. Priority species that use bare areas in BCR 7 Ontario, habitat description, population objectives and reasons for priority status.

| Priority Species | Habitat Description ¹ | Population Objective | COSEWIC ² | SARA ³ | SARO ⁴ | Regional/Sub-regional Concern ⁵ | Regional/Sub-regional Stewardship ⁶ | National/Continental Concern | National/Continental Stewardship |
|------------------|----------------------------------|----------------------|----------------------|-------------------|-------------------|-----------------------------------------------|---------------------------------------------------|---------------------------------|-------------------------------------|
| Golden Eagle | cliff faces; exposed rock | Assess/Maintain | | | Y | Y | | | |

¹ Habitat descriptions, in most cases, follow definitions under the Land-cover Classification System (LCCS; see Kennedy et al. 2012).

² Assessed by COSEWIC ([Committee on the Status of Endangered Wildlife in Canada](#)) as: E, Endangered; T, Threatened; SC, Special Concern.

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⁵ Regional refers to BCR-wide (i.e., all jurisdictional data were used for the entire BCR 7) while sub-regional refers to the Ontario portion of BCR 7 only (i.e., Ontario BCR data were used).

⁶ Only the landbird group distinguishes stewardship species from other priority species (see [Partners in Flight Handbook on Species Assessment](#))

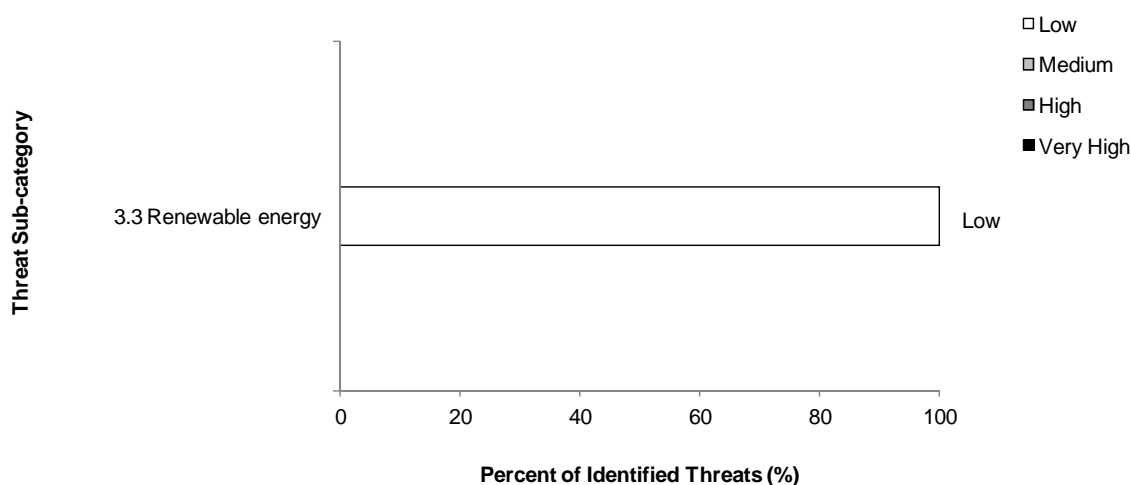


Figure 20. Percent of identified threats to priority species using bare areas in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat sub-category in bare areas (for example, if 100 threats were identified in total for all priority species in bare areas, and 10 of those threats were in the category 11.1 Habitat shifting & alteration, the bar on the graph would represent this as 10%). The bars are divided to show the distribution of Low (L), Medium (M), High (H) and Very High (VH) rankings of individual threats within each threat sub-category. For example, the same threat may have been ranked H for one species and L for another; the shading illustrates the proportion of L, M, H and VH rankings in the sub-category). The overall magnitude of the sub-threat in bare areas is shown at the end of each bar (also presented in Table 5: Relative magnitude of identified threats to priority species within BCR 7 ON by threat category and broad habitat class). Only threats with a magnitude of medium or higher are typically assigned habitat-specific conservation objectives.

Wetlands

Wetlands are the dominant habitat type in BCR 7 Ontario. Under the LCCS classification, wetlands are vegetated habitats that are aquatic or regularly flooded, including bogs,¹ fens, swamps, marshes and shallow water areas. These habitats may also be coastal or riparian in nature. By this definition, wetlands constitute over 75% of the land-cover of the region (Fig. 21) and are used extensively by 40 priority species (60%; Table 13). This long list of priority species using wetland habitats is relatively evenly split among bird groups, with 27% of the species being landbirds, 35% shorebirds, 23% waterfowl and 15% waterbirds.

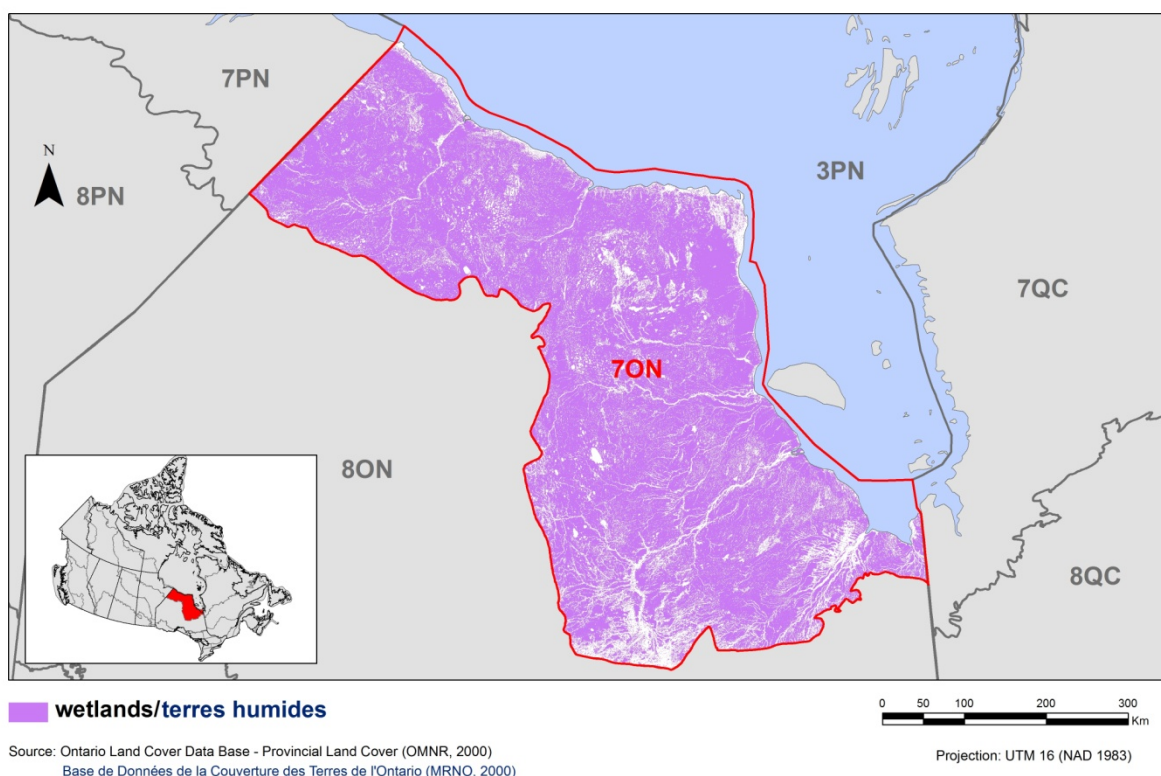


Figure 21. Map of wetland habitats in BCR 7 Ontario.

Habitat conservation issues discussed previously apply in wetlands, including minor habitat loss or degradation due to resource development (threat sub-categories 3.2 and 3.3; Fig. 22). Also, the degradation of coastal wetland habitats due to staging Mid-continent Lesser Snow Geese is a significant threat to other priority species and to the geese themselves (sub-category 8.2). The effects of staging Snow Geese on the wetlands along the coasts of Hudson and James Bays is pronounced in some locations, but the full geographic extent of the habitat degradation is

¹ Sparse forest land cover in the Hudson Bay–James Bay Lowland can be broadly interpreted to include bogs with a dense tree cover (Spectranalysis 2004, page 27) and based on expert opinion has been attributed to the BCR Habitat Class of wetlands.

poorly documented (Arctic Goose Joint Venture 2008). Moreover, the effects of the habitat degradation on other species are poorly understood. Considering that the habitat degradation is mainly due to staging Snow Geese from more northerly breeding populations, the majority of recommended actions are found in the Prairie and Northern BCR 3 Strategy (Arctic Plains and Mountains). Consequently, the objectives and actions proposed to address this threat are related to increasing our understanding of the issue (Table 14).

The threat to priority species from anthropogenic climate change is also substantial in wetlands (sub-category 11.1). The various wetland habitats of BCR 7 ON are sensitive to changes in hydrology. Although predictions for future patterns of precipitation are uncertain, altered timing or amount of precipitation could substantially affect wetlands in the region. Temperature too can affect the moisture regime of wetlands; the increased mean temperatures predicted for the region by all future climate scenarios will lead to increased evapotranspiration rates and a relative drying of wetlands (Far North Science Advisory Panel 2010). In regions where permafrost is continuous, an increase in the active layer depth can draw down surface waters and reduce the availability of shallow tundra wetlands (ACIA 2005), a key habitat for numerous priority shorebirds such as Semipalmated Sandpiper and Pectoral Sandpiper.

Table 13. Priority species that use wetland habitats in BCR 7 Ontario, habitat description, population objectives and reasons for priority status.

| Priority Species | Habitat Description ¹ | Population Objective | COSEWIC ² | SARA ³ | SARO ⁴ | Regional/Sub-regional Concern ⁵ | Regional/Sub-regional Stewardship ⁶ | National/Continental Concern | National/Continental Stewardship |
|-----------------------------------|----------------------------------|------------------------------|----------------------|-------------------|-------------------|-----------------------------------------------|---------------------------------------------------|---------------------------------|-------------------------------------|
| American Bittern | marsh | Maintain current | | | | Y | | Y | |
| American Black Duck | marsh, swamp, bog, fen | Assess/Maintain | | | | Y | | Y | |
| Black Tern | marsh | Assess/Maintain | | | Y | Y | | Y | |
| Black-bellied Plover | bog; fen | Migrant | | | | Y | | Y | |
| Atlantic Brant | marsh (coastal) | Migrant | | | | Y | | Y | |
| Canada Goose (Mississippi Valley) | marsh, fen, bog | Maintain current | | | | Y | | Y | |
| Canada Goose (Southern James Bay) | marsh, fen, bog | Maintain current | | | | Y | | Y | |
| Common Nighthawk | fen; bog | Assess/Maintain [†] | Y | Y | Y | Y | | Y | |
| Dunlin | wet meadows; grassy hummocks | Assess/Maintain | | | | Y | | Y | |
| Greater Yellowlegs | bog; fen | Maintain current | | | | Y | | Y | |
| Green-winged Teal | marsh, swamp | Assess/Maintain | | | | Y | | | |
| Hudsonian Godwit | grassland fen, grassland bog | Assess/Maintain | | | | Y | | Y | |
| Least Sandpiper | grassland bog | Maintain current | | | | Y | | | |
| Lesser Yellowlegs | bog, fen | Assess/Maintain | | | | Y | | | |
| Lincoln's Sparrow | bog, fen | Maintain current | | | | | Y | Y | Y |
| Little Gull | marsh | Assess/Maintain | | | | Y | | Y | |
| Long-tailed Duck | shallow wetlands | Assess/Maintain | | | | Y | | Y | |

¹ Habitat descriptions, in most cases, follow definitions under the Land Cover Classification System (LCCS; see Kennedy et al. 2012).

² Assessed by COSEWIC ([Committee on the Status of Endangered Wildlife in Canada](#)) as: E, Endangered; T, Threatened; SC, Special Concern.

³ Species listed on Schedule 1 of SARA as E, Endangered; T, Threatened; SC, Special Concern ([Species at Risk Public Registry](#)).

⁴ [Ontario Species at Risk List](#).

⁵ Regional refers to BCR-wide (i.e., all jurisdictional data were used for the entire BCR 7) while sub-regional refers to the Ontario portion of BCR 7 only (i.e., Ontario BCR data were used).

⁶ Only the landbird group distinguishes stewardship species from other priority species (see [Partners in Flight Handbook on Species Assessment](#))

[†] This interim population objective for this species will be replaced with the official recovery objective once recovery documents are published under the [Species at Risk Act](#)

| Priority Species | Habitat Description ¹ | Population Objective | COSEWIC ² | SARA ³ | SARO ⁴ | Regional/Sub-regional Concern ⁵ | Regional/Sub-regional Stewardship ⁶ | National/Continental Concern | National/Continental Stewardship |
|------------------------|-----------------------------------------------------------------|------------------------------|----------------------|-------------------|-------------------|--------------------------------------------|------------------------------------------------|------------------------------|----------------------------------|
| Mallard | marsh, swamp, bog, fen | Assess/Maintain | | | | Y | | | |
| Marbled Godwit | grassland fen; grassland bog | Assess/Maintain | | | | Y | | Y | |
| Nelson's Sparrow | grassland marsh; grassland fen | Assess/Maintain | | | | Y | Y | Y | |
| Northern Hawk Owl | swamp | Assess/Maintain | | | | | Y | | |
| Northern Shrike | muskeg; peatlands | Assess/Maintain | | | | | Y | | Y |
| Olive-sided Flycatcher | bog, fen | Assess/Maintain [†] | Y | Y | Y | Y | | Y | |
| Palm Warbler | bog, fen | Maintain current | | | | | Y | Y | Y |
| Pectoral Sandpiper | grassland marsh | Assess/Maintain | | | | Y | | | |
| Red-throated Loon | bog, fen | Assess/Maintain | | | | Y | | | |
| Ring-necked Duck | swamp, fen, bog | Assess/Maintain | | | | Y | | | |
| Rusty Blackbird | bog, fen | Assess/Maintain [†] | Y | Y | | Y | | Y | |
| Sandhill Crane | marsh, grassland fen | Maintain current | | | | Y | | | |
| Semipalmated Sandpiper | bog, fen | Assess/Maintain | | | | Y | | Y | |
| Short-billed Dowitcher | fen, wet bogs | Assess/Maintain | | | | Y | | Y | |
| Short-eared Owl | marsh | Assess/Maintain [†] | Y | Y | Y | Y | | Y | |
| Snow Goose | marsh, fen, bog | Decrease | | | | Y | | Y | |
| Solitary Sandpiper | marsh, bog, fen | Assess/Maintain | | | | Y | | Y | |
| Spruce Grouse | bog, fen | Assess/Maintain | | | | | Y | | Y |
| Swamp Sparrow | grassland/shrub marsh; grassland/shrub bog; grassland/shrub fen | Maintain current | | | | | Y | Y | Y |
| Whimbrel | bog, fen | Assess/Maintain | | | | Y | | Y | |
| White-rumped Sandpiper | grassland fen; grassland bog | Migrant | | | | Y | | | |
| Wilson's Snipe | marsh, bog, fen, swamp | Assess/Maintain | | | | Y | | | |
| Yellow Rail | marsh; grassland fen | Assess/Maintain [†] | Y | Y | Y | Y | | Y | |

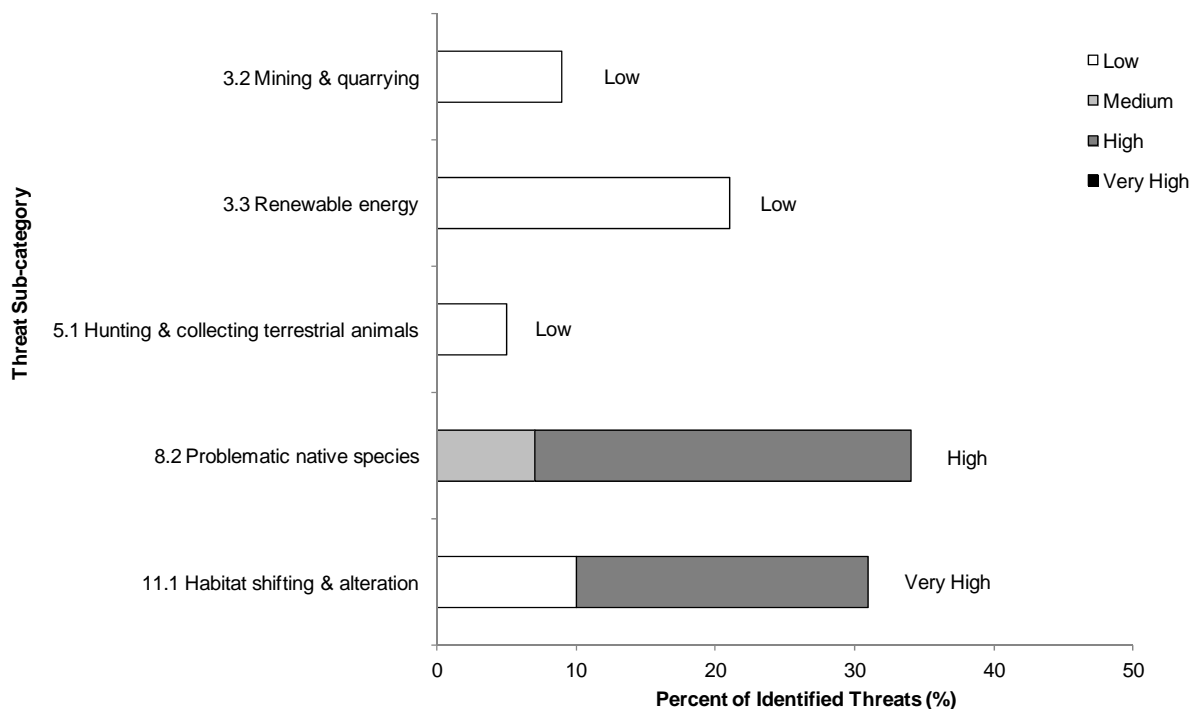


Figure 22. Percent of identified threats to priority species using wetland habitats in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat sub-category in wetland habitat (for example, if 100 threats were identified in total for all priority species in wetland habitat, and 10 of those threats were in the category 11.1 Habitat shifting & alteration, the bar on the graph would represent this as 10%). The bars are divided to show the distribution of Low (L), Medium (M), High (H) and Very High (VH) rankings of individual threats within each threat sub-category. For example, the same threat may have been ranked H for one species and L for another; the shading illustrates the proportion of L, M, H and VH rankings in the sub-category). The overall magnitude of the sub-threat in wetland habitat is shown at the end of each bar (also presented in Table 5: Relative magnitude of identified threats to priority species within BCR 7 ON by threat category and broad habitat class). Only threats with a magnitude of medium or higher are typically assigned habitat-specific conservation objectives.

Table 14. Threats addressed, conservation objectives, recommended actions, and priority species affected in wetland habitats in BCR 7 Ontario.**Note:** Issues such as climate change and pollution are not addressed in this table; instead, they are addressed in the Widespread Issues section.

| Threat Addressed | Threat Category | Objectives | Objective Category | Recommended Actions | Action Category | Priority Species Affected ¹ |
|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Heavy grazing by Lesser Snow Geese causing habitat loss/degradation | 8.2 Problematic native species | Determine the effects of Lesser Snow Geese on other birds and ecosystem components (Arctic Goose Joint Venture, 2008) | 7.4. Improve understanding of causes of population declines | Monitor the nature and rate of recovery of previously damaged areas | 8.2 Monitoring | American Black Duck Black-bellied Plover Brant (Atlantic) Canada Goose (Mississippi Valley) Canada Goose (Southern James Bay) Dunlin |
| Nesting, grazing and brood habitat for Mississippi Valley and Southern James Bay populations of Canada Geese are declining due to Lesser Snow Geese. | | | | Conduct research to determine effects of heavy grazing by Lesser Snow Geese on habitat and resource availability for other species | 8.1 Research | Hudsonian Godwit Least Sandpiper Long-tailed Duck Marbled Godwit Nelson's Sparrow Pectoral Sandpiper Red-throated Loon Semipalmated Sandpiper Short-billed Dowitcher Short-eared Owl Snow Goose Whimbrel White-rumped Sandpiper Yellow Rail |
| Federal or provincial Species at Risk | n/a | Meet the legal requirements of federal/provincial Species at Risk. | 3.4 Implement recovery plans for species at risk | Continue to develop and/or implement objectives and actions from SAR recovery documents. | 3.2 Species recovery | Black Tern, Common Nighthawk, Olive-sided Flycatcher, Rusty Blackbird, Short-eared Owl |
| Overabundant species | 8.2 Problematic native species | Manage Overabundant Species (Lesser Snow Geese, Mid-Continent Population) | 3.6 Reduce overabundant species | Develop / implement Management Plan | 3.1 Species management | Snow Goose |

¹ Priority species not mentioned in this table are absent for one of the following reasons: 1) information lack precludes developing conservation objectives and actions, 2) identified threats are discussed in the Widespread Issues section, or 3) identified threats in this habitat are of low magnitude.

Waterbodies

At least 8% of BCR 7 ON is covered with open water such as freshwater lakes, ponds, rivers and streams (Fig. 23). Marine habitats adjacent to BCR 7 ON are considered in the Prairie and Northern conservation strategy for BCR 3 (Arctic Plains and Mountains). Twelve priority species use inland waterbodies regularly within BCR 7 Ontario, 9 of which are waterfowl (Table 15). Waterfowl constitute an important part of the subsistence harvest by northern residents, and although maintaining this culturally significant harvest is desirable, poor monitoring of the level of harvest makes it difficult to understand whether it has population-level effects on priority species in BCR 7 Ontario. The “threat” of this harvest on priority species is assumed to be low (threat sub-category 5.1; Fig. 24) and no habitat-specific conservation objectives or actions are provided.

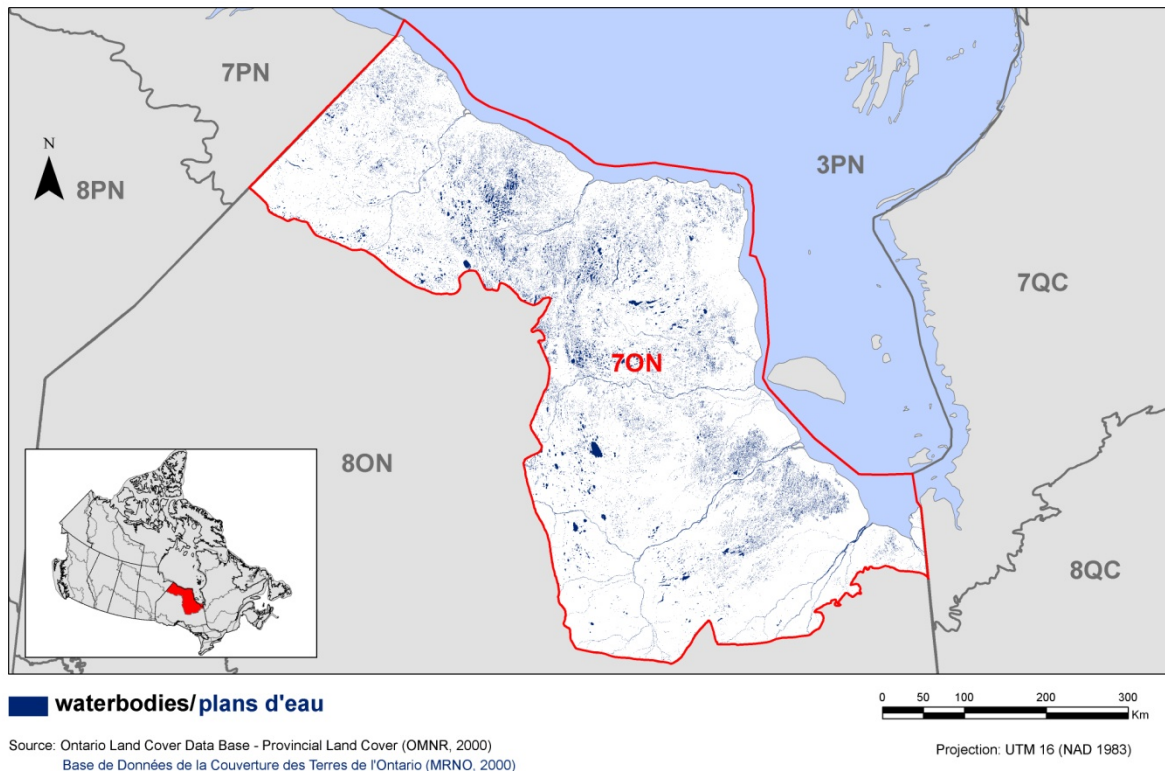


Figure 23. Map of waterbodies in BCR 7 Ontario.

Climate change (sub-category 11.1) constitutes a high-magnitude threat for species using waterbodies. Shallow ponds can be dramatically altered by a changing precipitation regime or changes in active layer depth where permafrost is present. Conservation objectives and actions relating to climate change are discussed in the Widespread IssuesWidespread Issues section of this strategy.

Table 15. Priority species that use waterbodies in BCR 7 Ontario, habitat description, population objectives and reasons for priority status.

| Priority Species | Habitat Description ¹ | Population Objective | COSEWIC ² | SARA ³ | SARO ⁴ | Regional/Sub-regional Concern ⁵ | Regional/Sub-regional Stewardship ⁶ | National/Continental Concern | National/Continental Stewardship |
|-----------------------------------|---------------------------------------------|----------------------|----------------------|-------------------|-------------------|--------------------------------------------|------------------------------------------------|------------------------------|----------------------------------|
| American Black Duck | ponds | Assess/Maintain | | | | Y | | Y | |
| Bald Eagle | lakes | Assess/Maintain | | | Y | Y | | | Y |
| Black Scoter | perennial pond/small lakes; perennial lakes | Assess/Maintain | | | | Y | | Y | |
| Canada Goose (Mississippi Valley) | ponds | Maintain current | | | | Y | | Y | |
| Canada Goose (Southern James Bay) | ponds | Maintain current | | | | Y | | Y | |
| Common Goldeneye | perennial lakes; perennial rivers | Assess/Maintain | | | | Y | | | |
| Green-winged Teal | perennial pond/small lakes | Assess/Maintain | | | | Y | | | |
| Long-tailed Duck | perennial lakes; nearshore marine areas | Assess/Maintain | | | | Y | | Y | |
| Mallard | perennial pond/small lakes | Assess/Maintain | | | | Y | | | |
| Pacific Loon | perennial pond/small lakes | Assess/Maintain | | | | Y | | Y | |
| Red-throated Loon | perennial lakes | Assess/Maintain | | | | Y | | | |
| Surf Scoter | perennial large lakes/ponds | Assess/Maintain | | | | Y | | Y | |

¹ Habitat descriptions, in most cases, follow definitions under the Land-cover Classification System (LCCS; see Kennedy et al. 2012).

² Assessed by COSEWIC ([Committee on the Status of Endangered Wildlife in Canada](#)) as: E, Endangered; T, Threatened; SC, Special Concern.

³ Species listed on Schedule 1 of SARA as E, Endangered; T, Threatened; SC, Special Concern ([Species at Risk Public Registry](#)).

⁴ [Ontario Species at Risk List](#).

⁵ Regional refers to BCR-wide (i.e., all jurisdictional data were used for the entire BCR 7) while sub-regional refers to the Ontario portion of BCR 7 only (i.e., Ontario BCR data were used).

⁶ Only the landbird group distinguishes stewardship species from other priority species (see [Partners in Flight Handbook on Species Assessment](#)).

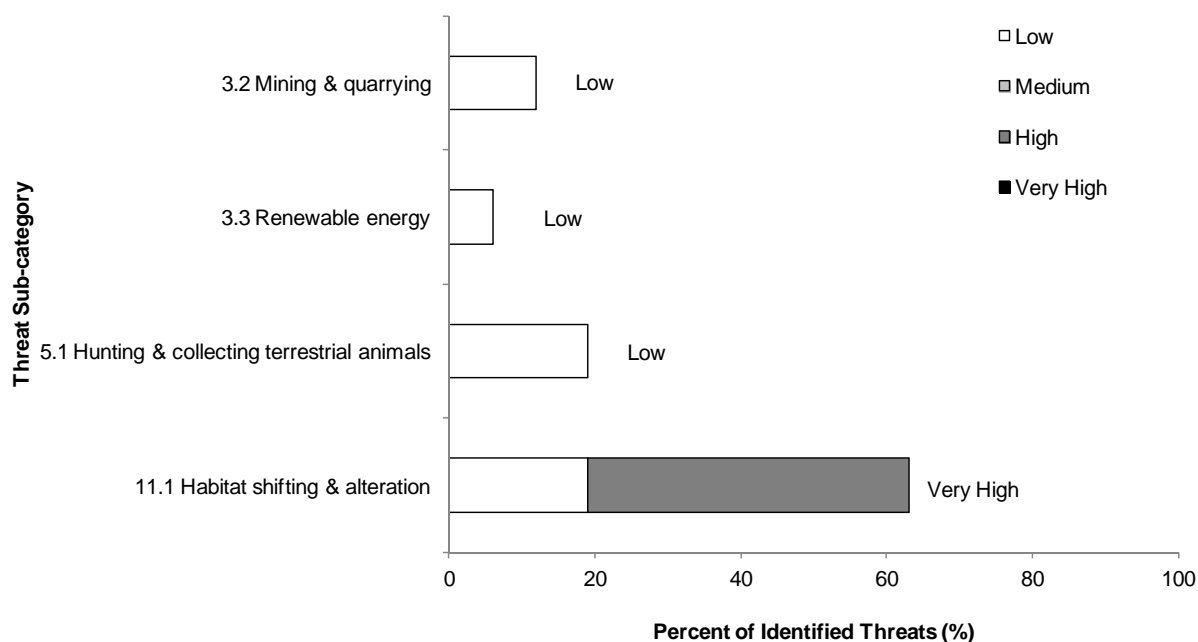


Figure 24. Percent of identified threats to priority species using waterbodies in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat sub-category in waterbodies (for example, if 100 threats were identified in total for all priority species in waterbodies, and 10 of those threats were in the category 11.1 Habitat shifting & alteration, the bar on the graph would represent this as 10%). The bars are divided to show the distribution of Low (L), Medium (M), High (H) and Very High (VH) rankings of individual threats within each threat sub-category. For example, the same threat may have been ranked H for one species and L for another; the shading illustrates the proportion of L, M, H and VH rankings in the sub-category). The overall magnitude of the sub-threat in waterbodies is shown at the end of each bar (also presented in Table 5: Relative magnitude of identified threats to priority species within BCR 7 ON by threat category and broad habitat class). Only threats with a magnitude medium or higher are typically assigned habitat-specific conservation objectives.

Coastal

Habitats defined as “coastal” include both terrestrial and aquatic habitats that occur along marine shorelines, such as coastal marshes or mudflats. BCR 7 ON includes the entire marine coastline which spans over 1000 kilometres along James and Hudson Bays (Fig. 25). Fourteen priority species use coastal habitats, and many of these are shorebirds or waterfowl that forage on coastal mudflats or salt marsh during migration or moulting (Table 16). Overabundant Mid-continent Lesser Snow Geese have profoundly affected coastal salt marsh in some portions of BCR 7 ON resulting in degradation or loss of key staging habitats for migrants including the endangered “*rufa*” Red Knot (threat sub-category 8.2; Fig. 26; Table 17).

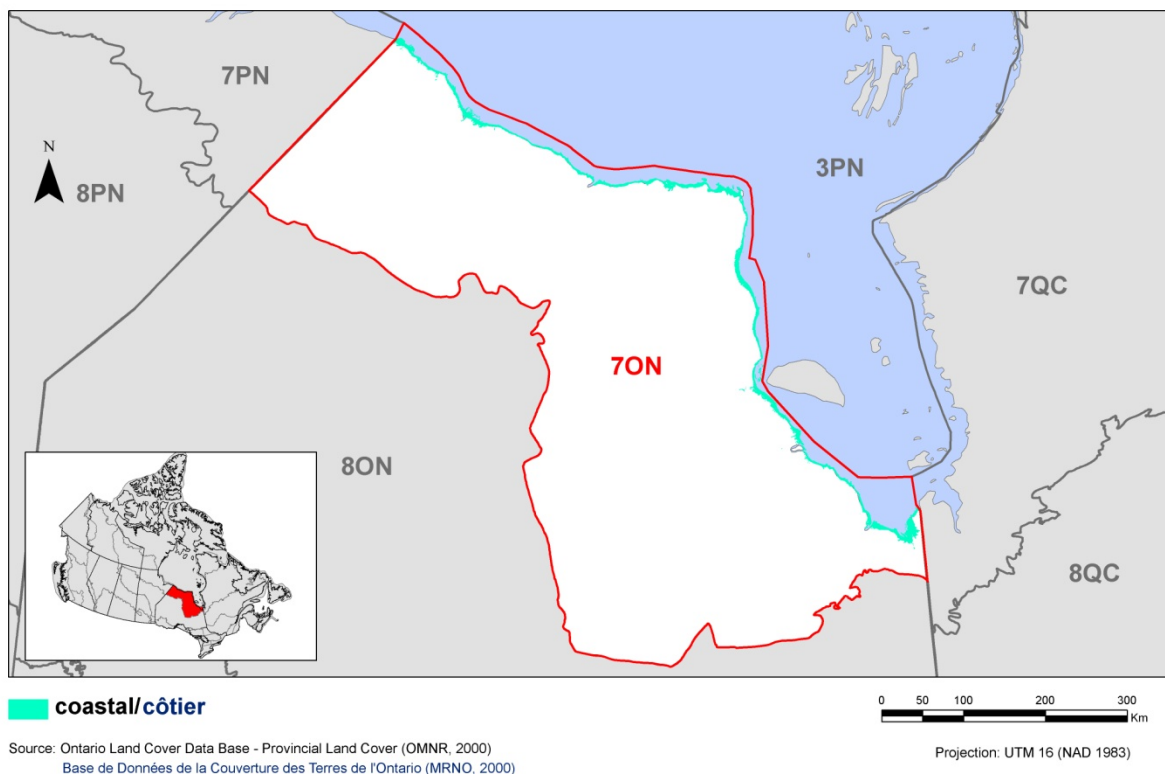


Figure 25. Map of coastal habitats in BCR 7 Ontario.

Coastal habitats, and the priority species that use them, face significant threats related to climate change (threat sub-category 11.1). Future climate scenarios predict a melting of polar ice caps and a consequent rise in sea level that may inundate coastal habitats. The extremely low slope of the Hudson Bay coast, 0.5 m/km in some areas, makes it especially prone to inundation under even modest scenarios of sea level rise (although ongoing isostatic rebound counteracts this risk to some extent). Conservation objectives and actions relating to climate change are discussed in the Widespread Issues section of the strategy.

Table 16. Priority species that use coastal habitats in BCR 7 Ontario, habitat description, population objectives and reasons for priority status.

| Priority Species | Habitat Description ¹ | Population Objective | COSEWIC ² | SARA ³ | SARO ⁴ | Regional/Sub-regional Concern ⁵ | Regional/Sub-regional Stewardship ⁶ | National/Continental Concern | National/Continental Stewardship |
|------------------------|---------------------------------------------------|-----------------------|----------------------|-------------------|-------------------|--------------------------------------------|------------------------------------------------|------------------------------|----------------------------------|
| American Golden-Plover | beaches and mudflats | Migrant | | | | Y | | Y | |
| Arctic Tern | coastal beaches, tidal flats and other bare areas | Assess/Maintain | | | | Y | | Y | |
| Bald Eagle | open shorelines | Assess/Maintain | | | Y | Y | | | Y |
| Atlantic Brant | tidal water (meadows) | Migrant | | | | Y | | Y | |
| Eskimo Curlew | coastal mudflats | Recovery not feasible | Y | Y | Y | Y | | Y | |
| Golden Eagle | coastal bare areas | Assess/Maintain | | | Y | Y | | | |
| Parasitic Jaeger | coastal tundra | Assess/Maintain | | | | Y | | | |
| Red Knot (rufa) | intertidal flats | Migrant | Y | Y | Y | Y | | Y | |
| Ruddy Turnstone | intertidal flats, rocky coastal habitats | Migrant | | | | Y | | Y | |
| Sanderling | intertidal mudflats | Migrant | | | | Y | | Y | |
| Semipalmated Plover | coastal mudflats and beaches | Assess/Maintain | | | | Y | | | |
| Semipalmated Sandpiper | beaches; intertidal mudflats | Assess/Maintain | | | | Y | | Y | |
| Snow Goose | coastal beaches and marshes | Decrease | | | | Y | | Y | |
| Surf Scoter | coastal marshes | Assess/Maintain | | | | Y | | Y | |

¹Habitat descriptions, in most cases, follow definitions under the Land-cover Classification System (LCCS; see Kennedy et al. 2012).

²Assessed by COSEWIC ([Committee on the Status of Endangered Wildlife in Canada](#)) as: E, Endangered; T, Threatened; SC, Special Concern.

³Species listed on Schedule 1 of SARA as E, Endangered; T, Threatened; SC, Special Concern ([Species at Risk Public Registry](#)).

⁴[Ontario Species at Risk List](#).

⁵Regional refers to BCR-wide (i.e., all jurisdictional data were used for the entire BCR 7) while sub-regional refers to the Ontario portion of BCR 7 only (i.e., Ontario BCR data were used).

⁶Only the landbird group distinguishes stewardship species from other priority species (see [Partners in Flight Handbook on Species Assessment](#)).

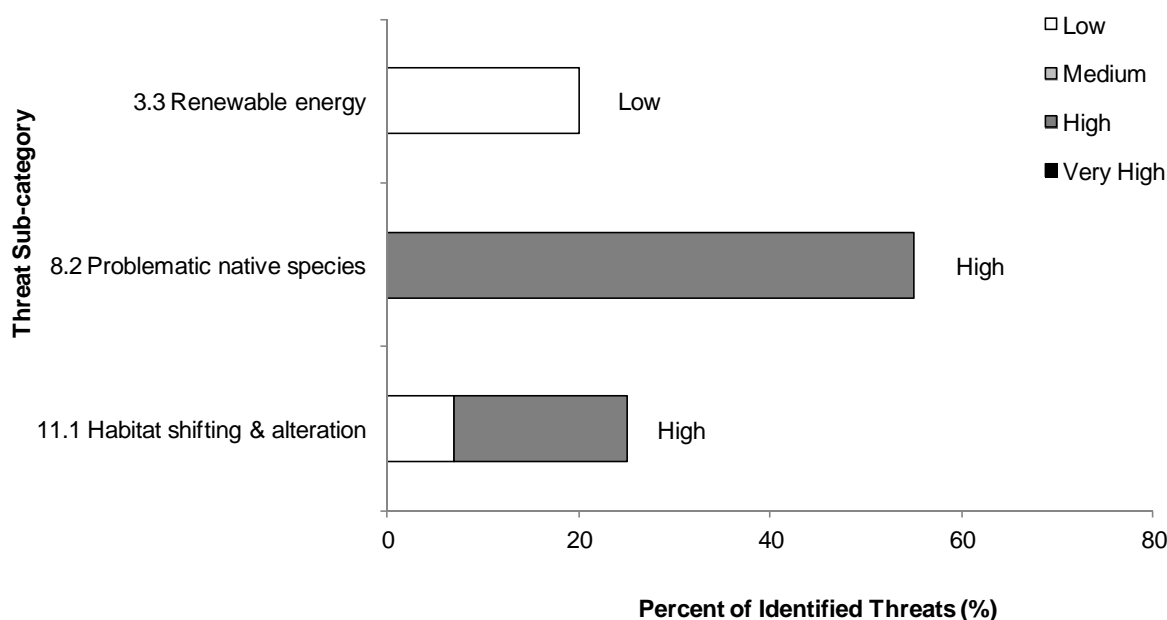


Figure 26. Percent of identified threats to priority species using coastal habitats in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat sub-category in coastal habitat (for example, if 100 threats were identified in total for all priority species in coastal habitat, and 10 of those threats were in the category 11.1 Habitat shifting & alteration, the bar on the graph would represent this as 10%). The bars are divided to show the distribution of Low (L), Medium (M), High (H) and Very High (VH) rankings of individual threats within each threat sub-category. For example, the same threat may have been ranked H for one species and L for another; the shading illustrates the proportion of L, M, H and VH rankings in the sub-category). The overall magnitude of the sub-threat in coastal habitat is shown at the end of each bar (also presented in Table 5 Relative magnitude of identified threats to priority species within BCR 7 ON by threat category and broad habitat class). Only threats with a magnitude of medium or higher are typically assigned habitat-specific conservation objectives.

Table 17. Threats addressed, conservation objectives, recommended actions, and list of priority species affected in coastal habitats in BCR 7 Ontario.**Note:** Issues such as climate change and pollution are not addressed in this table; instead, they are addressed in the Widespread Issues section.

| Threat Addressed | Threat Sub-category | Objective | Objective Category | Recommended Actions | Action Sub-category | Priority Species Affected |
|----------------------------------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Heavy grazing by Lesser Snow Geese causing habitat loss/degradation. | 8.2 Problematic native species | Determine the effects of Lesser Snow Geese on other birds and ecosystem components (Arctic Goose Joint Venture, 2008) | 7.4. Improve understanding of causes of population declines | Conduct research to determine effects of heavy grazing by Snow Geese on habitat and resource availability for other species | 8.1 Research | American Golden-Plover Arctic Tern Brant (Atlantic) Parasitic Jaeger Red Knot (<i>rufa</i>) Ruddy Turnstone Sanderling Semipalmated Plover Semipalmated Sandpiper Snow Goose Surf Scoter |
| | | | | Monitor the nature and rate of recovery of previously damaged areas | 8.2 Monitoring | |
| Federal or provincial Species at Risk | n/a | Meet the legal requirements of federal/provincial Species at Risk. | 3.4 Implement recovery documents for species at risk | Continue to develop and/or implement objectives and actions from SAR recovery documents. | 3.2 Species recovery | Bald Eagle, Eskimo Curlew, Golden Eagle, Red Knot (<i>rufa</i>) |
| Overabundant species | 8.2 Problematic native species | Manage overabundant species (Lesser Snow Geese, Mid-continent Population) | 3.6 Reduce overabundant species | Develop/implement Management Plan | 3.1 Species management | Snow Goose |

Riparian

The vast wetlands of BCR 7 ON are interconnected with an equally vast network of streams and rivers; riparian habitat, terrestrial habitat within 30 metres of a river's shoreline, is widespread in the region (Fig. 27). Four priority species make extensive use of riparian areas for breeding or foraging (Table 18). Flooding or alteration of stream flow for hydroelectric development (threat sub-category 3.3; Fig. 28) poses a clear threat to species dependent on riparian habitats. This currently low-magnitude threat from renewable energy may increase in the future if new hydroelectric development is pursued. Like wetland habitats, riparian habitats are likely at some risk from changes in hydrology resulting from climate change (sub-category 11.1). Because no threats in riparian habitat exceeded a low-level magnitude, no habitat-specific conservation objectives or actions are provided.

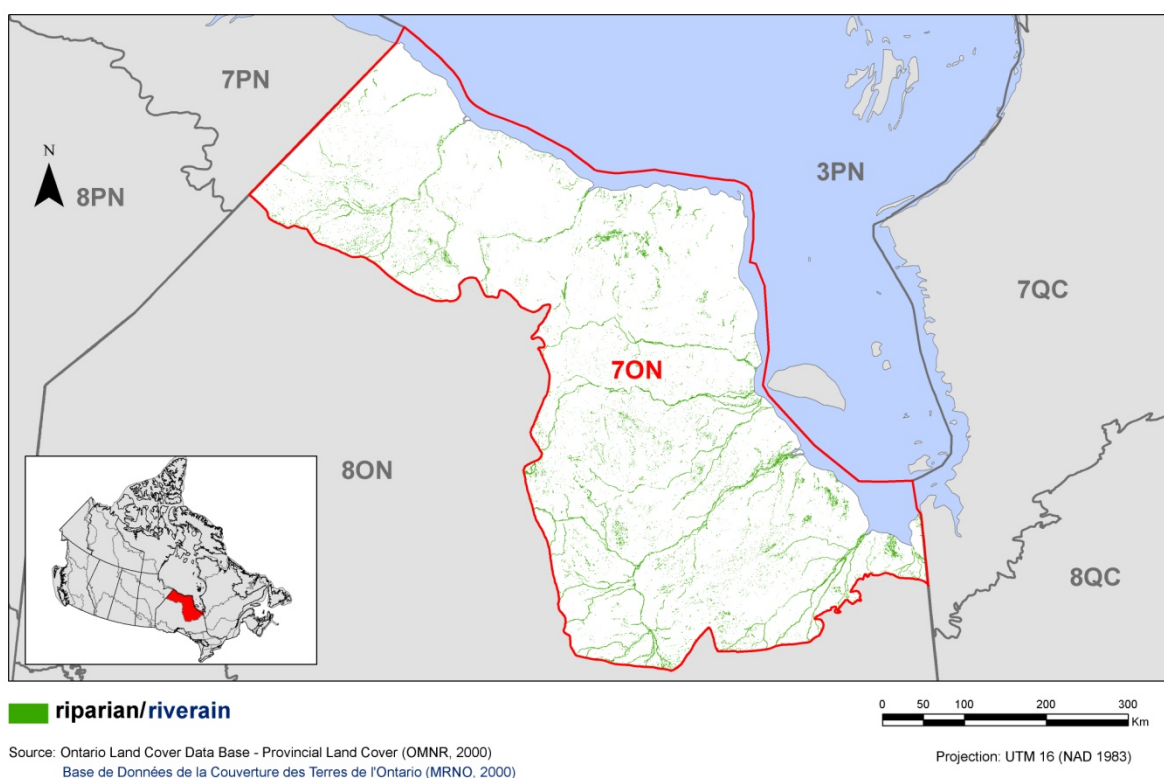


Figure 27. Map of riparian habitats in BCR 7 Ontario.

Table 18. Priority species that use riparian habitats in BCR 7 ON habitat description, population objectives and reasons for priority status.

| Priority Species | Habitat Description ¹ | Population Objective | COSEWIC ² | SARA ³ | SARO ⁴ | Regional/Sub-regional Concern ⁵ | Regional/Sub-regional Stewardship ⁶ | National/Continental Concern | National/Continental Stewardship |
|------------------|------------------------------------------------------------------------|------------------------------|----------------------|-------------------|-------------------|--------------------------------------------|------------------------------------------------|------------------------------|----------------------------------|
| Alder Flycatcher | riparian thicket | Assess/Maintain | | | | | Y | | Y |
| Bald Eagle | riparian mixed (evergreen) trees, riparian mixed (evergreen) woodlands | Assess/Maintain | | | Y | Y | | | Y |
| Common Goldeneye | riparian mixed forests | Assess/Maintain | | | | Y | | | |
| Rusty Blackbird | riparian mixed forests | Assess/Maintain [†] | Y | Y | | Y | | Y | |

¹ Habitat descriptions, in most cases, follow definitions under the Land-cover Classification System (LCCS; see Kennedy et al. 2012).

² Assessed by COSEWIC ([Committee on the Status of Endangered Wildlife in Canada](#)) as: E, Endangered; T, Threatened; SC, Special Concern.

³ Species listed on Schedule 1 of SARA as E, Endangered; T, Threatened; SC, Special Concern ([Species at Risk Public Registry](#)).

⁴ [Ontario Species at Risk List](#).

⁵ Regional refers to BCR-wide (i.e., all jurisdictional data were used for the entire BCR 7) while sub-regional refers to the Ontario portion of BCR 7 only (i.e., Ontario BCR data were used).

⁶ Only the landbird group distinguishes stewardship species from other priority species (see [Partners in Flight Handbook on Species Assessment](#)).

[†] This interim population objective for this species will be replaced with the official recovery objective once recovery documents are published under the *Species at Risk Act*.

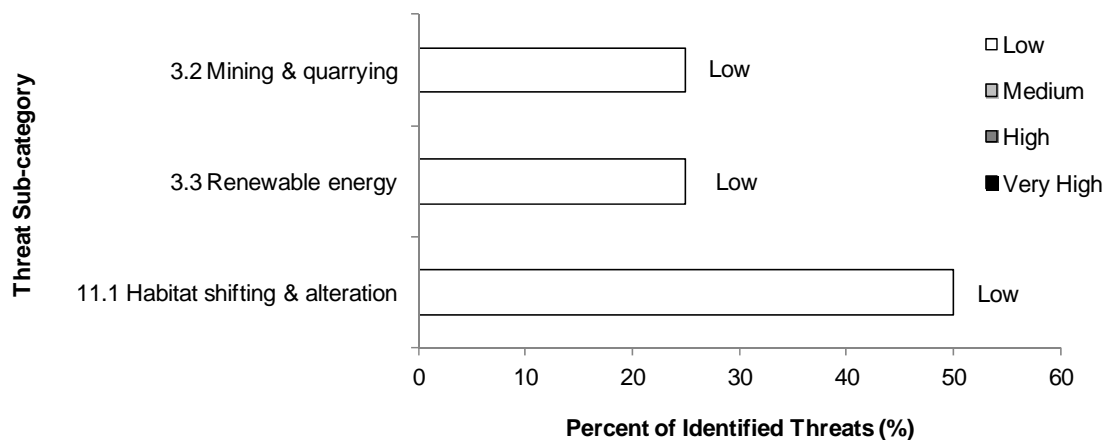


Figure 28. Percent of identified threats to priority species in riparian habitats in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat sub-category in riparian habitat (for example, if 100 threats were identified in total for all priority species in riparian habitat, and 10 of those threats were in the category 11.1 Habitat shifting & alteration, the bar on the graph would represent this as 10%). The bars are divided to show the distribution of Low (L), Medium (M), High (H) and Very High (VH) rankings of individual threats within each threat sub-category. For example, the same threat may have been ranked H for one species and L for another; the shading illustrates the proportion of L, M, H and VH rankings in the sub-category). The overall magnitude of the sub-threat in riparian habitat is shown at the end of each bar (also presented in Table 5: Relative magnitude of identified threats to priority species within BCR 7 ON by threat category and broad habitat class). Only threats with a magnitude of medium or higher are typically assigned habitat-specific conservation objectives.

Section 3: Additional Issues

Widespread Issues

Some well-known conservation issues may not be identified in the literature as significant threats to populations of an individual priority species and therefore may not be captured in the threat assessment. However, these issues, while they may or may not be limiting factors for any individual species or population, contribute to avian mortality or decreases in fecundity across many species and thus warrant conservation attention. Usually these issues transcend habitat types and are considered “widespread.” Examples of these issues include:

- Collisions with human-made structures (buildings, cars, utility/telecommunications towers and lines, etc.)
- Pollution
- Climate change

Because the widespread issues do not fit into the standard presentation format used in the BCR strategies, they are presented separately here. The mortality estimates included here are largely based on draft reports that were available within Environment Canada when this strategy was produced; the numbers may change as the final scientific papers are peer-reviewed and published. Human-related avian mortality across all sectors was standardized and compared in Calvert et al (2013).

Collisions

Communication Towers

There are currently almost 8 000 communication towers in Canada >60 m high (Longcore et al. 2012), each of which can pose a hazard to birds during migration. Birds are attracted to the lights of communication towers and are killed when they collide with the structures and guy wires. Mortality increases exponentially with tower height, in part because the use of guy wires also increases with tower height. Poor weather also plays a significant role in increasing migrant fatality; foggy and cloudy conditions increase the lit area around towers and block celestial clues used by migrating birds. The result is that birds circle to exhaustion in the halo of artificial light, or collide with each other, the tower, or its guy wires (American Bird Conservancy 2012).

Avian mortality at towers is unequally distributed among species and regions, but estimates suggest that over 220 000 birds are killed in Canada each year (Longcore et al. 2012).

Neotropical migrants in the families Parulidae (wood-warblers) and Vireonidae (vireos) are the species most commonly killed by communication towers. These families include threatened species and many that are of conservation concern in Canada and/or the United States. When considered in concert with mortality at towers in the United States (which is 20 times higher due to the larger number and greater height of towers in the United States), and the mortality from other stationary structures, mortality from collisions with communications towers may negatively affect the population trends of some birds. Mortality within BCR 7 ON is likely small and limited to the vicinity of the few, scattered communities. However, priority birds from BCR

7 ON encounter the risk of tower collision during migration through more heavily populated regions. See Table 19 for conservation objectives and actions.

Buildings

Collisions with glass windows or reflective panels on buildings are believed to be a significant source of bird mortality in Canada. Estimates of mortality from collisions with houses in Canada (including birds using feeders) range from approximately 15.8–30.5 million birds per year (Machtans et al. 2013). Mortality from collisions with buildings of less than 12 storeys is estimated at approximately 0.3–11.4 million birds/year, and for all cities in Canada with tall buildings in an urban core the estimate is 13 000–256 000 birds/year. The total estimate of mortality from collisions with buildings in Canada is therefore between 16.1–42.2 million birds/year (Machtans et al. 2013).

Individual species are not all equally susceptible to this source of mortality. Passerines were by far the taxonomic order most often killed at low-rise and high-rise buildings (90.4% tall buildings, 82.5% commercial and institutional buildings). Parulidae (Warblers – 6.4% tall buildings, 21.2% commercial and institutional) and Emberizidae (sparrows – 23.5%, 17.6%) were the families most commonly killed by both types of buildings. Other families of species representing more than 3% total relative mortality from tall buildings were Turdidae (thrushes – 6.3%), Certhiidae (Brown Creepers – 3.4%) and Paridae (chickadees – 3.3%), whereas for commercial and institutional buildings the families were Turdidae (14.8%), Cardinalidae (tanagers and grosbeaks – 6.3%), and Fringillidae (finches) and Mimidae (thrashers and mockingbirds – both 4.0%; Machtans et al. 2013). Differences in the rates and ranks of relative mortality among families may be attributable to study locations, species ranges, and/or differential susceptibilities of species in combination with building characteristics. The population-level effects of bird mortality from building strikes are unknown. See Table 19 for conservation objectives and actions.

Pollution

Pollution caused by industrial chemicals, pesticides and heavy metals can have both direct and indirect effects on survival and reproduction in birds. Sometimes the effects of exposure to pollutants are unexpected and do not result in immediate, measurable impacts on bird populations (Eeva and Lehtikoinen 2000, Franceschini et al. 2008, North American Bird Conservation Initiative, U.S. Committee 2009, Mineau 2010). However, persistent exposure can result in sharp declines in bird populations, as happened with Peregrine Falcons in eastern Canada prior to the ban of DDT. This issue was not identified as a specific threat to the priority species in BCR 7 ON but could have low-magnitude effects on a large number of species within the region, and higher magnitude effects while species are outside of the region during the non-breeding season. See Table 19 for conservation objectives and actions.

Many of the harmful pollutants that are released in large quantities elsewhere in the country, such as agricultural pesticides, are not used widely in BCR 7 Ontario. Industrial chemicals and harmful effluents may be released near communities and development sites, but the effects are localized and, in many cases, regulations governing release of these substances are in place.

Within this BCR in Ontario, the more widespread risk of pollution comes from chemicals transported over long distances entering into the system through atmospheric deposition and surface water flows. Through the process of bioaccumulation, some pollutants may threaten species at high trophic levels in particular.

Toxic Chemicals and Heavy Metals

Toxic organic chemicals and heavy metals released into the environment can also negatively impact bird populations. While some industrial chemicals such as PCBs are regulated, there is concern about new chemicals such as flame retardants (PBDE) that are used in computers, car parts and upholstery, and whose effects on wildlife are largely unknown (Environment Canada 2003). Scavengers experience toxic effects when they ingest lead shotgun pellets or bullet fragments embedded in carcasses of game animals, and loons and other waterbirds are exposed to lead from shotgun pellets, sinkers and jigs that they ingest either while collecting grit for their gizzards or by eating bait fish with line and sinker still attached (Scheuhammer and Norris 1996, Scheuhammer et al. 2003). In some areas, lead poisoning from sinkers and jigs can account for approximately half of the mortality of adult Common Loons on their breeding grounds (Scheuhammer and Norris 1996). Birds are also susceptible to bioaccumulation of other toxic metals such as methylmercury, selenium and others when they consume prey that has been exposed to these substances. See Table 19 for conservation objectives and actions.

In BCR 7 Ontario, an additional concern relates to the release of stored mercury from peatlands, wetlands and forests. Although the dynamics are complex and not completely understood, changes in temperature and hydrology could lead to elevated levels of methylmercury in the rivers of this BCR (e.g., O'Driscoll et al. 2005). Potentially harmful levels of this heavy metal have already been identified in predatory fish such as the Northern Pike and Walleye (Far North Science Advisory Panel 2010). Fires also lead to the release of mercury stored in boreal forests and peatlands, and in severe fire years may equal the nationwide emissions from industrial sources (Sigler et al. 2003, Turetsky et al. 2006). Disruptions to temperature and fire regimes as a result of climate change, or alteration of hydrology as a result of mining or hydroelectric development, could lead to the release and methylation of mercury at levels potentially harmful to birds and other wildlife.

Oil Pollution

Oil may enter the environment either accidentally, through deliberate dumping, or in contained tailings ponds. It may be a single large event, as occurred in the Gulf of Mexico in 2010, or numerous smaller events. Annual estimates are that between 217 800 and 458 600 birds are killed by ship-source oil spills annually (Calvert et al. 2013), largely as a result of deliberate dumping of oily waste by ships. Typically, diving birds are most at risk of oiling; however, any birds that come into contact with oil are vulnerable. Oil can impact birds through direct effects such as hypothermia (resulting from lost waterproofing of feathers following oil contamination), toxicity (from ingesting oil as they preen or by inhaling volatile organic compounds), and indirect effects, such as reduced prey availability and decreased quality of habitat. While techniques exist to clean and rehabilitate oiled birds, many birds die before,

during and after rescue attempts (Brown and Lock 2003). See Table 19 for conservation objectives and actions.

Marine shipping in or near BCR 7 ON is very limited, with some traffic between coastal communities and Churchill, Manitoba. The port at Churchill receives significant ship traffic, but the risk of a catastrophic oil spill to the coastal habitat of this BCR in Ontario remains small. However, as a result of changing sea-ice conditions, Hudson and James Bays are experiencing longer ice-free periods (Abraham and McKinnon 2011). The loss of ice cover could increase the potential for marine shipping and accidental oil spills that pose risks to wildlife (e.g., oiling of birds). It is important to note that a large number of BCR 7 ON priority species use coastal habitats during migration and may be exposed to significant threats from oil pollution elsewhere in their range.

Table 19. General conservation objectives and actions associated with bird mortality from collisions and contaminants in BCR 7 Ontario.

| Threats Addressed | Threat Sub-category | Objective | Objective Category | Recommended Actions | Action Sub-category | Example Priority Species Affected |
|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Collision mortality | | | | | | |
| Collisions with communications towers cause bird mortality, particularly during migration. | 1.2 Commercial and industrial areas | Reduce incidental mortality from collisions with human-made structures | 2.7 Reduce incidental mortality from collisions. | <p>Follow beneficial practices for reducing mortality to birds when constructing new communications towers.</p> <p>Switch off solid lights on existing towers and ensure that remaining lights have a synchronized, complete dark phase.</p> <p>Take steps to ensure that new towers avoid guy wires and minimize height, and avoid topographic locations where migrating birds are likely to be found in abundance.</p> <p>Retrofit existing towers to adhere to as many guidelines as possible.</p> | 2.1 Site/area management 5.3 Private sector standards and codes | Primarily warblers and sparrows. |
| Collisions with buildings cause bird mortality. | 1.1 Housing and urban areas 1.2 Commercial and industrial areas | Reduce incidental mortality from collisions with windows/buildings | 2.7 Reduce incidental mortality from collisions | Follow beneficial practices for bird-friendly buildings including using bird-friendly glass, reducing reflection from windows, providing visual markers to enable birds to perceive windows, and reducing light pollution. | 2.1 Site/area management 5.3 Private sector standards and codes | Primarily warblers and sparrows. |
| Population effects of collisions are unknown. | 12.1 Information lacking | Improve understanding of population effects of mortality from collisions | 7.4 Improve understanding of causes of population declines. | Assess the biological importance of bird kills from all sources of collisions. | 8.1 Research | Primarily warblers and sparrows. |
| Environmental Contaminants | | | | | | |
| Mortality from ingestion of lead shot or tackle. | 5.1 Hunting & collecting terrestrial animals 5.4 Fishing & harvesting aquatic resources | Reduce mortality and sub-lethal effects of lead shot and fishing tackle on birds | 2.2 Reduce mortality and/or sub-lethal effects from exposure to contaminants. | <p>Work with hunters, anglers and industry to eliminate the exposure of birds to shot, sinkers and jigs made of lead.</p> <p>Enforce the use of non-toxic shot in waterfowl hunting, and encourage adoption of non-toxic alternatives in target shooting, upland game bird hunting, and fishing.</p> | 4.3 Awareness and communications 5.4 Compliance and enforcement | American Black Duck, Bald Eagle, Common Loon, Green-winged Teal, Lesser Scaup, Mallard |
| Mortality from heavy metals and other contaminants. | 9.2 Industrial & military effluents | Reduce mortality from heavy metals and other contaminants | 2.2 Reduce mortality and/or sub-lethal effects from exposure to | Work with industry and policy makers to reduce the quantity of heavy metals and other contaminants released into the environment. | 5.3 Private sector standards and codes 5.2 Policies and | Waterbirds and Waterfowl |

Table 19 continued

| Threats Addressed | Threat Sub-category | Objective | Objective Category | Recommended Actions | Action Sub-category | Example Priority Species Affected |
|----------------------------------------------|--------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| | | | contaminants. | | regulations | |
| Mortality of waterbirds from oil pollution. | 9. Pollution | Reduce mortality from oil pollution | 2.3 Reduce mortality and/or sub-lethal effects of oil pollution. 5.1 Maintain natural food webs and prey sources. | Improve monitoring and enforcement capacity to reduce chronic oil pollution from illegal dumping of bilge waste and cleaning of oil tanks. Improve education/outreach to make sure that the oil industry and its regulators are aware of the potential impacts on birds and take measures to prevent exposure of birds to oil. | 5.4 Compliance and enforcement 4.3 Awareness and communications | Lethal and sub lethal effect of oil exposure: Bald Eagle, Common Goldeneye, Common Loon, Red Knot |
| Population effects of pollution are unknown. | 12.1 information lacking | Improve understanding of population effects of pollution | 7.4 Improve understanding of causes of population declines. | Evaluate the affects of PBDEs and other chemicals on vital rates in birds. Improve the ability to monitor and understand the effects of contaminant concentrations in birds. | 8.1 Research | All species |

Climate Change

The effects of climate change are already measurable in many bird habitats and have resulted in range shifts and changes in the timing of migration and breeding in some species (National Audubon Society 2009, North American Bird Conservation Initiative, U.S. Committee 2009). Birds in all habitats will be affected by climate change. The most vulnerable are predicted to be those that are dependent on oceanic ecosystems and those found in coastal, island, grassland, arctic and alpine habitats (North American Bird Conservation Initiative, U.S. Committee 2010). Changing climate may also facilitate the spread of disease, the introduction of new predators and the invasion of non-native species, which alter habitat structure and community composition (North American Bird Conservation Initiative, U.S. Committee 2009, Faaborg et al. 2010). See Tables 20 and 21 for a summary of impacts of climate change and conservation objectives.

A recent exercise used bioclimatic modelling to predict changes in bird species ranges based on anticipated climate change for different time periods and under different emissions scenarios (Lawler et al. unpublished; Lawler et al. 2009). Bioclimatic models use statistical associations between the current range of a species and a suite of climate variables to predict future ranges under new climate conditions. The study focused on priority bird species currently found within BCRs in Canada. The results suggest that bird species turnover in Canada will be highest in northern BCRs as species ranges continue to shift northward in the coming decades (Fig. 29). In BCR 7 Ontario, the model predicts a gain of 49 species and a loss of 28 species for a total turnover (species gains + species losses) of 48% by the year 2100.

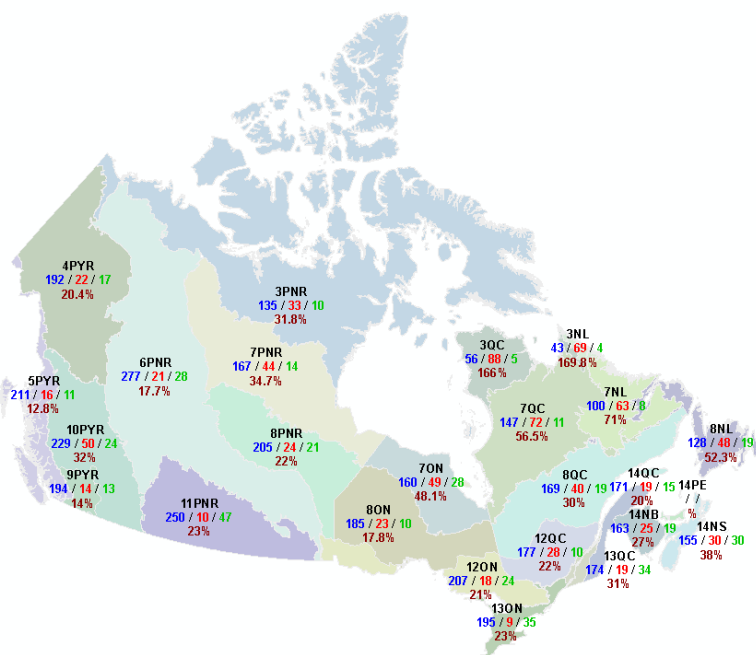


Figure 29. Number of species analyzed (blue), gained (red), lost (green) and the percent turnover (reddish brown) by BCR sub-region.

In BCR 7 Ontario, climatic warming has already resulted in measurable habitat and ecological change, and the threat was ranked as having a very high magnitude overall. A number of priority species breed in Ontario only in BCR 7, and their restricted ranges mean that even a small degree of habitat change could significantly affect their abundance in the province. Species that breed in the tundra of the Hudson Bay coast are especially vulnerable, as any northward shift of this already restricted habitat would eliminate nesting habitat for tundra birds in the province. Drawdown of water levels due to a deepening active layer and increased evapotranspiration could lead to drying of shallow tundra ponds, and key coastal tundra wetlands could be lost to a rising sea level. Breeding species such as the Dunlin and Parasitic Jaeger may be lost from Ontario.

The predicted climatic changes may have both positive and negative effects on forest birds and their habitats. The increased temperatures and longer growing season could contribute to increased growth rates of trees and a northward progression of the treeline (increasing the availability of forest habitat within the current boundaries of BCR 7 Ontario). Species dependent on closed-canopy forest, such as the Tennessee and Bay-breasted Warblers, may benefit, while species dependent on transitional taiga habitats, such as Smith's Longspur and Harris' Sparrow, may be adversely affected. Also, predicted climatic conditions may promote increased severity of fire, insect outbreaks and drought, again with positive and negative effects on priority bird species. The highly complex interactions among ecosystem components make precise predictions of future habitat effects difficult.

Similar uncertainty surrounds the fate of wetlands in BCR 7 under scenarios of global climate change. Future patterns of precipitation are difficult to predict, but changes in timing or amount of precipitation will have profound effects on wetland hydrology, and increased temperatures will contribute to a drying of wetlands through increased evapotranspiration, with generally adverse effects on waterbirds and waterfowl.

Although uncertainty remains about the precise effects of a changing climate on the habitats of BCR 7 Ontario, it is clear that the widespread changes already underway will profoundly affect the region's wildlife. To maintain healthy bird populations in the face of a changing climate, conservation must be carefully planned and must be implemented so as to buffer birds from the negative impacts of climate change wherever possible (Faaborg et al. 2010).

Table 20. Examples of the current and anticipated effects of climate change on bird populations in Canada and some affected birds

Note: The species shown here do not represent an exhaustive list, but instead provide examples of species where the effects of climate change have been suggested or documented.

| Potential and Realized Effects of Climate Change | Examples of Species Affected |
|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Mismatch between peak hatch and peak food abundance | Olive-sided Flycatcher, Rusty Blackbird |
| Extended breeding season | Canada Goose, Lincoln's Sparrow |
| Habitat loss as a result of ecosystem changes (e.g., advances in treeline) | Yellow Rail, Harris's Sparrow |
| Increase in severe weather events | Canada Goose, Red Knot |
| Introduction of new predators and competitors | Canada Goose |
| Range shifts to the north and from coastal to inland sites | Tennessee Warbler, Spruce Grouse |
| Changes in ocean temperature and currents impact marine productivity and food webs | Pacific Loon, Red-throated Loon, Parasitic Jaeger, Black Scoter |
| Thawing of permafrost and increased evaporation will result in vegetation shifts and loss of wetlands in arctic habitat | Hudsonian Godwit, Ring-necked Duck, Rusty Blackbird, Yellow Rail |

Table 21. Proposed conservation objectives and actions to address climate change.

| Threats Addressed | Threat Sub-category | Objective | Objective Category | Recommended Actions | Action Sub-category | Priority Species Affected |
|------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------------|
| Climate change impacts habitat and negatively affects survival and productivity of birds | 11.1 Habitat shifting and alteration | Reduce greenhouse gas emissions | 6.1 Support efforts to reduce greenhouse gas emissions | Support efforts to reduce greenhouse gas emissions. | 5.2 Policies and regulations | All |
| | | Mitigate the effects of climate change on bird habitat | 6.2 Manage for habitat resilience as climate changes | Manage ecosystems to maximize carbon storage and sequestration while simultaneously enhancing bird habitat. | | |
| | | | | Complete a protected areas network in accordance with Far North Land Use Planning Initiatives. | 1.1 Site/area protection | |
| | | | | Manage for habitat resilience to allow ecosystems to adapt despite disturbances and changing conditions. Minimize anthropogenic stressors (such as development or pollution) to help maintain resilience. | 2.1 Site/area management | |
| | | | | Manage buffer areas and the matrix between protected areas to enhance movement of species across the landscape. | | |
| | | | | Incorporate predicted shifts in habitat into landscape level plans (e.g., when establishing protected areas ensure the maintenance of north-south corridors to facilitate northward range shifts of bird species). | 5.2 Policies and regulations | |

Table 21 continued

| Threats Addressed | Threat Sub-category | Objective | Objective Category | Recommended Actions | Action Category | Priority Species Affected |
|--------------------------------------------------------|--------------------------|---------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------------|
| Population-level effects of climate change are unknown | 12.1 Information lacking | Improve understanding of climate change on birds and their habitats | 7.5 Improve understanding of potential effects of climate change | Evaluate which species are most vulnerable to climate change. | 8.1 Research | All |
| | | | | Investigate the cumulative effects of climate change. | | |
| | | | | Investigate behavioural responses to climate change (such as range shifts, changes in demographic rates, and changes in timing of breeding and migration) through long-term studies. | | |
| | | | | Continue to monitor bird populations so changes in numbers and distributions can be identified. | 8.2 Monitoring | |
| | | | | Undertake monitoring to evaluate the effectiveness of mitigation activities. | | |

Research and Population Monitoring Needs

Population Monitoring

An estimate of population trend for each species is necessary for the development of elements 1 and 3 (Species Assessment and Population Objectives). However, there are many species for which we are currently unable to estimate a reliable population trend (PT) score. These species were typically assigned a population objective of “assess/maintain.” Our inability to estimate a PT score may be the result of a lack of monitoring data for the BCR as a whole or may be because certain species are not well captured by common monitoring techniques. To be able to effectively evaluate species believed to be of conservation concern, and to track those not yet of concern for future changes in status, we require more comprehensive monitoring that enables us to generate population trends for all species of birds in Canada. However, it is important to note that for some species, population trends are better understood at scales larger or smaller than the BCR unit, and lack of BCR-scale population trend data should not preclude acting to conserve these species.

Despite significant efforts, gaps in knowledge are the rule rather than the exception in BCR 7 Ontario. Commonly used monitoring programs such as the Breeding Bird Survey are not feasible because of a lack of roads. Similarly, many other standard monitoring programs are not feasible because of the financial and logistical challenges of working in this remote and inaccessible region. Indeed, northern boreal/taiga habitats are considered among the most poorly monitored in the country in terms of bird abundance and distribution. For the majority of species, the only source of data (which is sparse) originates from the two Ontario Breeding Bird Atlases. Consequently, for 41 species, a lack of information about population status was determined to be a conservation concern. These species and recommendations for improving the monitoring of their population status appear in Table 22.

A recent Environment Canada review (Avian Monitoring Review Steering Committee 2012) of avian monitoring programs in Canada made the following recommendations for each of the four main species groups:

Landbirds

- develop options for on-the-ground monitoring across boreal Canada;
- evaluate the ability of migration monitoring and checklist surveys to contribute to Environment Canada’s monitoring needs; and
- evaluate the feasibility and cost-effectiveness of improving demographic monitoring to help understand causes of population change.

Shorebirds

- develop more reliable sampling methods for counting shorebirds in migration to address concerns about bias; and
- increase Latin American involvement in monitoring shorebirds on the wintering grounds, including Red Knot.

Waterbirds

- evaluate alternative strategies for filling gaps in coverage for both colonial waterbirds and marsh birds;
- consider both costs and potential reduction in risks; and
- carry out any necessary pilot work to evaluate options.

Waterfowl

- develop strategies to reduce expenditures on the prairie and eastern waterfowl breeding surveys, while retaining acceptable precision in population estimates;
- review the information needs and expenditures for arctic goose and duck banding programs;
- reduce the number of Greater Snow Goose survey components;
- realign resources for eider and scoter monitoring to a more efficient suite of surveys.

The key priorities for monitoring (Table 22) can be summarized (in ascending levels of investment) as:

- Basic occurrence data on species at risk in the BCR sub-region would be highly useful to enable any necessary pre- and post-construction monitoring for environmental assessments.
- Status and trend monitoring for all priority species would improve assessment of population objectives and future management recommendations. This could be accomplished by:
 - Determining methods and designs that work for remote landscapes and the particular species requiring monitoring. For instance, it is not clear what protocols could be used to monitor some boreal-breeding shorebirds such as Solitary Sandpiper.
 - Considering survey program design in light of what sampling is needed in the BCR sub-region to inform management.

Status and trends of species at risk would be the most difficult to determine given typically low densities and discontinuous distributions (compared to more common species listed on the BCR priority list).

Table 22. Species for which incomplete monitoring information was considered a conservation concern, and suggested actions to address these gaps in monitoring information.

| Action | Justification and Discussion | Priority Species |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| All Bird Groups | | |
| Obtain accurate occurrence data for mapping species' distribution in the BCR | Most planning or management exercises require distribution information on species, usually at the level provided by modern atlas work (e.g., Ontario Bird Atlas 2). While the atlases have provided good information, the information may be biased because most sites visited are done so by river and less accessible habitats are poorly covered. Information is also poor for early nesting species such as waterfowl, secretive birds or birds with clumped distributions (e.g., colonial waterbirds). However, this work should be useful for environmental assessments of species-at-risk and mitigation/monitoring recommendations for developments. Work could build on programs such as eBird and bird atlases to help obtain the data. Location data that are tied to specific habitats would allow much better habitat associations within the BCR, also important for environmental assessments and predicting impacts of habitat loss or conversion. | Priority species that are "at risk" especially require better data, but current distribution data cannot be extrapolated with sufficient confidence. |
| Landbirds | | |
| Develop a monitoring program in boreal Canada, including representative sampling in BCR 7 ON for species with poor monitoring precision scores from Partners in Flight (PIF) assessments. | These data are necessary for setting population objectives and other management actions. A monitoring program will need to be selective in sampling areas and intensity to balance investment within the BCR compared to other boreal BCRs. The opportunity for broad-scale "management" action is very low given that development is sparse and there is little fire suppression. Monitoring data would be most useful in the national context hence the recommendation of "representative sampling" rather than "comprehensive sampling." | All BCR 7 ON priority landbirds listed by PIF as having poor monitoring precision. |
| Shorebirds and Waterbirds | | |
| Develop a monitoring program for selected shorebird and waterbird species (including marsh birds) | Little information on boreal shorebirds and waterbird trends exists beyond the few species that can be covered by Breeding Bird Survey methodology in other boreal BCRs. Like landbirds, selective effort will need to be used to determine what information on trend is needed from within the BCR to compare to other boreal areas for context. Methodology would need to be determined for several difficult-to-monitor species (Sinclair 2004, Elliot. 2010). Work is needed to provide appropriate field data that could be used to design a monitoring program | All priority shorebird and waterbird species. |

Table 22 continued

| Action | Justification and Discussion | Priority Species |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| | (logistics, detectability issues, between site and between year variance estimates especially). | |
| Waterfowl | | |
| Increase monitoring effort for species with a poor trend score. | Spring waterfowl transect surveys do not currently cover much of the BCR. However, the original design was prioritized to focus on areas with higher waterfowl abundance to balance survey costs with areas of population importance. Consideration could be given if expansion of spring surveys into BCR 7 ON is warranted for continental management of any waterfowl populations. Regional issues may require smaller programs (e.g., monitoring in protected areas, specific management questions related to threats in the BCR). | All priority waterfowl species |

Research

The focus of this section is to outline the main areas where a lack of information has hindered the ability to understand conservation needs and make conservation recommendations. Research objectives presented here are bigger-picture questions that do not replace the need for some more targeted studies to determine the needs of individual species. Undertaking research will allow us to improve future iterations of BCR strategies and to focus future implementation, and will also enable the development of new tools for conservation.

The paucity of monitoring data, or even detailed information on species' distribution in BCR 7 Ontario, limits our ability to formulate the most relevant research questions. Nevertheless, the following would improve our capacity to manage and conserve species in BCR Ontario:

- Research on species-at-risk to understand regional biology, status and (potentially) trends, and the relationship of national trends and populations to local data.
- Research that links BCR 7 ON priority species with their migration routes and wintering grounds.
- Research on the impacts of overabundant geese on other species or their habitats.
- Research to determine specific impacts of development activities (e.g., mining, transportation corridors) on birds to properly understand the local impacts of these activities.
- Research projects that use sites in this BCR sub-region as a control for impacted sites in other BCRs or BCR sub-regions.
- Research to determine species-habitat associations to help assess the effects of development activities and refine post-construction monitoring regimes.
- Research to understand the observed impacts of changing climate on habitats and birds.

Threats Outside Canada

Many bird species found in Canada spend a large portion of their life cycle outside of the country (Fig. 30). These species face threats while they are outside Canada; in fact, threats to some migratory species may be most severe outside of the breeding season (Calvert et al. 2009). Of the 66 priority species in BCR 7 Ontario, 62 (91%) migrate to spend part of their non-breeding season outside of the region or outside of Canada.



Figure 30. Percent of Canadian breeding birds that migrate to regions outside of Canada for part of their life cycle (North American Bird Conservation Initiative Canada 2012).

Similar to the assessment of threats facing priority species within Canada, we conducted a literature review to identify threats facing priority species while they are outside Canada. A lack of data was a pervasive issue for this exercise. For many species, little is known about threats they face during migration or while on their wintering grounds. Indeed, for some species, their wintering ranges and habitat use while outside of Canada are only poorly known, if at all. There is also little information linking specific wintering areas to particular breeding populations, making it difficult to connect declines in breeding populations to potential problems on the wintering grounds. In addition, what data exist on wintering migrant species are heavily biased towards work done in the United States, and little research is available from Mexico, Central and South America. While many of the threats identified in the United States likely affect species throughout their range, unique issues outside of the United States may have been missed. An absence of threats in a region may reflect that the necessary research has not yet been conducted (or may not be published in English). Because information on bird distributions during the non-breeding season is limited, we were unable to fully assess the scope and severity of threats to priority species while they are outside of Canada.

Regardless, some information is available to inform conservation work outside Canada (Fig. 31). Priority birds from BCR 7 in Ontario face the loss or degradation of key migration and wintering habitats. The primary sources of habitat loss and degradation are conversion of wetlands and coastal areas as a result of residential and commercial development (threat categories 1.1 and 1.2), conversion of habitat for cropland and livestock (threat categories 2.1 and 2.3), and dams/water management (threat category 7.2). The threat of loss and degradation of stopover or wintering habitat is greater for species that have relatively small and concentrated wintering ranges. Others, such as Buff-breasted Sandpiper, Hudsonian Godwit and Red Knot, are particularly vulnerable as large numbers of these species concentrate at just a handful of key migratory stopover sites; degradation or loss of these sites could have devastating impacts on the species.

In addition to habitat loss, priority birds from BCR 7 ON are also affected by increased mortality from human sources during migration and overwintering. Collisions with structures such as communications towers were frequently reported (threat category 1.2). Many priority bird species, primarily shorebirds and waterfowl, are affected by hunting (threat category 5.1), and several priority birds from BCR 7 ON are subject to lead poisoning (threat category 5.1). Other sources of lethal and sub-lethal impacts to priority birds from BCR 7 ON include exposure to industrial contaminants such as oil pollution and heavy metals (threat category 9.2) and agricultural pesticides (threat category 9.3).

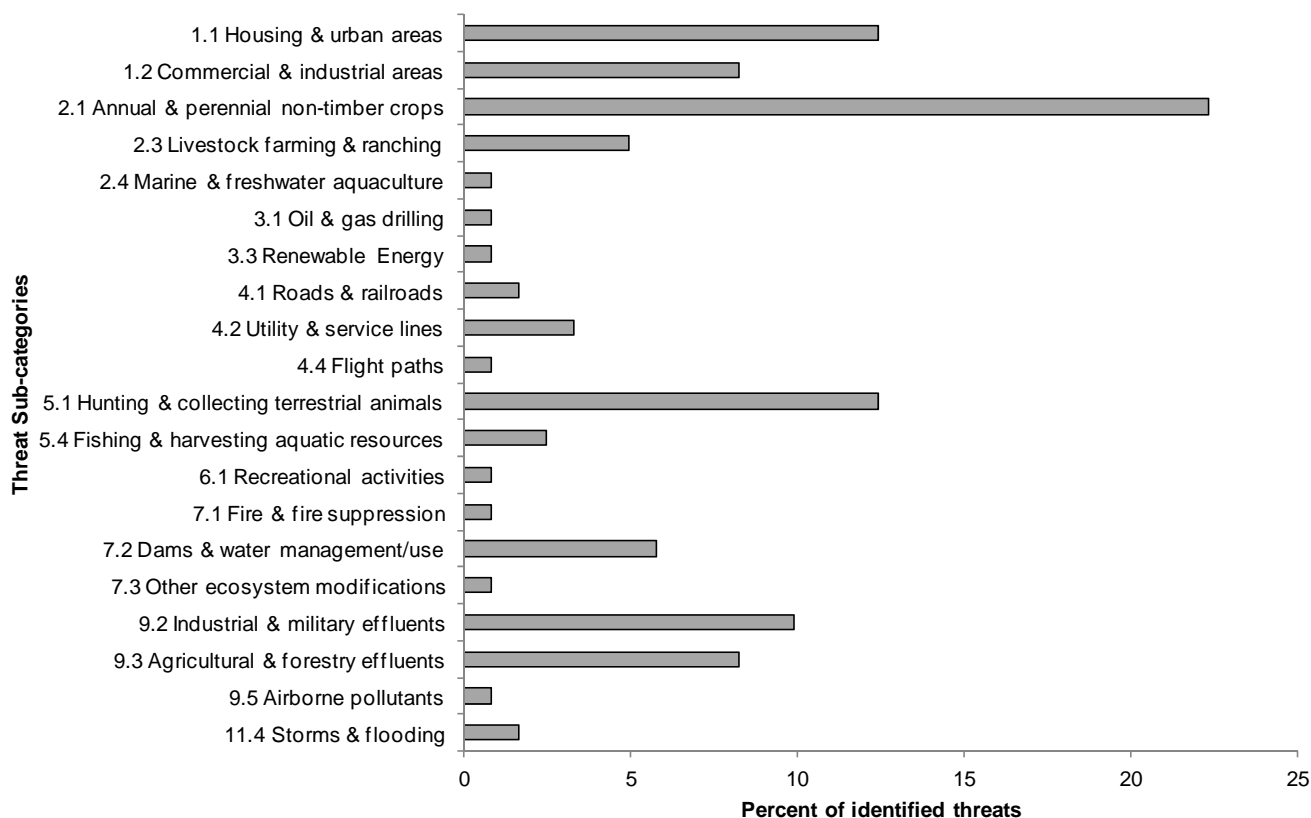


Figure 31. Percent of identified threats to BCR 7 Ontario's priority species while they are outside of Canada, by IUCN threat sub-category.

Note: Magnitudes could not be assigned for threats outside of Canada due to lack of information on the scope and severity of threats considered.

Next Steps

The primary aims of BCR strategies are to present Environment Canada's priorities with respect to migratory bird conservation, and to provide a comprehensive overview of the conservation needs of all bird populations to practitioners who may then undertake activities that promote bird conservation in Canada and internationally. Users from all levels of government, Aboriginal communities, the private sector, academia, NGOs and citizens will benefit from the information. BCR strategies can be used in many different ways, depending on the needs of the user, who may focus on one or more of the elements of the strategy to guide their conservation projects.

BCR strategies will be updated periodically. Errors, omissions and additional sources of information may be provided to [Environment Canada](#) at any time for inclusion in subsequent versions.

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Appendix 1

List of All Bird Species Occurring in BCR 7 Ontario

Table A1. Complete list of species in BCR 7 Ontario, when they are in the BCR (breeding, migrant, wintering) and their priority status.

| Latin Name | English Name | French Name | Bird Group | Breeding | Migrant | Wintering | Priority |
|------------------------------|-----------------------------------|--------------------------------------------|------------|----------|---------|-----------|----------|
| <i>Anas rubripes</i> | American Black Duck | Canard noir | Waterfowl | X | | | X |
| <i>Anas americana</i> | American Wigeon | Canard d'Amérique | Waterfowl | X | | | |
| <i>Melanitta nigra</i> | Black Scoter | Macreuse noire | Waterfowl | X | | | X |
| <i>Anas discors</i> | Blue-winged Teal | Sarcelle à ailes bleues | Waterfowl | X | | | |
| <i>Branta bernicla</i> | Brant | Bernache cravant | Waterfowl | | X | | X |
| <i>Bucephala albeola</i> | Bufflehead | Petit Garrot | Waterfowl | X | | | |
| <i>Branta canadensis</i> | Canada Goose (Mississippi Valley) | Bernache du Canada (vallée du Mississippi) | Waterfowl | X | | | X |
| <i>Branta canadensis</i> | Canada Goose (Southern James Bay) | Bernache du Canada (sud de la baie James) | Waterfowl | X | | | X |
| <i>Somateria mollissima</i> | Common Eider | Eider à duvet | Waterfowl | X | | | |
| <i>Bucephala clangula</i> | Common Goldeneye | Garrot à oeil d'or | Waterfowl | X | | | X |
| <i>Mergus merganser</i> | Common Merganser | Grand Harle | Waterfowl | X | | | |
| <i>Anas strepera</i> | Gadwall | Canard chipeau | Waterfowl | X | | | |
| <i>Aythya marila</i> | Greater Scaup | Fuligule milouinan | Waterfowl | X | | | |
| <i>Anas crecca</i> | Green-winged Teal | Sarcelle d'hiver | Waterfowl | X | | | X |
| <i>Lophodytes cucullatus</i> | Hooded Merganser | Harle couronné | Waterfowl | X | | | |
| <i>Somateria spectabilis</i> | King Eider | Eider à tête grise | Waterfowl | X | | | |
| <i>Aythya affinis</i> | Lesser Scaup | Petit Fuligule | Waterfowl | X | | | |

Table A1 continued

| Latin Name | English Name | French Name | Bird Group | Breeding | Migrant | Wintering | Priority |
|-------------------------------------|----------------------------------------------|---------------------------------------------|------------|----------|---------|-----------|----------|
| <i>Clangula hyemalis</i> | Long-tailed Duck | Harelde kakawi | Waterfowl | X | | | X |
| <i>Anas acuta</i> | Northern Pintail | Canard pilet | Waterfowl | X | | | |
| <i>Anas clypeata</i> | Northern Shoveler | Canard souchet | Waterfowl | X | | | |
| <i>Mergus serrator</i> | Red-breasted Merganser | Harle huppé | Waterfowl | X | | | |
| <i>Aythya americana</i> | Redhead | Fuligule à tête rouge | Waterfowl | X | | | |
| <i>Aythya collaris</i> | Ring-necked Duck | Fuligule à collier | Waterfowl | X | | | X |
| <i>Chen rossii</i> | Ross's Goose | Oie de Ross | Waterfowl | X | | | |
| <i>Oxyura jamaicensis</i> | Ruddy Duck | Érismature rousse | Waterfowl | X | | | |
| <i>Chen caerulescens</i> | Lesser Snow Goose (Mid-continent population) | Petite oie des neiges (Centre du continent) | Waterfowl | X | | | X |
| <i>Melanitta perspicillata</i> | Surf Scoter | Macreuse à front blanc | Waterfowl | X | | | X |
| <i>Cygnus columbianus</i> | Tundra Swan | Cygne siffleur | Waterfowl | X | | | |
| <i>Melanitta fusca</i> | White-winged Scoter | Macreuse brune | Waterfowl | X | | | |
| <i>Botaurus lentiginosus</i> | American Bittern | Butor d'Amérique | Waterbird | x | | | X |
| <i>Fulica americana</i> | American Coot | Foulque d'Amérique | Waterbird | X | | | |
| <i>Sterna paradisaea</i> | Arctic Tern | Sterne arctique | Waterbird | x | | | X |
| <i>Chlidonias niger</i> | Black Tern | Guifette noire | Waterbird | x | | | X |
| <i>Chroicocephalus philadelphia</i> | Bonaparte's Gull | Mouette de Bonaparte | Waterbird | X | | | |
| <i>Gavia immer</i> | Common Loon | Plongeon huard | Waterbird | X | | | |
| <i>Sterna hirundo</i> | Common Tern | Sterne pierregarin | Waterbird | X | | | |
| <i>Larus hyperboreus</i> | Glaucous Gull | Goéland bourgmestre | Waterbird | | X | | |
| <i>Ardea herodias</i> | Great Blue Heron | Grand Héron | Waterbird | X | | | |
| <i>Larus argentatus</i> | Herring Gull | Goéland argenté | Waterbird | X | | | |
| <i>Hydrocoloeus minutus</i> | Little Gull | Mouette pygmée | Waterbird | x | | | X |

Table A1 continued

| Latin Name | English Name | French Name | Bird Group | Breeding | Migrant | Wintering | Priority |
|-----------------------------------|-------------------------|------------------------------|------------|----------|---------|-----------|----------|
| <i>Gavia pacifica</i> | Pacific Loon | Plongeon du Pacifique | Waterbird | X | | | X |
| <i>Stercorarius parasiticus</i> | Parasitic Jaeger | Labbe parasite | Waterbird | X | | | X |
| <i>Podilymbus podiceps</i> | Pied-billed Grebe | Grèbe à bec bigarré | Waterbird | X | | | |
| <i>Podiceps grisegena</i> | Red-necked Grebe | Grèbe jougris | Waterbird | X | | | |
| <i>Gavia stellata</i> | Red-throated Loon | Plongeon catmarin | Waterbird | X | | | X |
| <i>Grus canadensis</i> | Sandhill Crane | Grue du Canada | Waterbird | X | | | X |
| <i>Porzana carolina</i> | Sora | Marouette de Caroline | Waterbird | X | | | |
| <i>Coturnicops noveboracensis</i> | Yellow Rail | Râle jaune | Waterbird | X | | | X |
| <i>Pluvialis dominica</i> | American Golden-Plover | Pluvier bronzé | Shorebird | X | | | X |
| <i>Calidris bairdii</i> | Baird's Sandpiper | Bécasseau de Baird | Shorebird | | X | | |
| <i>Pluvialis squatarola</i> | Black-bellied Plover | Pluvier argenté | Shorebird | | X | | X |
| <i>Tryngites subruficollis</i> | Buff-breasted Sandpiper | Bécasseau roussâtre | Shorebird | | X | | X |
| <i>Calidris alpina</i> | Dunlin | Bécasseau variable | Shorebird | X | | | X |
| <i>Numenius borealis</i> | Eskimo Curlew | Courlis esquimau | Shorebird | | X | | X |
| <i>Tringa melanoleuca</i> | Greater Yellowlegs | Grand Chevalier | Shorebird | X | | | X |
| <i>Limosa haemastica</i> | Hudsonian Godwit | Barge hudsonienne | Shorebird | X | | | X |
| <i>Charadrius vociferus</i> | Killdeer | Pluvier kildir | Shorebird | X | | | |
| <i>Calidris minutilla</i> | Least Sandpiper | Bécasseau minuscule | Shorebird | X | | | X |
| <i>Tringa flavipes</i> | Lesser Yellowlegs | Petit Chevalier | Shorebird | X | | | X |
| <i>Limnodromus scolopaceus</i> | Long-billed Dowitcher | Bécassin à long bec | Shorebird | | X | | |
| <i>Limosa fedoa</i> | Marbled Godwit | Barge marbrée | Shorebird | X | | | X |
| <i>Calidris melanotos</i> | Pectoral Sandpiper | Bécasseau à poitrine cendrée | Shorebird | X | | | X |

Table A1 continued

| Latin Name | English Name | French Name | Bird Group | Breeding | Migrant | Wintering | Priority |
|--------------------------------|------------------------|----------------------------|------------|----------|---------|-----------|----------|
| <i>Calidris maritima</i> | Purple Sandpiper | Bécasseau violet | Shorebird | | X | | |
| <i>Calidris canutus rufa</i> | Red Knot (rufa) | Bécasseau maubèche (rufa) | Shorebird | | X | | X |
| <i>Phalaropus lobatus</i> | Red-necked Phalarope | Phalarope à bec étroit | Shorebird | X | | | |
| <i>Arenaria interpres</i> | Ruddy Turnstone | Tournepieuvre à collier | Shorebird | | X | | X |
| <i>Calidris alba</i> | Sanderling | Bécasseau sanderling | Shorebird | | X | | X |
| <i>Charadrius semipalmatus</i> | Semipalmated Plover | Pluvier semipalmé | Shorebird | X | | | X |
| <i>Calidris pusilla</i> | Semipalmated Sandpiper | Bécasseau semipalmé | Shorebird | X | | | X |
| <i>Limnodromus griseus</i> | Short-billed Dowitcher | Bécassin roux | Shorebird | X | | | X |
| <i>Tringa solitaria</i> | Solitary Sandpiper | Chevalier solitaire | Shorebird | X | | | X |
| <i>Actitis macularius</i> | Spotted Sandpiper | Chevalier grivelé | Shorebird | X | | | |
| <i>Calidris himantopus</i> | Stilt Sandpiper | Bécasseau à échasses | Shorebird | X | | | |
| <i>Numenius phaeopus</i> | Whimbrel | Courlis corlieu | Shorebird | X | | | X |
| <i>Calidris fuscicollis</i> | White-rumped Sandpiper | Bécasseau à croupion blanc | Shorebird | | X | | X |
| <i>Phalaropus tricolor</i> | Wilson's Phalarope | Phalarope de Wilson | Shorebird | X | | | |
| <i>Gallinago delicata</i> | Wilson's Snipe | Bécassine de Wilson | Shorebird | X | | | X |
| <i>Empidonax alnorum</i> | Alder Flycatcher | Moucherolle des aulnes | Landbird | X | | | X |
| <i>Corvus brachyrhynchos</i> | American Crow | Corneille d'Amérique | Landbird | X | | | |
| <i>Spinus tristis</i> | American Goldfinch | Chardonneret jaune | Landbird | X | | | |
| <i>Falco sparverius</i> | American Kestrel | Crécerelle d'Amérique | Landbird | X | | | |
| <i>Anthus rubescens</i> | American Pipit | Pipit d'Amérique | Landbird | X | | | |

Table A1 continued

| Latin Name | English Name | French Name | Bird Group | Breeding | Migrant | Wintering | Priority |
|---------------------------------|--------------------------------|---------------------------|------------|----------|---------|-----------|----------|
| <i>Setophaga ruticilla</i> | American Redstart | Paruline flamboyante | Landbird | X | | | |
| <i>Turdus migratorius</i> | American Robin | Merle d'Amérique | Landbird | X | | | |
| <i>Picoides dorsalis</i> | American Three-toed Woodpecker | Pic à dos rayé | Landbird | X | | | |
| <i>Spizella arborea</i> | American Tree Sparrow | Bruant hudsonien | Landbird | X | | | |
| <i>Haliaeetus leucocephalus</i> | Bald Eagle | Pygargue à tête blanche | Landbird | X | | | X |
| <i>Riparia riparia</i> | Bank Swallow | Hirondelle de rivage | Landbird | X | | | |
| <i>Hirundo rustica</i> | Barn Swallow | Hirondelle rustique | Landbird | X | | | |
| <i>Setophaga castanea</i> | Bay-breasted Warbler | Paruline à poitrine baie | Landbird | X | | | X |
| <i>Megaceryle alcyon</i> | Belted Kingfisher | Martin-pêcheur d'Amérique | Landbird | X | | | |
| <i>Mniotilta varia</i> | Black-and-white Warbler | Paruline noir et blanc | Landbird | X | | | |
| <i>Picoides arcticus</i> | Black-backed Woodpecker | Pic à dos noir | Landbird | X | | X | X |
| <i>Setophaga fusca</i> | Blackburnian Warbler | Paruline à gorge orangée | Landbird | X | | | |
| <i>Poecile atricapillus</i> | Black-capped Chickadee | Mésange à tête noire | Landbird | X | | | |
| <i>Setophaga striata</i> | Blackpoll Warbler | Paruline rayée | Landbird | X | | | |
| <i>Setophaga virens</i> | Black-throated Green Warbler | Paruline à gorge noire | Landbird | X | | | |
| <i>Vireo solitarius</i> | Blue-headed Vireo | Viréo à tête bleue | Landbird | X | | | |
| <i>Bombcilla garrulus</i> | Bohemian Waxwing | Jaseur boréal | Landbird | X | | | |
| <i>Poecile hudsonica</i> | Boreal Chickadee | Mésange à tête brune | Landbird | X | | X | X |
| <i>Aegolius funereus</i> | Boreal Owl | Nyctale de Tengmalm | Landbird | X | | | |

Table A1 continued

| Latin Name | English Name | French Name | Bird Group | Breeding | Migrant | Wintering | Priority |
|---------------------------------|------------------------|--------------------------|------------|----------|---------|-----------|----------|
| <i>Buteo platypterus</i> | Broad-winged Hawk | Petite Buse | Landbird | X | | | |
| <i>Certhia americana</i> | Brown Creeper | Grimpereau brun | Landbird | X | | | |
| <i>Toxostoma rufum</i> | Brown Thrasher | Moqueur roux | Landbird | X | | | |
| <i>Cardellina canadensis</i> | Canada Warbler | Paruline du Canada | Landbird | X | | | X |
| <i>Setophaga tigrina</i> | Cape May Warbler | Paruline tigrée | Landbird | X | | | |
| <i>Bombycilla cedrorum</i> | Cedar Waxwing | Jaseur d'Amérique | Landbird | X | | | |
| <i>Setophaga pensylvanica</i> | Chestnut-sided Warbler | Paruline à flancs marron | Landbird | X | | | |
| <i>Spizella passerina</i> | Chipping Sparrow | Bruant familial | Landbird | X | | | |
| <i>Spizella pallida</i> | Clay-colored Sparrow | Bruant des plaines | Landbird | X | | | |
| <i>Petrochelidon pyrrhonota</i> | Cliff Swallow | Hirondelle à front blanc | Landbird | X | | | |
| <i>Quiscalus quiscula</i> | Common Grackle | Quiscale bronzé | Landbird | X | | | |
| <i>Chordeiles minor</i> | Common Nighthawk | Engoulevent d'Amérique | Landbird | X | | | X |
| <i>Corvus corax</i> | Common Raven | Grand Corbeau | Landbird | X | | | |
| <i>Acanthis flammea</i> | Common Redpoll | Sizerin flammé | Landbird | X | | | |
| <i>Geothlypis trichas</i> | Common Yellowthroat | Paruline masquée | Landbird | X | | | |
| <i>Oporornis agilis</i> | Connecticut Warbler | Paruline à gorge grise | Landbird | X | | | |
| <i>Junco hyemalis</i> | Dark-eyed Junco | Junco ardoisé | Landbird | X | | | |
| <i>Picoides pubescens</i> | Downy Woodpecker | Pic mineur | Landbird | X | | | |
| <i>Tyrannus tyrannus</i> | Eastern Kingbird | Tyran tritri | Landbird | X | | | |
| <i>Sturnus vulgaris</i> | European Starling | Étourneau sansonnet | Landbird | X | | | |
| <i>Passerella iliaca</i> | Fox Sparrow | Bruant fauve | Landbird | X | | | |
| <i>Aquila chrysaetos</i> | Golden Eagle | Aigle royal | Landbird | X | | X | X |

Table A1 continued

| Latin Name | English Name | French Name | Bird Group | Breeding | Migrant | Wintering | Priority |
|--------------------------------|------------------------|---------------------------|------------|----------|---------|-----------|----------|
| <i>Regulus satrapa</i> | Golden-crowned Kinglet | Roitelet à couronne dorée | Landbird | X | | | |
| <i>Perisoreus canadensis</i> | Gray Jay | Mésangeai du Canada | Landbird | X | | X | X |
| <i>Catharus minimus</i> | Gray-cheeked Thrush | Grive à joues grises | Landbird | X | | | |
| <i>Strix nebulosa</i> | Great Gray Owl | Chouette lapone | Landbird | X | | | |
| <i>Bubo virginianus</i> | Great Horned Owl | Grand-duc d'Amérique | Landbird | X | | | |
| <i>Falco rusticolus</i> | Gyr Falcon | Faucon gerfaut | Landbird | | X | | |
| <i>Picoides villosus</i> | Hairy Woodpecker | Pic chevelu | Landbird | X | | | |
| <i>Zonotrichia querula</i> | Harris's Sparrow | Bruant à face noire | Landbird | X | | | X |
| <i>Catharus guttatus</i> | Hermit Thrush | Grive solitaire | Landbird | X | | | |
| <i>Acanthis hornemanni</i> | Hoary Redpoll | Sizerin blanchâtre | Landbird | X | | | |
| <i>Eremophila alpestris</i> | Horned Lark | Alouette hausse-col | Landbird | X | | | |
| <i>Calcarius lapponicus</i> | Lapland Longspur | Bruant lapon | Landbird | X | | | |
| <i>Ammodramus leconteii</i> | Le Conte's Sparrow | Bruant de Le Conte | Landbird | X | | | |
| <i>Empidonax minimus</i> | Least Flycatcher | Moucherolle tchébec | Landbird | X | | | |
| <i>Melospiza lincolni</i> | Lincoln's Sparrow | Bruant de Lincoln | Landbird | X | | | X |
| <i>Asio otus</i> | Long-eared Owl | Hibou moyen-duc | Landbird | X | | | |
| <i>Setophaga magnolia</i> | Magnolia Warbler | Paruline à tête cendrée | Landbird | X | | | |
| <i>Falco columbarius</i> | Merlin | Faucon émerillon | Landbird | X | | | |
| <i>Zenaidura macroura</i> | Mourning Dove | Tourterelle triste | Landbird | X | | | |
| <i>Geothlypis philadelphia</i> | Mourning Warbler | Paruline triste | Landbird | X | | | |
| <i>Oreothlypis ruficapilla</i> | Nashville Warbler | Paruline à joues grises | Landbird | X | | | |
| <i>Ammodramus nelsoni</i> | Nelson's Sparrow | Bruant de Nelson | Landbird | X | | | X |
| <i>Colaptes auratus</i> | Northern Flicker | Pic flamboyant | Landbird | X | | | |

Table A1 continued

| Latin Name | English Name | French Name | Bird Group | Breeding | Migrant | Wintering | Priority |
|--------------------------------|------------------------|----------------------------|------------|----------|---------|-----------|----------|
| <i>Accipiter gentilis</i> | Northern Goshawk | Autour des palombes | Landbird | X | | | |
| <i>Circus cyaneus</i> | Northern Harrier | Busard Saint-Martin | Landbird | X | | | |
| <i>Surnia ulula</i> | Northern Hawk Owl | Chouette épervière | Landbird | X | | X | X |
| <i>Setophaga americana</i> | Northern Parula | Paruline à collier | Landbird | X | | | |
| <i>Lanius excubitor</i> | Northern Shrike | Pie-grièche grise | Landbird | X | | | X |
| <i>Parkesia noveboracensis</i> | Northern Waterthrush | Paruline des ruisseaux | Landbird | X | | | |
| <i>Contopus cooperi</i> | Olive-sided Flycatcher | Moucherolle à côtés olive | Landbird | X | | | X |
| <i>Oreothlypis celata</i> | Orange-crowned Warbler | Paruline verdâtre | Landbird | X | | | |
| <i>Pandion haliaetus</i> | Osprey | Balbusard pêcheur | Landbird | X | | | |
| <i>Seiurus aurocapilla</i> | Ovenbird | Paruline couronnée | Landbird | X | | | |
| <i>Setophaga palmarum</i> | Palm Warbler | Paruline à couronne rousse | Landbird | X | | | X |
| <i>Vireo philadelphicus</i> | Philadelphia Vireo | Viréo de Philadelphie | Landbird | X | | | |
| <i>Dryocopus pileatus</i> | Pileated Woodpecker | Grand Pic | Landbird | X | | | |
| <i>Pinicola enucleator</i> | Pine Grosbeak | Durbec des sapins | Landbird | X | | X | X |
| <i>Spinus pinus</i> | Pine Siskin | Tarin des pins | Landbird | X | | | |
| <i>Haemorhous purpureus</i> | Purple Finch | Roselin pourpré | Landbird | X | | | |
| <i>Sitta canadensis</i> | Red-breasted Nuthatch | Sittelle à poitrine rousse | Landbird | X | | | |
| <i>Vireo olivaceus</i> | Red-eyed Vireo | Viréo aux yeux rouges | Landbird | X | | | |
| <i>Buteo jamaicensis</i> | Red-tailed Hawk | Buse à queue rousse | Landbird | X | | | |
| <i>Agelaius phoeniceus</i> | Red-winged Blackbird | Carouge à épaulettes | Landbird | X | | | |
| <i>Columba livia</i> | Rock Pigeon | Pigeon biset | Landbird | X | | | |

Table A1 continued

| Latin Name | English Name | French Name | Bird Group | Breeding | Migrant | Wintering | Priority |
|----------------------------------|------------------------|---------------------------|------------|----------|---------|-----------|----------|
| <i>Lagopus muta</i> | Rock Ptarmigan | Lagopède alpin | Landbird | | | | |
| <i>Buteo lagopus</i> | Rough-legged Hawk | Buse pattue | Landbird | X | | | |
| <i>Regulus calendula</i> | Ruby-crowned Kinglet | Roitelet à couronne rubis | Landbird | X | | | |
| <i>Bonasa umbellus</i> | Ruffed Grouse | Gélinotte huppée | Landbird | X | | | |
| <i>Euphagus carolinus</i> | Rusty Blackbird | Quiscale rouilleux | Landbird | X | | | X |
| <i>Passerculus sandwichensis</i> | Savannah Sparrow | Bruant des prés | Landbird | X | | | |
| <i>Accipiter striatus</i> | Sharp-shinned Hawk | Épervier brun | Landbird | X | | | |
| <i>Tympanuchus phasianellus</i> | Sharp-tailed Grouse | Tétras à queue fine | Landbird | X | | | |
| <i>Asio flammeus</i> | Short-eared Owl | Hibou des marais | Landbird | X | | | X |
| <i>Calcarius pictus</i> | Smith's Longspur | Bruant de Smith | Landbird | X | | | X |
| <i>Bubo scandiacus</i> | Snowy Owl | Harfang des neiges | Landbird | | | X | |
| <i>Melospiza melodia</i> | Song Sparrow | Bruant chanteur | Landbird | X | | | |
| <i>Falci pennis canadensis</i> | Spruce Grouse | Tétras du Canada | Landbird | X | | X | X |
| <i>Catharus ustulatus</i> | Swainson's Thrush | Grive à dos olive | Landbird | X | | | |
| <i>Melospiza georgiana</i> | Swamp Sparrow | Bruant des marais | Landbird | X | | | X |
| <i>Oreothlypis peregrina</i> | Tennessee Warbler | Paruline obscure | Landbird | X | | | X |
| <i>Tachycineta bicolor</i> | Tree Swallow | Hirondelle bicolore | Landbird | X | | | |
| <i>Catharus fuscescens</i> | Veery | Grive fauve | Landbird | X | | | |
| <i>Zonotrichia leucophrys</i> | White-crowned Sparrow | Bruant à couronne blanche | Landbird | X | | | |
| <i>Zonotrichia albicollis</i> | White-throated Sparrow | Bruant à gorge blanche | Landbird | X | | | |
| <i>Loxia leucoptera</i> | White-winged Crossbill | Bec-croisé bifascié | Landbird | X | | X | X |
| <i>Lagopus lagopus</i> | Willow Ptarmigan | Lagopède des saules | Landbird | X | | X | |

Table A1 continued

| Latin Name | English Name | French Name | Bird Group | Breeding | Migrant | Wintering | Priority |
|-------------------------------|---------------------------|----------------------------|------------|----------|---------|-----------|----------|
| <i>Cardellina pusilla</i> | Wilson's Warbler | Paruline à calotte noire | Landbird | X | | | |
| <i>Troglodytes hiemalis</i> | Winter Wren | Troglodyte mignon | Landbird | X | | | |
| <i>Setophaga petechia</i> | Yellow Warbler | Paruline jaune | Landbird | X | | | |
| <i>Empidonax flaviventris</i> | Yellow-bellied Flycatcher | Moucherolle à ventre jaune | Landbird | X | | | |
| <i>Sphyrapicus varius</i> | Yellow-bellied Sapsucker | Pic maculé | Landbird | X | | | |
| <i>Setophaga coronata</i> | Yellow-rumped Warbler | Paruline à croupion jaune | Landbird | X | | | |

Appendix 2

General Methodology for Compiling the Six Standard Elements

Each strategy includes six required elements to conform to the national standard. An extensive manual (Kennedy et al. 2012) provides methods and other guidance for completing each element. The six elements provide an objective means of moving towards multi-species conservation efforts that are targeted to species and issues of highest priority. The six elements are:

- 1) identifying priority species – to focus conservation attention on species of conservation concern and those most representative of the region
- 2) attributing priority species to habitat classes – a tool for identifying habitats of conservation interest and a means of organizing and presenting information
- 3) setting population objectives for priority species – an assessment of current population status compared to the desired status, and a means of measuring conservation success
- 4) assessing and ranking threats – identifies the relative importance of issues affecting populations of priority species within the planning area as well as outside Canada (i.e., throughout their lifecycle)
- 5) setting conservation objectives – outlines the overall conservation goals in response to identified threats and information needs; also a means of measuring accomplishments
- 6) proposing recommended actions – strategies to begin on-the-ground conservation to help achieve conservation objectives.

The first four elements apply to individual priority species, and together comprise an assessment of the status of priority species and the threats they face. The last two elements integrate information across species to create a vision for conservation implementation both within Canada and in countries that host priority species during migration and the non-breeding season.

Element 1: Species Assessment to Identify Priority Species

The Bird Conservation Strategies identify “priority species” from all regularly occurring bird species in each sub-region. The priority species approach allows management attention and limited resources to focus on those species with particular conservation importance, ecological significance and/or management need. The species assessment processes used are derived from standard assessment protocols developed by the four major bird conservation initiatives¹.

The species assessment process applies quantitative rule sets to biological data for factors such as:

- population size,
- breeding and non-breeding distribution,

¹ Partners in Flight (landbirds), Wings Over Water (waterbirds), Canadian Shorebird Conservation Plan (shorebirds), North American Waterfowl Management Plan (waterfowl).

- population trend,
- breeding and non-breeding threats, and
- regional density and abundance

The assessment is applied to individual bird species and ranks each species in terms of its biological vulnerability and population status. The assessments can be used to assign sub-regional (i.e., provincial section of a BCR), regional (BCR) and continental conservation priorities among birds.

For landbirds in BCR 7 Ontario, species were included on the priority species list if they are of Continental Concern, Regional Concern, Continental Stewardship, Regional Stewardship, Management Interest and/or are a Species at Risk in the Ontario Partners in Flight Plan (2010). Shorebirds that had been identified as high or medium priority in the existing shorebird plan (Ross et al. 2003) and that were vetted by expert opinion (K. Ross, pers. comm. 2009) were included in the all-bird priority list, with those noted as low priority generally excluded. Priority waterbird species were those that were designated as WBT1 = Waterbird priority Tier 1 or WBT2 = Waterbird priority Tier 2 in the Ontario Waterbird Conservation Plan (Zeran et al. 2009) (within BCR 7 Ontario). For waterfowl, species that were identified within the Ontario Eastern Habitat Joint Venture Plan as being a high-priority breeding or non-breeding species within BCR 7 ON were added to the BCR 7 ON priority species list (Ontario Eastern Habitat Joint Venture 2007), as were species considered by NAWMP (NAWMP Plan Committee 2004) to have breeding or non-breeding needs of Moderately High, High or Highest for WCR 7.1. In some cases, additions and exclusions were made to the priority lists based on expert opinion.

Element 2: Habitats Important to Priority Species

Identifying the broad habitat requirements for each priority species in the breeding and non-breeding season allows species with shared habitat-based conservation issues or actions to be grouped. If many priority species associated with the same habitat class face similar conservation issues, then conservation action in that habitat class may support populations of several priority species. In most cases, all habitat associations identified in the literature are listed for individual species. Habitat associations do not indicate relative use, suitability ratings or rankings, or selection or avoidance; this could be a useful exercise to undertake in the future.

In order to link with other national and international land classification schemes and to capture the range of habitat types across Canada, habitat classes for all priority species are based, at the coarsest level, on the hierarchical approach of the international Land-cover Classification System (LCCS) developed by the United Nations Food and Agriculture Organization (Food and Agriculture Organization 2000). Some modifications were made to the LCCS scheme to reflect habitat types that are important to birds but that are not included in the classification (e.g., marine habitats). Species often are assigned to more than one of these coarse habitat classes. To retain the link to regional spatial data (provincial forest inventories, etc.), or to group species into regionally relevant habitat classes, individual BCR strategies may identify finer-scale habitat classes. Finer-scale habitat attributes and the surrounding landscape context were also captured when possible to better guide the development of specific conservation objectives and actions. For BCR 7 Ontario, secondary habitat associations were defined for priority species

based on information in Cadman et al. (2007) and the [Birds of North America Online](#). These secondary habitat attributes include important nesting features (e.g., snags, cliffs), and habitat modifiers (e.g., burns, seral stage, riparian vegetation, structural complexity).

Element 3: Population Objectives for Priority Species

A central component of effective conservation planning is setting clear objectives that can be measured and evaluated. Bird Conservation Strategies set objectives based upon the conservation philosophies of national and continental bird initiatives, including the North American Bird Conservation Initiative (NABCI), that support conserving the distribution, diversity and abundance of birds throughout their historical ranges. The baselines for population objectives used in this planning exercise (those existing during the late 1960s, 1970s and 1990s for eastern waterfowl) reflect population levels prior to widespread declines. Most of the four bird conservation initiatives under the umbrella of NABCI have adopted the same baselines at the continental and national scale (waterfowl, shorebirds and landbirds; national and continental waterbird plans have not yet set population objectives). Some regions in the current planning effort have adjusted baselines to reflect the start of systematic monitoring (e.g., the Eastern Waterfowl Survey in Ontario began in the early to mid-nineties). The ultimate measure of conservation success will be the extent to which population objectives have been reached. Progress towards population objectives will be regularly assessed as part of an adaptive management approach.

Population objectives for all bird groups are based on a quantitative or qualitative assessment of species' population trends. If the population trend for a species is unknown, the objective is usually "assess and maintain" population, and a monitoring objective is set. Harvested waterfowl and many stewardship species may already be at desired population levels and are thus given an objective of "maintain". For any species listed under the *Species at Risk Act* (SARA) or under provincial/territorial endangered species legislation, Bird Conservation Strategies defer to population objectives in available Recovery Strategies and Management Plans. If recovery documents are not available, objectives are set using the same approach as for other species within that bird group. Once recovery objectives are available, they will replace interim objectives.

Shorebirds and Landbirds

Our ability to set appropriate population objectives for landbirds and shorebirds in BCR 7 ON was constrained by limited knowledge. Current and past population levels are unknown for many species, and our understanding of distribution and natural variation in abundance is limited for populations within the remote habitats of BCR 7 Ontario. In contrast to more southerly portions of Ontario, the region has no coverage by the Breeding Bird Survey or the Ontario Shorebird Survey. The primary sources of quantitative information describing most bird populations in the region are the distribution data collected during the first Ontario Breeding Bird Atlas (OBBA) (1981–1985), and the distribution and abundance data collected during the second atlas (OBBA2) (2001–2005). The atlas data sets provide two "snapshots" of breeding bird populations in BCR 7 ON but are not sufficient for estimating the range of natural variation or for determining which species can be adequately monitored by this method. Despite the

limitations, these data were used to set the population objectives for priority species in BCR 7 ON where possible, because they represent the best available data.

Population objectives were not set for shorebird species that do not breed in BCR 7 Ontario. Objectives for these more northerly breeding species are provided in strategies for other BCRs (see BCR 3).

Waterfowl

Population objectives have been set for Mississippi Valley and Southern James Bay Canada Goose populations based on annual breeding ground surveys and flyway management plans (Ontario Eastern Habitat Joint Venture 2007). Mid-continent Lesser Snow Geese breeding south of 60° differ in timing of breeding, timing of migration and adult survival as compared to the more northerly nesting segment of the population (Arctic Goose Joint Venture 2008); objectives for this overabundant population as a whole are in development, and specific objectives for more southerly breeding birds may be desirable. However, with the exceptions of those for Snow and Canada Geese, there are no regularly repeated waterfowl surveys in BCR 7 ON to inform population objectives and as a result, the majority of waterfowl species have objectives set to “assess/maintain”.

Waterbirds

Population objectives for waterbirds were based on observed population trends (Zeran et al. 2009) and/or the species’ conservation status (e.g., listed as a Species at Risk or ranked as provincially rare), as described in Table A2. No population trend data specific to BCR 7 ON were available for waterbirds.

Species at Risk

Population objectives described in current management plans or recovery strategies were used when available. Where such documents were not available (as is the case for most species at risk considered in this strategy), interim population objectives were set to “assess/maintain”, recognizing the lack of population information specific to BCR 7 Ontario.

Table A2. Relationship between waterbird population trend assessment and generic population objectives.

| Population Trend and/or Conservation Status | BCR Plan Population Objective |
|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Biologically significant population decline | Increase |
| Apparent population decline | Maintain |
| Apparent population decline AND S4-S5* | Assess/Maintain |
| Apparently stable population | Maintain |
| Apparent population increase | Maintain |
| Apparently stable population OR Apparent population increase AND S1-S3* | Assess/Maintain |
| Biologically significant population increase | Maintain OR Manage population OR N/A |
| Information Lacking or Information Unreliable/Unknown | Assess/Maintain |
| Species at Risk (END, THR) | Recovery AND/OR Reverse Decline AND/OR Assess population (as determined by Recovery Plan or Assessment Report) |

* Provincial (or regional) ranks are used by the Natural Heritage Information Centre to set protection priorities for rare species and natural communities. These ranks convey the degree of rarity of the species or community at the regional level and are not legal designations.

S1 Critically Imperiled—Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled—Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure—Common, widespread, and abundant in the nation or state/province.

Element 4: Threat Assessment for Priority Species

Bird population trends are driven by factors that affect reproduction and/or survival during any point in the annual cycle. Threats that can reduce survival include, for example, reduced food availability at migratory stopovers or exposure to toxic compounds. Examples of threats that can reduce reproductive success may include high levels of nest predation or reduced quality or quantity of breeding habitat.

The threats assessment exercise included three main steps:

1. Conducting a literature review to itemize past, current and future threats for each priority species and classifying the threats following a standardized classification scheme (Salafsky et al. 2008).
2. Ranking the magnitude of threats for priority species following a standardized protocol (Kennedy et al. 2012).

3. Preparing a set of threat profiles for the BCR sub-region, for broad habitat categories.

Each threat was categorized following the IUCN-CMP threat classification scheme (Salafsky et al. 2008), with the addition of categories to capture species for which we lack information. Only threats stemming from human activity were included in the threats assessment because they can be mitigated; natural processes that prevent populations from expanding beyond a given level were considered and noted, but no actions beyond research and/or monitoring were developed. Threats were ranked by assessing the scope (the proportion of the species' range within the sub-region that is affected by the threat) and severity (the relative impact that the threat poses to the viability of the species' populations) of the threat. The scores for scope and severity were combined to determine an overall magnitude of low, medium, high or very high. These magnitudes were then rolled up by threat categories and sub-categories across habitat types (see Kennedy et al. 2012 for details on this process). The threats roll-up allows for comparison of the relative magnitude of the threats among threat categories and habitat types. The scoring and ranking of threats not only helps to determine which threats contribute most to population declines in individual species, but also allows us to focus attention on the threats with the greatest effects on suites of species or in broad habitat classes.

For this strategy, threats were identified through literature reviews including the existing pillar plans for BCR 7 ON (landbirds – Partners in Flight 2010; waterfowl – Ontario Eastern Habitat Joint Venture 2007; waterbirds – Zeran et al. 2009; shorebirds – Ross et al. 2003) and local expert opinion. Supplementary data from Cadman et al. (2007), Sandilands (2005), COSEWIC species assessments and various species accounts from the [Birds of North America online](#) were also used. Each threat was categorized following the IUCN threat classification scheme.

Element 5: Conservation Objectives

Overall, conservation objectives represent the desired conditions within the sub-region that will collectively contribute to achieving population objectives. Objectives may also outline the research or monitoring needed to improve the understanding of species declines and how to best take action.

Currently, most conservation objectives are measurable using qualitative categories (e.g., decrease, maintain, increase) that will allow an evaluation of implementation progress, but they are not linked quantitatively to population objectives. Implementation that incorporates an active adaptive management process is an underlying principle of this conservation effort and will allow for future evaluation of whether or not reaching conservation objectives contributed to achieving population objectives.

Whenever possible, conservation objectives benefit multiple species and/or respond to more than one threat. However, where necessary, they focus on the specific requirements of a single species.

Conservation objectives generally fall into one of two broad categories:

- habitat objectives within the BCR sub-region (the quantity, quality and configuration of priority habitats),
- non-habitat objectives within the BCR sub-region (minimizing mortality by reducing predation, conducting education and outreach to reduce human disturbance, etc.)

Ideally, habitat objectives would reflect the type, amount and location of habitat necessary to support population levels of priority species outlined in the population objectives. Currently, there is a lack of data and tools at the BCR scale to develop these specific quantitative objectives. Threats-based objectives present the direction of change required to move toward the population objectives using the best available information and our knowledge of ecosystem management strategies within broad habitat types. For BCR 7, a coarse estimate of available habitat for birds has been produced as a baseline to track habitat (see Section 2 for maps by habitat). This is especially relevant for species whose population changes might be influenced by availability of habitat on the breeding grounds.

Element 6: Recommended Actions

Recommended conservation actions are the strategies required to achieve conservation objectives. Recommended actions are usually made at the strategic level rather than being highly detailed and prescriptive. Actions were classified following the IUCN-CMP classification of conservation actions (Salafsky et al. 2008), with the addition of categories to address research and monitoring needs. When possible, more detailed recommendations can be included, for example if beneficial management practices, ecosystem plans or multiple recovery documents are available for a sub-region. However, actions should be detailed enough to provide initial guidance for implementation.

The objectives for research, monitoring and widespread issues may not have actions associated with them. These issues are often so multi-faceted that actions are best designed in consultation with partners and subject-matter experts. Implementation teams will be better positioned to address these complex issues, drawing input from various stakeholders.

Recommended actions defer to or support those provided in recovery documents for species at risk at the federal, provincial or territorial level, but because these strategies are directed at multiple species, actions are usually more general than those developed for individual species. For more detailed recommendations for species at risk, readers should consult recovery documents.

www.ec.gc.ca

Additional information can be obtained at:

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