



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

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Preface

Environment Canada (EC) led the development of all-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 from 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*.

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



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Executive Summary

The Taiga Shield and Hudson Plains, Bird Conservation Region 7 (BCR 7), cover an area of 561 721 km² in Quebec and span the province from Hudson Bay and James Bay in the west to the Labrador border in the east. BCR 7-QC is mostly covered by taiga in its southern portion, while the northern portion is dominated by the forest-tundra ecotone, which represents the transition from boreal to arctic habitats. This BCR includes an extensive area of wetlands on the lowlands south of James Bay and numerous small lakes throughout its territory. The abundance of water provides important habitat for breeding waterfowl, and the coasts of Hudson Bay and James Bay are a major migration route and represent critical staging habitat for shorebirds. BCR 7 is one of the least populated areas of Quebec. The main human activities include hydroelectric developments, hunting and trapping.

We evaluated 152 bird species that occur in the region, and 54 were determined to qualify as priority species. All bird groups were represented, with 54% of the priority list consisting of landbirds, 22% shorebirds, 15% waterfowl and 9% waterbirds. Of these, 11 are species at risk either at the provincial and/or the federal level. Consistent with the prevalence of wetlands across the landscape, a majority of species (64%) used wetland habitats extensively. Riparian habitat (39%) and waterbodies (33%) are the other habitats most used by the priority species.

Population objectives were set on the basis of observed trends, but insufficient monitoring information was a pervasive issue in BCR 7-QC. Consequently, 57% 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 13% of species, population levels were deemed to be at or near the objective. These results do not imply that bird populations in Quebec's BCR 7 have not changed in 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-QC. Important conservation issues facing this region's avifauna include habitat loss and degradation due to current and potential increases in energy production (hydro-electricity) and mining projects. Even though the total area affected by these projects remains relatively small in comparison with the extent of this BCR, they still represent the most serious threats to priority bird species, along with climate change, in this area. Furthermore, the demographic parameters of many of the priority species in this region are poorly known. For 52 priority species (96% of priority species, 40% of threats overall), a lack of knowledge of population status and limiting factors was also considered to be a significant impediment to determining their conservation priority.

Therefore, actions related to knowledge acquisition are most often suggested in this BCR. 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 region. Recommendations are provided to

address the information gaps. The other most recommended actions to reach population objectives are related to developing and implementing beneficial management practices, and targeting actions on habitats that will favour priority species.

Migratory birds occurring in BCR 7-QC face additional issues and threats that do not fit into the standard presentation format used in the BCR strategies. These include widespread issues (threats from collisions with human-made structures, pollution and climate change), global monitoring and research needs, and threats that occur when birds are outside Canada. An overview of these issues, the species affected and the proposed conservation actions is given.

This conservation strategy for Quebec's BCR 7 builds on existing bird conservation strategies 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 highly prescriptive, but rather is intended to guide future implementation efforts undertaken by various partners and 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.

¹NAWMP Plan Committee 2004; Lepage et al. In preparation.

² Milko et al. 2003; Chapdelaine and Rail 2004.

³ Donaldson et al. 2000; Aubry and Cotter 2007.

⁴ Rich et al. 2004; Drolet et al. 2010.; Falardeau et al. 2010.

Strategy Structure

Section 1 of this strategy presents general information about the BCR and the subregion, with an overview of the six elements⁵ 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 subregion. 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 <u>Environment Canada</u>.

⁵ 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

The Taiga Shield and Hudson Plains, Bird Conservation Region (BCR 7), extend across much of the Canadian Shield, spanning eight provinces and territories. In Quebec, the BCR covers an area of 561 721 km² and spans the province from Hudson Bay and James Bay in the west to the Labrador border in the east (Fig. 1). It is the largest of Quebec's BCRs, representing 37% of the province's territory. This region represents the transition from boreal to arctic habitats, bordered by boreal forests to the south and treeless tundra to the north. The northern limit of this BCR coincides with the limit of tree growth. Henceforth, "BCR 7-QC" will be used as shorthand for the Quebec portion of BCR 7.



Figure 1. Landcover in BCR 7 Quebec Region: Taiga Shield and Hudson Plains.

Physical Environment

Topography

The relief of BCR 7-QC consists of plains and massive rolling hills, formed by the rock of the Canadian Shield. The altitude in the western part of the BCR varies from 100 m to 450 m, while the terrain in the east is more rugged, with some portions reaching an altitude of 915 m (Ecological Stratification Working Group 1996). The highest peaks in the BCR include Mount Geren (860 m), Hades hills (600 m), and other mountains that rise over 300 m like Mount Nuvulialuk, Mount Kaminiskutau, and Mount Apituwawakach (Direction générale de l'information géographique 2001).

Hydrography and Hydrology

BCR 7 is drained by major rivers such as the Caniapiscau, Rupert, Larch, Leaf, George, Eastmain, La Grande and Great Whale rivers. The presence of large rivers in the region has spurred the development of numerous hydroelectric energy projects including the construction of the largest hydroelectric complex in Canada, La Grande. The La Grande complex is fed by a series of rivers and reservoirs whose total surface area exceeds half that of Lake Ontario. These include the Robert-Bourassa (2835 km²), La Grande 3 (2420 km²), Caniapiscau (4275 km²) and Opinaca (1040 km²) reservoirs (Ministère du Développement durable, de l'Environnement et des Parcs 2002). Numerous small lakes are also present throughout the BCR.

Climate

The climate of BCR 7-QC is subarctic, characterized by relatively short, cool summers with prolonged periods of daylight and long, very cold winters. The average annual temperature is between -6 ° and -4.5 °C and mean annual precipitation ranges from 475 to 900 mm (Ecological Stratification Working Group 1996). The average temperature ranges from 6 to 8.5 °C in summer, and from -18 to -16.5 °C in winter. Snow covers the ground from six to eight months per year.

According to several models, the northern regions of Quebec will be particularly strongly affected by climate change in the coming decades. By 2050, BCR 7 may experience an increase in average temperatures of 2 to 4.5 °C and an increase in rainfall of up to 32% (adapted from Bourque and Simonet 2008). Climate change is expected to alter the dynamics of natural disturbances (fire and insects) and frequency of extreme weather events (e.g., ice storms and drought).

Land Cover and Land Use

More than a quarter of BCR 7 is coniferous forest, which covers most of the lower portion of the region (Fig. 1). Herbaceous vegetation is equally important, covering 27% of the BCR, mostly in the upper portion of the region. Waterbodies are abundant and cover 19% of this BCR. Other habitat types that individually cover less than 10% of the BCR include mixedwood, lichens and mosses, and shrubs and early successional vegetation. Wetlands, which represent almost 6% of

the BCR, are mostly concentrated on the lowlands south of James Bay. The main human activities are hydroelectric developments, hunting, trapping and recreation (Ecological Stratification Working Group 1996). The entire BCR is part of the area covered by the Quebec government's Plan Nord, for which the objective is to develop in a sustainable manner the economic potential of Northern Quebec. The economic sectors targeted by the Plan Nord in BCR 7 include mining, transportation and telecommunications (Ministère des Ressources naturelles et de la Faune 2011). In 2011, the Quebec government committed to devoting 50% of the territory covered by the Plan Nord to protecting the environment, safeguarding biodiversity, sustaining the natural heritage and developing various types of non-industrial activities by 2035.

Biological Environment

Vegetation

BCR 7-QC is represented by three vegetation types: the boreal forest, the taiga and the foresttundra ecotone (Ministère des Ressources naturelles 2013). The boreal forest covers the southwestern corner of the BCR and is characterized by spruce-moss forest, where black spruce dominates and balsam fir, white birch and trembling aspen are present. The understory is dominated by moss and ericaceous shrubs and has relatively few herbaceous plant species. The southern half of the BCR is largely taiga, characterized by spruce-lichen woodlands where black spruce occurs at lower density than in the spruce-moss forest. This is where balsam fir and jack pine reach the northern limit of their range. The northern half of the BCR is dominated by the forest-tundra ecotone, which represents the transition between the boreal and arctic zones. The landscape is a mosaic of shrub-dominated areas interspersed by trees or clumps of trees, mostly stunted black spruces. Since BCR 7-QC is located north of the commercial forest area, no significant forestry activity is reported in this sector. Therefore, these forest stands are the last large area of old-growth forests in Quebec. Fire is the main natural disturbance in these forests, with a cycle close to 100 years in the western portion of the BCR (Payette et al. 1989). Fires often cover large areas and influence the landscape by ensuring the maintenance of a diverse plant mosaic in species and ages that is characteristic of the taiga.

Wildlife

As a transition zone between the boreal and arctic ecosystems, BCR 7-QC offers a relatively wide variety of habitats for wildlife. Characteristic mammals include moose, black bear, wolf, beaver, marten, lynx, snowshoe hare and Labrador collared lemming. BCR 7-QC includes the winter range of the Leaf River and George River herds of Barren-ground caribou. Every fall, hundreds of thousands of caribou migrate south from the tundra to BCR 7 and travel back north in the spring to calve. The wolverine (Eastern population), which is a species listed as threatened in Quebec (Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs 2013) and as endangered in Canada (Species at Risk Public Registry 2012), occurs in this BCR.

Given the harsh climate present in BCR 7, the herpetofauna is limited to eight species (seven amphibians and one reptile): the boreal chorus frog (a candidate for designation as threatened

or endangered in Quebec), blue-spotted salamander, northern spring peeper, mink frog, northern leopard frog, wood frog, American toad and common garter snake. BCR 7's waters are also home to several species of fish, which include the Atlantic salmon, lake trout, northern pike, lake whitefish, walleye, longnose sucker, white sucker and Arctic char.

BCR 7 is used by 152 species of birds for breeding, molting or during migration (Appendix 1). The abundance of water in this BCR provides important habitat for breeding waterfowl with representative species including Canada Goose, Common Eider, Ring-necked Duck, Green-winged Teal, scaup, mergansers, and scoters (Lepage *et al.* in preparation). Breeding shorebirds include Greater Yellowlegs, Lesser Yellowlegs, Solitary Sandpiper, Marbled Godwit, Least Sandpiper and Short-billed Dowitcher (*griseus*). For a number of shorebird species breeding in the Canadian Arctic, the coastlines of Hudson Bay and James Bay are a major migration route. Some of the coastal marshes and beaches in Rupert Bay and Boatswain Bay are also important for many shorebirds (Aubry and Cotter 2007). The Arctic Tern, Herring Gull and Black Guillemot use islands and islets along the coast, and other representative waterbirds of this BCR include Red-throated Loon and Common Loon (Chapdelaine and Rail 2004). Characteristic landbirds include Willow Ptarmigan, Osprey, Northern Shrike, Common Raven, Gray-cheeked Thrush, American Tree Sparrow, White-crowned Sparrow and Common Redpoll (Drolet *et al.* 2010; Falardeau *et al.* 2010).

Human Environment

BCR 7 is one of the least populated areas of Quebec, with roughly 15 000 inhabitants, mostly Aboriginal peoples (Cree, Innu, Inuit and Naskapis), in 13 communities located primarily along James Bay, Hudson Bay and Ungava Bay. The main settlements are the Cree villages of Chisasibi (> 3800 inhabitants) and Waskaganish (> 2000 inhabitants; Aboriginal Affairs and Northern Development Canada 2010).

Protected and Designated Areas

At present, approximately 10% of the BCR 7-QC territory benefits from protected status (Fig. 2). There is only one federal protected area, the Boatswain Bay Migratory Bird Sanctuary, located along the east coast of James Bay. The vast majority of the territory is under provincial jurisdiction and includes 17 areas defined under 4 different types of provincial status. These include 9 proposed biodiversity reserves, four reserves for protected areas purposes, 3 national park reserves and 1 projected aquatic reserve. The largest protected entity in this BCR is the Quebec national park project of Tursujuq, a territory of nearly 1.5 million hectares located on the eastern side of Hudson Bay (Fig. 2). Seven Important Bird Areas are located in BCR 7-QC; they represent a territory of 9 420 km² (Fig. 2).



Figure 2. Map of protected and designated areas in BCR 7 Quebec Region: Taiga Shield and Hudson Plains.

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 subregion (see Appendix 1). Species that are vulnerable due to population size, distribution, population trend, abundance and 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 subregion; many of these species have some conservation concern, while others may not require specific conservation effort at this time. Species of management concern 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).

The purpose of the prioritization exercise is to focus implementation efforts on the issues of greatest significance for Canadian avifauna. Table 1 provides a full list of all priority species and their reason for inclusion. Tables 2 and 3 summarize the number of priority species in BCR 7 Quebec by bird group and by the reason for priority status.

The standardized species assessment method initially identified 57 priority species or populations in this BCR among the 152 species, subspecies or populations (specific populations are referred to as "species" for simplicity in this document) that occur in this region (Appendix 1). A revision of the preliminary list by regional experts led to the removal of 14 priority species or populations and the addition of 11 new ones. Justifications for such decisions are provided in Appendix 3. Slightly less than half of the final 54 priority species (26) are recognized as being of conservation concern (Table 1; shaded cells), including 11 species that have a species at risk status either at the provincial and/or the federal level. The 28 remaining species are included for stewardship purposes (Table 1).

The 54 priority species are distributed unevenly among the 4 bird groups. Landbirds are by far the largest group, accounting for 54% of the priority species of this BCR (there are nearly three times more landbird species than any other bird group in this BCR; see Appendix 1 and Table 2). Shorebirds stand out as having 80% of their species on the priority list, indicating the precarious situation for this bird group in this BCR in particular and in Canada in general (Donaldson *et al.* 2000). See Table 3 for more detailed information on reasons for priority status for each bird group.

Priority species ¹	Bird group	Population objective	COSEWIC ²	SARA ³	Quebec provincial listing ⁴	National/continental concern ⁵ (landbirds)	Continental stewardship ⁵ (landbirds)	Regional stewardship ⁵ (landbirds)	Conservation category and rule ⁶ (shorebirds)	Priority tier ⁷ (waterbirds)	NAWMP rank ⁸ (waterfowl)	Expert review ⁹ (added to priority list)
Alder Flycatcher	Landbird	Assess/Maintain					Y					
Bald Eagle	Landbird	Recovery objective			V		Y					
Belted Kingfisher	Landbird	Assess/Maintain						Y				
Black-backed Woodpecker	Landbird	Assess/Maintain					Y	Y				
Blackpoll Warbler	Landbird	Assess/Maintain						Y				
Boreal Chickadee	Landbird	Assess/Maintain					Y					

Table 1. Priority species in BCR 7 Quebec, population objective, and the reason for priority status.

¹ Conservation concern species are in shaded cells, others were selected for stewardship purposes.

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

³ Species listed on <u>Schedule 1 of the Species at Risk Act</u> as E, Endangered; TH, Threatened; SC, Special Concern (Species at Risk Public Registry 2012).

⁴ Loi sur les espèces menacées ou vulnérables, TH = threatened, V = vulnerable, L = likely to be designated threatened or vulnerable.

⁵ See Panjabi et al. (2005) for details, database downloaded from <u>www.partnersinflight.org</u>.

⁶ Conservation concern at the level of USA and Canada as identified in the Canadian Shorebird Conservation Plan (Donaldson *et al.* 2000). Score 5 is "Highly imperilled" and score 1 is "Not at risk". Refer to Donaldson *et al.* (2000) for the complete description of each category of conservation concern.

⁷ National Priority tiers as identified in "Wings Over Water", Canada's Waterbird Conservation Plan (Milko et al. 2003). Tier 1 is highest priority.

⁸ NAWMP: North American Waterfowl Management Plan (North American Waterfowl Management Plan, Plan Committee, 2004).

⁹ Expert review indicates where species were added to the priority list as a result of expert opinion. Justification for additions are presented in Appendix 3. Species that were removed from the priority list by expert review, along with their conservation features and the reason for removal, are also presented in Appendix 3.

Priority species ¹	Bird group	Population objective	COSEWIC ²	SARA ³	Quebec provincial listing ⁴	National/continental concern ⁵ (landbirds)	Continental stewardship ⁵ (landbirds)	Regional stewardship ⁵ (landbirds)	Conservation category and rule ⁶ (shorebirds)	Priority tier ⁷ (waterbirds)	NAWMP rank ⁸ (waterfowl)	Expert review ⁹ (added to priority list)
Common Nighthawk ¹⁰	Landbird	Recovery objective	тн	тн	L	Y						
Fox Sparrow	Landbird	Assess/Maintain				Y	Y					
Golden Eagle	Landbird	Recovery objective			V							
Gray Jay	Landbird	Assess/Maintain					Y					
Gray-cheeked Thrush	Landbird	Assess/Maintain										Y
Le Conte's Sparrow	Landbird	Assess/Maintain										Y
Lincoln's Sparrow	Landbird	Assess/Maintain				Y	Y					
Merlin	Landbird	Assess/Maintain						Y				
Nelson's Sparrow	Landbird	Assess/Maintain			L	Y						
Northern Hawk Owl	Landbird	Assess/Maintain										Y
Northern Shrike	Landbird	Assess/Maintain					Y	Y				
Olive-sided Flycatcher ¹⁰	Landbird	Recovery objective	TH	TH	L	Y						
Orange-crowned Warbler	Landbird	Assess/Maintain										Y
Palm Warbler	Landbird	Assess/Maintain				Y	Y	Y				
Peregrine Falcon (anatum/tundrius) ¹⁰	Landbird	Recovery objective	SC	SC	V ¹¹	Y						

Table 1 continued

 ¹⁰ The species is listed under SARA, however, its recovery documents have not yet been finalized.
 ¹¹ Under Québec's Loi sur les espèces menacées ou vulnérables, the subspecies anatum is designated Vulnerable but the subspecies tundrius is designated Likely to be designated threatened or vulnerable.

Priority species ¹	Bird group	Population objective	COSEWIC ²	SARA ³	Quebec provincial listing ⁴	National/continental concern ⁵ (landbirds)	Continental stewardship ⁵ (landbirds)	Regional stewardship ⁵ (landbirds)	Conservation category and rule ⁶ (shorebirds)	Priority tier ⁷ (waterbirds)	NAWMP rank ⁸ (waterfowl)	Expert review ⁹ (added to priority list)
Pine Grosbeak	Landbird	Assess/Maintain				Y	Y	Y				
Rusty Blackbird ¹⁰	Landbird	Recovery objective	SC	SC	L	Y		Y				
Short-eared Owl ¹⁰	Landbird	Recovery objective	SC	SC	L	Y						
Spruce Grouse	Landbird	Assess/Maintain					Y					
Swamp Sparrow	Landbird	Assess/Maintain				Y	Y	Y				
Tennessee Warbler	Landbird	Assess/Maintain					Y					
White-throated Sparrow	Landbird	Assess/Maintain				Y	Y					
White-winged Crossbill	Landbird	Assess/Maintain				Y	Y					
Dunlin	Shorebird	Assess/Maintain							3a			
Greater Yellowlegs	Shorebird	Assess/Maintain							3b			Y
Least Sandpiper	Shorebird	Assess/Maintain							3e			Y
Lesser Yellowlegs	Shorebird	Assess/Maintain							2a			Y
Marbled Godwit	Shorebird	Increase 50%							4a,b			
Red Knot (<i>rufa</i>) ¹⁰	Shorebird	Recovery objective	EN	EN	L				4a			
Red-necked Phalarope	Shorebird	Increase 50%							3a			
Semipalmated Plover	Shorebird	Increase 50%							2a			Y
Semipalmated Sandpiper	Shorebird	Increase 100%							3a			
Short-billed Dowitcher (griseus)	Shorebird	Assess/Maintain							3a			
Solitary Sandpiper	Shorebird	Assess/Maintain							3b			Y
Wilson's Snipe	Shorebird	Increase 50%							3e			Y

Table 1 continued

Table 1 continued												
Priority species ¹	Bird group	Population objective	COSEWIC ²	SARA ³	Quebec provincial listing ⁴	National/continental concern ⁵ (landbirds)	Continental stewardship ⁵ (landbirds)	Regional stewardship ⁵ (landbirds)	Conservation category and rule ⁶ (shorebirds)	Priority tier ⁷ (waterbirds)	NAWMP rank ⁸ (waterfowl)	Expert review ⁹ (added to priority list)
American Bittern	Waterbird	Assess/Maintain								Tier 1		
Bonaparte's Gull	Waterbird	Assess/Maintain								Tier 1		
Common Loon	Waterbird	Assess/Maintain								Tier 1		
Sora	Waterbird	Assess/Maintain								Tier 2		
Yellow Rail	Waterbird	Recovery objective	SC	SC	TH					Tier 1		
American Black Duck	Waterfowl	Maintain current									High	
Black Scoter	Waterfowl	Maintain current									Mod high	
Brant	Waterfowl	Maintain current									High	
Canada Goose (Atlantic)	Waterfowl	Maintain current									Highes t	
Canada Goose (North Atlantic)	Waterfowl	Maintain current									High	
Harlequin Duck (Eastern population)	Waterfowl	Recovery objective	SC	SC	V						High	
Red-breasted Merganser	Waterfowl	Maintain current									Mod	Y
Surf Scoter	Waterfowl	Maintain current									High	

Bird group	Total species	Total priority species	Percent listed as priority	Percent of priority list
Landbirds	90	29	32%	54%
Shorebirds	15	12	80%	22%
Waterbirds	16	5	31%	9%
Waterfowl	31	8	26%	15%
Total	152	54	36%	100%

Table 2. Summary of priority species, by bird group, in BCR 7 Quebec.

Table 3. Number of priority species in BCR 7 Quebec by reason for priority status.

Reason for priority listing ¹	Landbirds	Shorebirds	Waterbirds	Waterfowl
COSEWIC ²	5	1	1	1
Federal SARA listed ³	5	1	1	1
Provincially listed ⁴	8	1	1	1
National/Continental Concern ⁵	13	-	-	-
Regional Concern ⁵	0	-	-	-
Continental Stewardship ⁵	15	-	-	-
Regional Stewardship ⁵	9	-	-	-
Conservation Category ⁶	-	6	-	-
Priority Tier ⁷	-	-	5	-
NAWMP ⁸	-	-	-	7
Expert review ⁹	4	6	0	1

¹ A single species can be on the priority list for more than one reason. Note that not all reasons for inclusion apply to every bird group (indicated by "-").

² Species assessed by the Committee on the Status of Endangered Wildlife in Canada as Endangered, Threatened, or Special Concern.

³ Species listed on Schedule 1 of the Species at Risk Act as Endangered, Threatened, or Special Concern.
 ⁴ Species listed on Quebec's Loi sur les espèces menacées ou vulnérables as Threatened, Vulnerable or Susceptible to become Threatened or Vulnerable.

⁵See Table 1.

⁶ Conservation category refers to species identified in the Canadian Shorebird Conservation Plan (Donaldson et al 2000) as having a conservation category of 5, 4a, 4b or 3a at the continental level.
 ⁷ Priority tier refers to species identified in Canada's Waterbird Conservation Plan (Milko et al 2003) as being Tier 1 or Tier 2.

⁸Species ranked in the North American Waterfowl Management Plan (Plan Committee 2004) as having Moderately High, High or Highest breeding or non-breeding conservation and/or monitoring need in the BCR.

⁹ Species that were included based on expert opinion.

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 Element 2: Habitats Important to Priority Species 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.

In BCR 7-QC, habitats occupied by priority species can be grouped into 7 major classes (Fig. 3). Wetlands cover only 5.7% of the subregion's territory (Fig. 1), but are used by 63% of priority species, representing 34 bird species from the 4 bird groups. The second and third most used habitat classes are riparian (39% of priority species) and waterbodies (33% of priority species), and coniferous habitats are also important with 26% of priority species. Among the 21 species using riparian habitat, shorebirds and landbirds are respectively represented by 8 and 7 species, whereas shorebird and waterfowl are the main inhabitants of the waterbodies habitat type. At the other end, even though herbaceous habitat covers 27% of BCR 7-QC, no priority species primarily uses this habitat in this BCR.

See Section 2: Conservation Needs by Habitat for more detailed information on priority species, threats and conservation actions related to each habitat type.



Figure 3. Percent of priority species that are associated with each habitat type in BCR 7 Quebec. Note: The total exceeds 100% because each species may be assigned to 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 Element 3: Population Objectives for Priority Species). 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. The ultimate measure of conservation success will be the extent to which population objectives have been reached over the next 40 years. Population objectives do not currently factor in feasibility of achievement but are held as a standard against which to measure progress.

Figure 4 shows that three categories of population objectives account for 90% of priority species in this BCR: "Assess/Maintain" (59%), "Recovery objective" (18%), and "Maintain current" (13%). The importance of the "Assess/Maintain" and "Maintain Current" categories reflects the high proportion of species that are on the priority list for stewardship reasons (28 out of 54 species). These two categories are not exclusively reserved for stewardship species, but stewardship species are typically given one or the other as a population objective; this reflects the fact that stewardship species often have stable population trends and are not unduly threatened. The importance of the "Assess/Maintain" category is also driven by the large number of priority species for which population trends are not well known or are unknown in this northern BCR. The issue of monitoring knowledge gaps will be addressed in Section 3.

The "Recovery objective" category stands out in this BCR because many (11) priority species in this region are species at risk, at the provincial and/or the federal level, and such species were automatically given this population objective category (except for the Nelson's sparrow, candidate for designation as threatened or endangered in Quebec), though in some cases their recovery documents are not yet complete.



Figure 4. Percent of priority species that are associated with each population objective category in BCR 7 Quebec.

Element 4: Threat Assessment for Priority Species

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 subregion 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 (such as predation by domestic cats or climate change) 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. We have incorporated them in a separate section on Widespread Issues, but, unlike other threats, they are not ranked.

Figure 5 shows that information is lacking for many priority species in BCR 7-QC (52 out of 54; also reflected in the importance of the "Assess/Maintain" population objective category in Figure 4), although the magnitude of this problem is considered low (Table 4). The "12.1 Information lacking" sub-category includes two factors: "Lack of knowledge on the biological or demographic parameters for proper management of populations" and "Species at risk without recovery strategy/management plan". At the time of writing, of the 11 species at risk at the provincial and/or the federal level, only the Bald Eagle, Golden Eagle, Harlequin Duck (Eastern population) and Yellow Rail had recovery documents published.

The "3.3 Renewable energy" sub-category is an important threat in BCR 7-QC, accounting for 19% of all identified threats and having a medium or high magnitude. Eleven hydroelectric generating stations were active on the territory of BCR 7-QC in 2012 (Hydro-Quebec 2012). Even though the total area affected by these projects remains relatively small in comparison to the extent of BCR 7-QC, they still represent the most serious threat to priority bird species in this region. More explicitly, this threat sub-category refers to hydroelectric energy projects that modify hydrological systems, causing permanent or seasonal flooding of natural habitats and changes in salinity in coastal waters. Shorebirds are particularly affected by this threat.

The "3.2 Mining & quarrying" sub-category is the next most important threat, accounting for 10% of all identified threats and having a magnitude of medium. Mining activities currently cover a very small combined area on the BCR 7-QC territory. However, the Plan Nord could generate significant development of the mining sector, potentially leading to the loss, degradation, or contamination of freshwater, riparian and wetland habitats used by priority species such as shorebirds. In 2011, more than 50 exploration projects were active within the boundaries of BCR 7-QC (Gouvernement du Quebec 2012).

The "5.1 Hunting and collecting terrestrial animals" sub-category also accounts for 10% of all identified threats, but its magnitude is low. Two specific threats fall under this sub-category. One is the deliberate killing or accidental trapping of birds, which affects only two species, the

Golden Eagle and Bald Eagle. The other one is the lack of knowledge on the extent of subsistence harvest and its impacts on bird populations, which is not a threat per se, but rather a conservation issue.

Other important threat sub-categories are "11.1 Habitat shifting & alteration" and "11.5 Other impacts", both with high magnitudes. "11.1 Habitat shifting & alteration" refers to the loss and degradation of freshwater, coastal and wetland habitats caused by climate change that could potentially affect several species of shorebirds and some waterbirds. "11.5 Other impacts" is also related to climate change and refers to the possibility of a higher frequency of unfavourable climate events affecting migration, reproductive success, availability of prey (aerial insects) and/or nesting phenology. Aerial insectivores such as the Common Nighthawk and Olive-sided Flycatcher could potentially be affected by such climate events.

The "7.2 Dams and water management/use" threat sub-category, for which the magnitude is mostly medium, includes threats such as flooding of nests resulting from water level fluctuations in reservoirs and rivers, and the loss or degradation of freshwater, coastal and wetland habitats due to an increase in sedimentation rates caused by water-level management activities (a threat mostly affecting shorebirds).



Figure 5. Percent of identified threats to priority species within BCR 7 Quebec by threat sub-category. Each bar represents the percent of the total number of threats identified in each threat sub-category in BCR 7-QC (for example, if 100 threats were identified in total for all priority species in BCR 7-QC and 10 of those threats were in the category 3.2 Mining & quarrying, 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. The overall magnitude of the sub-threat in the BCR is shown at the end of each bar. (See Element 4: Threat Assessment for Priority Species for details on how magnitude was assessed.)

Table 4 shows that the broad threat category "3. Energy production & mining" has an overall magnitude of high and that its magnitude is highest in the waterbodies, wetlands, coastal and riparian habitat classes, where several species of shorebirds occur. Threat category "11. Climate change & severe weather" also has an overall magnitude of high and its magnitude is highest in wetland and coastal habitats.

Threat category "9. Pollution" has an overall magnitude of medium. This category includes the acidification of wetlands and waterbodies due to airborne pollutants, a threat to the American Bittern. The other pollution-related threat is the contamination of prey by mercury and lead fishing tackle, and is specific to the Bald Eagle in the waterbodies and coastal habitat classes. Threat category "7. Natural system modifications" is another with an overall magnitude of medium and includes threats from sub-category "7.2 Dams and water management/use" described above, as well as a threat specific to Brant, the decline in eelgrass distribution and abundance in Hudson Bay. Threat category "12. Other" refers to sub-category "12.1 Information lacking" shown in Figure 5 and explained earlier.

The wetlands and coastal habitat classes are those with the highest overall threat magnitude. Wetlands have the highest number of priority species (see Fig. 3), and coastal habitats are used by several species of shorebirds that have a precarious status.

More detail on threats associated with the different habitat classes are presented in Section 2: Conservation Needs by Habitat. Threats to priority species while they are outside Canada during the non-breeding season were also assessed and are presented in Threats Outside Canada (Section 3).

Table 4. Relative magnitude of identified threats to priority species within BCR 7 Quebec by threat category and broad habitat class.

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		~	-	Habita	t class		-	-
	Coniferous	Shrub/Early Successional	Bare Areas	Wetlands	Waterbodies - freshwater	Coastal	Riparian	Overall
Overall	L	L	L	н	м	н	м	
3. Energy production & mining	-	L	L	н	н	Н	Н	н
4. Transportation & service corridors	-	-	-	L	-	-	-	L
5. Biological resource use	-	L	L	L	L	L	L	L
6. Human intrusions & disturbance	-	-	L	-	-	-	-	L
7. Natural system modifications	-	-	-	м	м	М	м	м
9. Pollution	-	-	-	м	м	М	-	м
11. Climate change & severe weather	-	-	-	н	М	Н	м	н
12. Other	L	L	L	L	L	L	L	L

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).

Conservation objectives were grouped under seven categories (Fig. 6). Ninety percent of the conservation objectives were represented by two categories: "1. Ensure adequate habitat" and "7. Improve understanding". The conservation objectives in category "1. Ensure adequate habitat" are the following and pertain to freshwater, riparian, coastal and wetland habitats: "1.1 Ensure that land and resource-use policies and practices maintain or improve bird habitat"; "1.2 Maintain the size, shape and configuration of habitat within the natural range of variation"; and "1.3 Ensure the continuation of natural processes that maintain bird habitat". Category "7. Improve understanding" refers to conservation objectives designed to address the lack of knowledge of breeding success and survival rates of several priority species, as well as the lack of information on Aboriginal subsistence hunting of Brant and several species of shorebirds. Refer to Section 2: Conservation Needs by Habitat for details on other conservation objectives.





Element 6: Recommended Actions

Recommended actions indicate on-the-ground activities that will help to achieve the conservation objectives (Fig. 7). Actions are strategic rather than highly detailed and prescriptive (see Element 6: Recommended Actions). Whenever possible, recommended actions benefit multiple species, and/or respond to more than one threat. Recommended actions defer to or support those provided in recovery documents for species at risk at the federal, provincial or territorial level, but will usually be more general than those developed for individual species.

Figure 7 shows that close to half of the recommended actions in BCR 7-QC fall into subcategories "8.2 Monitoring" and "8.1 Research". Such actions are clearly needed to address the lack of knowledge for many priority species in this BCR. Another important sub-category is "5.3 Private sector standards and codes" (with 27 % of all recommended actions), to which the following broad recommended actions were assigned: (a) encourage the adoption of more environmentally friendly operation standards; (b) establish policies/standards to regulate water levels/flow regimes; and (c) implement appropriate avoidance or mitigation measures identified in environmental assessment projects. These actions are needed to minimize the impacts of threats in category "3. Energy production & mining" (which has a high overall magnitude; see Table 4) on priority species and their habitats. Another sub-category related to this threat is "2.3 Habitat and natural process restoration", which refers to the restoration of freshwater, wetland and riparian habitats after the completion of mining projects.

Category "1.1 Site area/protection" accounts for almost 10 % of all recommended actions and includes actions aimed at identifying and protecting breeding and staging areas, particularly in wetland and riparian habitats. Sub-category "3.2 Species recovery" (6 % of all recommended actions) includes recommended actions to address the lack of recovery documents for several of the priority species that are at risk either at the provincial and/or the federal level. Recommended actions under sub-category "6.2 Substitution" are aimed at reducing the potential impact of climate change on freshwater, coastal, riparian, and wetland habitats.

More details on recommended actions associated with the different habitat classes are presented in Section 2: Conservation Needs by Habitat.





Section 2: Conservation Needs by Habitat

The following sections provide more detailed information on priority species, their threats and objectives within each of the broad habitat classes that occur in BCR 7 Quebec. Where appropriate, habitat information is provided at a finer scale than the broad habitat categories in order to coincide with other land management exercises in the region. 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.

Coniferous

Coniferous habitats are the dominant land cover of BCR 7-QC with 27.4% of the total coverage (Fig. 8). Under the UN's Land Cover Classification System, coniferous stands are defined as "Needleleaved evergreen forest or woodland", which includes all dense, open and sparse stands, as long as they are coniferous. These forest ecosystems are located between the continuous boreal forest to the south and the arctic tundra to the north. This zone, also known as taiga, is characterized by a cold climate and discontinuous permafrost. The main tree species in this habitat is black spruce. The three forest bioclimatic domains that we find in this BCR include spruce-moss domain in the southwest, spruce-lichen in the centre, and forest-tundra in the northern portion of the BCR.



Figure 8. Map of coniferous habitat in BCR 7 Quebec Region: Taiga Shield and Hudson Plains.

In BCR 7-QC, the conifer stands are home to 14 priority species (Table 5). All are landbirds, and 13 out of 14 are included as stewardship species. The only species that is of conservation concern in this habitat (Olive-sided Flycatcher) is a species at risk whose main threats could be located outside Canada (Falardeau *et al.* 2010), see Section 3: Additional Issues for more details. Therefore, the lack of knowledge regarding population trends is the only conservation issue that applies to all of the 14 priority species nesting in coniferous habitat. This conservation issue is addressed in Section 3: Additional Issues (since it is not habitat related). As a result, no conservation objectives or actions are presented in this coniferous habitat section. Table 5. Priority species that use coniferous habitat in BCR 7-QC, detailed habitat used, population objectives and reason for priority status.

	Detailed hebitet used	Deputation objective	Reason for priority status				
Phonicy species			At Risk ¹	CC ²	S ³		
Black-backed Woodpecker	Dead evergreen, deciduous or mixed trees	Assess/Maintain	-	-	Yes		
Blackpoll Warbler	Needleleaved evergreen low woodland	Assess/Maintain	-	-	Yes		
Boreal Chickadee	Needleleaved evergreen high forest	Assess/Maintain	-	-	Yes		
Gray Jay	Needleleaved evergreen forest	Assess/Maintain	-	-	Yes		
Gray-cheeked Thrush	Needleleaved evergreen forest; Needleleaved evergreen woodland	Assess/Maintain	-	-	Yes		
Merlin	Needleleaved evergreen low woodland	Assess/Maintain	-	-	Yes		
Northern Hawk Owl	Needleleaved evergreen woodland	Assess/Maintain	-	-	Yes		
Northern Shrike	Needleleaved evergreen woodland	Assess/Maintain	-	-	Yes		
Olive-sided Flycatcher ⁴	Needleleaved evergreen forest	Recovery objective	Yes	Yes	-		
Pine Grosbeak	Needleleaved evergreen forest	Assess/Maintain	-	-	Yes		
Spruce Grouse	Needleleaved evergreen forest	Assess/Maintain	-	-	Yes		
Tennessee Warbler	Needleleaved evergreen low woodland	Assess/Maintain	-	-	Yes		
White-throated Sparrow	Needleleaved evergreen forest	Assess/Maintain	-	-	Yes		
White-winged Crossbill	Needleleaved evergreen woodland	Assess/Maintain	-	-	Yes		

¹"At risk" includes species considered Endangered, Threatened or Special Concern pursuant to an assessment by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC); listed on Schedule 1 of the *Species at Risk Act* (SARA) as Endangered, Threatened or Special Concern, and listed as Endangered, Vulnerable or Likely to be designated threatened or vulnerable under the *Loi sur les espèces menacées ou vulnérables* (Quebec).

² "CC", or Conservation Concern, includes species considered of concern in the Partners in Flight database downloaded from <u>www.partnersinflight.org</u>, the Canadian Shorebird Conservation Plan (Donaldson et al., 2000), Canadian Shorebird Conservation Plan (Milko et al., 2003), the North American Waterfowl Management Plan (Plan Committee, 2004) or by regional experts.

³ "S", or Stewardship, includes abundant species with a wide range with a large percentage of their range or their continental population located in the conservation unit or sub-unit. These species include landbirds considered by Partners in Flight but also species from other bird groups added by experts.
⁴ Species listed on Schedule 1 of SARA, but for which there are no management plans or recovery strategies. Official documents related to SARA will prevail

as soon as they are published; however, the interim population objectives for these species are Olive-sided Flycatcher: Assess / Increase 100%.

Shrub/Early Successional

Under the Land Cover Classification System, shrub is defined as vegetation lower than five meters. This habitat represents only 4.4 % of the BCR 7 territory in Quebec, and is mostly located in its south-west portion (Fig. 9). There are very few (five) priority species in this habitat type in BCR 7 (Table 6). They are all landbirds of stewardship concern except one (Golden Eagle) that is a species at risk in Quebec (conservation concern). Other than the lack of knowledge on trends and population sizes for all of these species (which is reported in Section 3: Additional Issues), the Golden Eagle faces two other conservation issues in this habitat: deliberate killing and loss of habitat from permanent or seasonal flooding (Table 7). Both of these issues have an overall rolled-up magnitude of low (Fig. 10).



Figure 9. Map of shrub and early successional habitat in BCR 7 Quebec Region: Taiga Shield and Hudson Plains.
Table 6. Priority species that use shrub / early successional habitat in BCR 7-QC, detailed habitat used, population objectives and reason for priority status.

			Reason for priority		
Priority species	Detailed habitat used	Population objective	status		
			At risk ¹	CC ²	S ³
Alder Flycatcher	Closed and open shrubland	Assess/Maintain	-	-	Yes
Fox Sparrow	Thicket	Assess/Maintain	-	-	Yes
Golden Eagle	Open dwarf shrubland	Provincial recovery objective ⁴	Yes	Yes	-
Lincoln's Sparrow	Closed and open shrubland; Riparian closed shrubland	Assess/Maintain	-	-	Yes
Orange-crowned Warbler	Shrubland	Assess/Maintain	-	-	Yes

¹"At risk" includes species considered Endangered, Threatened or Special Concern pursuant to an assessment by COSEWIC; listed on Schedule 1 of SARA as Endangered, Threatened or Special Concern, and listed as Endangered, Vulnerable or Likely to be designated threatened or vulnerable under the *Loi sur les espèces menacées ou vulnérables* (Quebec).

² "CC", or Conservation Concern, includes species considered of concern in the Partners in Flight database downloaded from <u>www.partnersinflight.org</u>, the Canadian Shorebird Conservation Plan (Donaldson et al., 2000), Canadian Shorebird Conservation Plan (Milko et al., 2003), the North American Waterfowl Management Plan (Plan Committee, 2004) or by regional experts.

³ "S", or Stewardship, includes abundant species with a wide range with a large percentage of their range or their continental population located in the conservation unit or sub-unit. These species include landbirds considered by Partners in Flight but also species from other bird groups added by experts. ⁴ Refer to Équipe de rétablissement de l'aigle royal au Quebec (2005).



Figure 10. Percent of identified threats to priority species in shrub/early successional habitat in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat subcategory 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 1.1 Housing & urban areas, 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 subthreat in shrub / early successional habitat is shown at the end of each bar. See "Element 4" in Appendix 2 for more details.

Table 7. Threats addressed, conservation objectives, recommended actions and priority species affected for shrub/early successional habitat
in BCR 7 Quebec Region.

Table 7. Threats addressed, conservation objectives, recommended actions and priority species affected for shrub/early successional habita
in BCR 7 Quebec Region.

Threats addressed	Threat sub-	Objectives	Objective sub-	Recommended actions	Action sub-	Priority species
	category		category		category	affected ¹
Deliberate killing or	5.1 Hunting &	Recover	3.4 Implement	Implement the provincial recovery strategy	3.2 Species	Golden Eagle
accidental trapping.	terrestrial animals	species at tisk	strategies for species at risk	rétablissement de l'aigle royal au Quebec, 2005).	recovery	
Habitat loss and degradation (permanent or seasonal flooding of natural habitats).	3.3 Renewable energy	Recover species at risk	3.4 Implement recovery strategies for species at risk	Implement the provincial recovery strategy for the Golden Eagle (Équipe de rétablissement de l'aigle royal au Quebec, 2005).	3.2 Species recovery	Golden Eagle

¹ Some priority species for this habitat may not be mentioned here if their only threats in this habitat fall under the sub-category "12.1 Information Lacking".

Bare Areas

Under the UN's Land Cover Classification System, bare areas are defined as habitats with less than 4% vegetation cover, which is not artificial or the result of human activity. These habitats include, among others, bare rocks, sandy areas, and cliffs. However, bare areas exclude coastal habitats, which are discussed seperately. Bare area habitats represent only 1% of BCR 7 territory in Quebec (Fig. 11). In this conservation region, cliffs, rocky outcrops and burned areas are the habitat types for priority species that fall under this category. Golden Eagle, Peregrine Falcon (*anatum/tundrius*) and Common Nighthawk are the only three species using this habitat in this BCR (Table 8). Note that these species are all at risk.



Figure 11. Map of bare areas in BCR 7 Quebec Region: Taiga Shield and Hudson Plains.

In this habitat, the three priority species identified face threats like disturbance, killing of individuals, and habitat loss/degradation due to hydroelectric projects. However, these are all low or medium level magnitude threats, and few conservation actions are needed to address them (Fig. 12; Table 9).

Reason for priority

Table 8. Priority species that use bare area habitat in BCR 7-QC, detailed habitat used, population objectives and reason for priority status.

Priority species	Detailed habitat used	Population objective	status		
			At Risk ¹	CC ²	S ³
Common Nighthawk ⁴	Rocky outcrops; Burned areas	Recovery objective	Yes	Yes	-
Golden Eagle	Cliffs	Provincial recovery objective ⁵	Yes	Yes	-
Peregrine Falcon (<i>anatum/tundrius</i>) ⁴	Cliffs	Recovery objective	Yes	Yes	-

¹"At risk" includes species considered Endangered, Threatened or Special Concern pursuant to an assessment by COSEWIC; listed on Schedule 1 of SARA as Endangered, Threatened or Special Concern, and listed as Endangered, Vulnerable or Likely to be designated threatened or vulnerable under the *Loi sur les espèces menacées ou vulnérables* (Quebec).

² "CC", or Conservation Concern, includes species considered of concern in the Partners in Flight database downloaded from <u>www.partnersinflight.org</u>, the Canadian Shorebird Conservation Plan (Donaldson et al., 2000), Canadian Shorebird Conservation Plan (Milko et al., 2003), the North American Waterfowl Management Plan (Plan Committee, 2004) or by regional experts.

³ "S", or Stewardship, includes abundant species with a wide range with a large percentage of their range or their continental population located in the conservation unit or sub-unit. These species include landbirds considered by Partners in Flight but also species from other bird groups added by experts.

⁴ Species listed on Schedule 1 of SARA, but for which there are no management plans or recovery strategies. Official documents related to SARA will prevail as soon as they are published; however, the interim population objectives for these species are as follows: Common Nighthawk: Assess; Peregrine Falcon (*anatum/tundrius*): Assess.

⁵ Refer to Équipe de rétablissement de l'aigle royal au Quebec (2005).



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

Each bar represents the percent of the total number of threats identified in each threat sub-category in bare area habitat (for example, if 100 threats were identified in total for all priority species in bare area habitat, and 10 of those threats were in the category 1.1 Housing & urban areas, 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 area habitat is shown at the end of each bar. See "Element 4" in Appendix 2 for more details.

Threats addressed	Threat sub-	Objectives	Objective sub- category	Recommended actions	Action sub-	Priority species affected ¹
Habitat loss and degradation (permanent or seasonal flooding of natural habitats)	3.3 Renewable Energy	Recover species at risk	3.4 Implement recovery strategies for species at risk	Implement the provincial recovery strategy for the Golden Eagle (Équipe de rétablissement de l'aigle royal au Quebec, 2005).	3.2 Species recovery	Golden Eagle
Deliberate killing or accidental trapping	5.1 Hunting & collecting terrestrial animals	Recover species at risk	3.4 Implement recovery strategies for species at risk	Implement the provincial recovery strategy for the Golden Eagle (Équipe de rétablissement de l'aigle royal au Quebec, 2005).	3.2 Species recovery	Golden Eagle
Disturbance at nesting sites	6.1 Recreational activities	Minimize human disturbance in proximity of nesting sites	4.1 Reduce disturbance from human recreation	Raise the awareness of the communities of northern Quebec through education programs.	4.3 Awareness and communica- tions	Peregrine Falcon (anatum/ tundrius)

Table 9. Threats addressed, conservation objectives, recommended actions and priority species affected for bare area habitat in BCR 7-QC.

¹ Some priority species for this habitat may not be mentioned here if their only threats in this habitat fall under the sub-category "12.1 Information Lacking".

Wetlands

The Wetlands broad habitat class includes bogs, fens, swamps, as well as freshwater and saltwater marshes. In BCR 7-QC, these habitats are particularly abundant in the south-western portion, more specifically in the Abitibi lowlands (Fig. 13). In fact, a significant proportion of the wetlands found across the province of Quebec are located in BCR 7-QC (± 33%; see Element 2: Habitats Important to Priority Species). However, this habitat class covers only 5.7% of the landscape in BCR 7-QC. Nevertheless, 64% of the priority species in this BCR use wetlands (34 species; Table 10), and they are from all bird groups (14 landbirds, 12 shorebirds, 4 waterfowl, and 4 waterbirds). These habitats are used for breeding, brooding, resting and feeding. They also represent important stopover sites during the annual migration for a large number of birds. The number and variety of priority bird species in this scarce habitat highlights the importance of this habitat type for conservation activities in BCR 7-QC.





These habitats and the birds that depend on them are faced with many conservation issues. Habitat loss and degradation due to energy production is by far the main one (27% of all occurrences in this BCR subregion, and high magnitude; Figure 14). Habitat shifting and alteration due to climate change comes next (15% of occurrences; overall rolled-up magnitude of High). Refer to

Element 4: Threat Assessment for Priority Species (Threat Assessment for Priority Species) for the distinction between climate change as it appears in this section and climate change as it appears in Section 3: Additional Issues. Wetlands could well be one of the habitats most affected by climate change, and given the number of priority bird species using this habitat, it is an important conservation issue for BCR 7-QC.

The complete set of conservation objectives and conservation actions addressing these conservation issues as well as others in this habitat is provided in Table 11. The conservation objectives primarily aim at restoring and maintaining the quantity and quality of wetland habitat, and reducing the potential impact of climate change on this habitat type. The main conservation actions fall under site/area protection, policies and regulations, private sector standards and codes, and research/monitoring activities.

Priority species	Detailed habitat used	Population objective	Reason for priority status			
,			At risk ¹	CC ²	S ³	
Alder Flycatcher	Peatland (bog/fen)	Assess/Maintain	-	-	Yes	
American Bittern	Marsh; Saltmarsh (Coastal)	Assess/Maintain	-	Yes	-	
American Black Duck	Marsh; Peatland (bog/fen)	Maintain current	-	-	Yes	
Belted Kingfisher	Marsh	Assess/Maintain	-	-	Yes	
Bonaparte's Gull	Peatland (bog/fen)	Assess/Maintain	-	Yes	-	
Brant	Saltmarsh (Coastal)	Maintain current	-	Yes	-	
Canada Goose (Atlantic pop.)	Peatland (bog/fen)	Maintain current	-	-	Yes	
Canada Goose (North Atlantic)	Peatland (bog/fen)	Maintain current	-	-	Yes	
Common Nighthawk ⁴	Marsh	Recovery objective	Yes	Yes	-	
Dunlin	Saltmarsh (Coastal)	Assess/Maintain	-	Yes	-	
Golden Eagle	Peatland (bog/fen)	Provincial recovery objective ⁵	Yes	Yes	-	
Greater Yellowlegs	Peatland (bog/fen); Swamp	Assess/Maintain	-	Yes	-	

Table 10. Priority species that use wetland habitat in BCR 7-QC, detailed habitat used, population objectives and reason for priority status.

⁵ Refer to Équipe de rétablissement de l'aigle royal au Québec (2005).

¹ "At risk" includes species considered Endangered, Threatened or Special Concern pursuant to an assessment by COSEWIC; listed on Schedule 1 of SARA as Endangered, Threatened or Special Concern, and listed as Endangered, Vulnerable or Likely to be designated threatened or vulnerable under the *Loi sur les espèces menacées ou vulnérables* (Quebec).

² "CC", or Conservation Concern, includes species considered of concern in the Partners in Flight database downloaded from <u>www.partnersinflight.org</u>, the Canadian Shorebird Conservation Plan (Donaldson et al., 2000), Canadian Shorebird Conservation Plan (Milko et al., 2003), the North American Waterfowl Management Plan (Plan Committee, 2004) or by regional experts.

³ "S", or Stewardship, includes abundant species with a wide range with a large percentage of their range or their continental population located in the conservation unit or sub-unit. These species include landbirds considered by Partners in Flight but also species from other bird groups added by experts.

⁴ Species listed on Schedule 1 of SARA, but for which there are no management plans or recovery strategies. Official documents related to SARA will prevail as soon as they are published; however, the interim population objectives for these species are as follows: Common Nighthawk: Assess; Olive-sided Flycatcher: Assess / Increase 100%; Peregrine Falcon (*anatum/tundrius*): Assess; Red Knot (*rufa*): Increase 100%; Rusty Blackbird: Increase 100%; Short-eared Owl: Assess; Yellow Rail: Assess/Maintain.

Priority species	Detailed habitat used	Population objective	Reason	Reason for priority status			
			At risk ¹	CC ²	S³		
Le Conte's Sparrow	Saltmarsh (Coastal)	Assess/Maintain	-	Yes	-		
Least Sandpiper	Peatland (bog/fen); Swamp	Assess/Maintain	-	Yes	-		
Lesser Yellowlegs	Peatland (bog/fen); Swamp	Assess/Maintain	-	Yes	-		
Lincoln's Sparrow	Peatland (bog/fen)	Assess/Maintain	-	-	Yes		
Marbled Godwit	Wetland (undefined) - Coastal	Increase 50%	-	Yes	-		
Nelson's Sparrow	Saltmarsh (Coastal)	Assess/Maintain	Yes	Yes	-		
Olive-sided Flycatcher ⁴	Swamp	Recovery objective	Yes	Yes	-		
Palm Warbler	Bog	Assess/Maintain	-	-	Yes		
Peregrine Falcon	Marsh; Saltmarsh (Coastal)	Recovery objective	Yes	Yes	-		
(anatum/tundrius) ⁴							
Red Knot (<i>rufa</i>) ⁴	Saltmarsh (Coastal)	Recovery objective	Yes	-	-		
Red-necked Phalarope	Peatland (bog/fen); Swamp	Increase 50%	-	Yes	-		
Rusty Blackbird ⁴	Wetland (undefined)	Recovery objective	Yes	Yes	-		
Semipalmated Plover	Peatland (bog/fen); Swamp	Increase 50%	-	Yes	-		
Semipalmated Sandpiper	Wetland (undefined) - Coastal	Increase 100%	-	Yes	-		
Short-billed Dowitcher (griseus)	Peatland (bog/fen); Swamp	Assess/Maintain	-	-	Yes		
Short-eared Owl ⁴	Marsh; Peatland (bog/fen); Saltmarsh	Recovery objective	Yes	-	-		
	(Coastal)						
Solitary Sandpiper	Peatland (bog/fen); Swamp	Assess/Maintain	-	Yes	-		
Sora	Marsh; Saltmarsh (Coastal)	Assess/Maintain	-	Yes	-		
Spruce Grouse	Peatland (bog/fen)	Assess/Maintain	-	-	Yes		
Swamp Sparrow	Marsh; Saltmarsh (Coastal)	Assess/Maintain	-	-	Yes		
Wilson's Snipe	Peatland (bog/fen); Swamp	Increase 50%	-	Yes	-		
Yellow Rail	Marsh; Peatland (bog/fen); Saltmarsh (Coastal)	Recovery objective ⁶	Yes	-	-		

⁶ Consult Environment Canada (2012).



Figure 14. Percent of identified threats to priority species in wetland habitat 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 1.1 Housing & urban areas, 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. See "Element 4" in Appendix 2 for more details.

Table 11. Threats addressed, conservation objectives, recommended actions and priority species affected for wetland habitat in BCR 7Quebec Region.

Threats addressed	Threat sub-	Objectives	Objective sub-	Recommended actions	Action sub-	Priority species
	category		category		category	affected ¹
Habitat loss and	7.3 Other	Maintain/	1.2 Maintain the	Preserve important eelgrass beds remaining.	1.1 Site/area	Brant
degradation (decline	ecosystem	restore the	size, shape and		protection	
in eelgrass	modifications	quantity and	configuration of	Restore (by replanting root stock) important		
distribution and		quality of	habitat within	eelgrass patches.	2.3 Habitat	
abundance)		eelgrass beds	the natural		and natural	
		across the	range of		process	
		landscape	variation	Implement proper avoidance or mitigation	restoration	
				measures identified in environmental	5.3 Private	
				assessment of projects.	sector	
					standards	
				Assess the conditions favouring the	and codes	
				emergence of the disease "Labyrinthula	8.1 Research	
				zosterae".		
				Develop records realizate to concerts		
				Develop research projects to assess the		
Habitat loss and	0 E Airborno	Maintain/	1 1 Encure land	Encourage reduction of acid rain generating	E 2 Drivata	Amorican
dogradation	9.5 All Dorne	rostoro tho	1.1 Elisure lanu		5.5 Private	Bittorn
(acidification of	pollutants	diversity and	use policies and	gas emissions.	standards	DILLETT
wetlands could		quality of	nractices		and codes	
influence the food		wetland	maintain or	Develop research projects to fill knowledge	8 1 Research	
availability and		habitate	improve bird	gans on lake acidification and ecotoxicology	0.1 Nesearch	
increase mercury		across the	hahitat	gaps of fake actumention and ecotoxicology.		
noisoning)		landscane				

¹ Some priority species for this habitat may not be mentioned here if their only threats in this habitat fall under the sub-category "12.1 Information Lacking".

Threats addressed	Threat sub-	Objectives	Objective sub-	Recommended actions	Action sub-	Priority species
	category		category		category	affected ¹
Habitat loss and	11.1 Habitat	Reduce the	6.2 Manage for	Encourage reduction of greenhouse gas	6.2	Dunlin, Greater
degradation (global	shifting &	potential	habitat resilience	emissions.	Substitution	Yellowlegs,
climate change may	alteration	impact of	as climate			Least
be responsible for the		climate	changes			Sandpiper,
loss of productivity of		change on				Lesser
staging habitats)		wetland				Yellowlegs,
		habitats				Marbled
						Godwit, Red
						Knot (<i>rufa</i>),
						Semipalmated
						Plover,
						Semipalmated
						Sandpiper,
						Solitary
						Sandpiper.
Habitat loss and	11.1 Habitat	Reduce the	6.2 Manage for	Encourage reduction of greenhouse gas	6.2	American
degradation (global	shifting &	potential	habitat resilience	emissions.	Substitution	Bittern, Sora,
climate change may	alteration	impact of	as climate			Yellow Rail.
modify the number,		climate	changes			
size and location of		change on				
wetlands)		wetland				
		habitats				

Threats addressed	Threat sub-	Objectives	Objective sub-	Recommended actions	Action sub-	Priority species
	category		category		category	affected
Habitat loss and	3.2 Mining &	Maintain/	1.1 Ensure land	Protect and secure large wetlands through	1.1 Site/area	Brant, Dunlin,
degradation (mining	quarrying	restore the	and resource-	the attribution of legal conservation status or	protection	Greater
projects)		diversity and	use policies and	the use of various stewardship approaches.		Yellowlegs,
		quality of	practices			Least
		wetland	maintain or	Restore habitats after completion of projects.	2.3 Habitat	Sandpiper,
		habitats	improve bird		and natural	Lesser
		across the	habitat		process	Yellowlegs, Red-
		landscape			restoration	necked
				Increase the protection of wetlands by using	5 2 Policies	Phalarope,
				existing policies, regulations and stewardship	and	Semipalmated
				tools.	regulations	Plover,
					regulations	Semipalmated
					5.3 Private	Sandpiper,
				Encourage the adoption of more	sector	Short-eared
				environment-friendly operation standards.	standards	Owl, Solitary
				Implement proper sucidance or mitigation	and codes	Sanupiper,
				measures identified in environmental		wilson's sinpe.
				assessment of projects		
				assessment of projects.		
				Ensure that once restored the exploited	8.2	
				sites offer wildlife habitat equivalent to the	Monitoring	
				original through pre- and post-operation		
				wildlife monitoring.		

Threats addressed	Threat sub-	Objectives	Objective sub-	Recommended actions	Action sub-	Priority species
	category		category		category	affected ¹
Habitat loss and degradation (permanent or seasonal flooding of natural habitats)	3.3 Renewable Energy	Maintain/ restore the diversity and quality of wetland habitats across the landscape	1.3 Ensure the continuation of natural processes that maintain bird habitat	Protect and secure large wetlands (including important nesting sites) through the attribution of legal conservation status or the use of various stewardship approaches. Manage water level so that no nest flooding will occur during the nesting period. Implement proper avoidance or mitigation measures identified in environmental assessment of projects.	1.1 Site/area protection 5.3 Private sector standards and codes	American Bittern, Bonaparte's Gull, Golden Eagle, Least Sandpiper, Marbled Godwit, Peregrine Falcon (<i>anatum/tundri</i> <i>us</i>), Red Knot (<i>rufa</i>), Red- necked Phalarope, Rusty Blackbird, Semipalmated Plover, Semipalmated Sandpiper, Sora, Wilson's Snipe, Yellow Rail.
Habitat loss and degradation (potential salinity change following hydrological system modification)	3.3 Renewable Energy	Maintain/ restore the diversity and quality of wetland habitats across the landscape	1.3 Ensure the continuation of natural processes that maintain bird habitat	Protect and secure large wetlands through the attribution of legal conservation status or the use of various stewardship approaches. Implement proper avoidance or mitigation measures identified in environmental assessment of projects.	1.1 Site/areaprotection5.3 Privatesectorstandardsand codes	Brant, Dunlin, Greater Yellowlegs, Le Conte's Sparrow, Lesser Yellowlegs, Nelson's Sparrow.

Threats addressed	Threat sub-	Objectives	Objective sub-	Recommended actions	Action sub-	Priority species
	category		category		category	affected
Habitat loss and degradation (possible increase in sedimentation rate may alter habitat)	7.2 Dams & water management/ use	Maintain/ restore the diversity and quality of wetland habitats across the landscape	1.1 Ensure land and resource- use policies and practices maintain or improve bird habitat	Assess the impacts of sediment deposition rate modification on habitat structure of Cabbage Willows and Boatswain bays in Rupert Bay.	8.1 Research	Brant, Dunlin, Least Sandpiper, Marbled Godwit, Red Knot (<i>rufa</i>), Red-necked Phalarope, Semipalmated Plover, Semipalmated Sandpiper, Solitary Sandpiper, Wilson's Snipe.
Habitat loss and fragmentation (construction of roads)	4.1 Roads & railroads	Maintain/ restore the diversity and quality of wetland habitats across the landscape	1.1 Ensure land and resource- use policies and practices maintain or improve bird habitat	Implement proper avoidance or mitigation measures identified in environmental assessment of projects.	5.3 Private sector standards and codes	Brant, Greater Yellowlegs, Least Sandpiper, Lesser Yellowlegs, Red- necked Phalarope, Semipalmated Plover, Semipalmated Sandpiper, Solitary Sandpiper, Wilson's Snipe.

Threats addressed	Threat sub-	Objectives	Objective sub-	Recommended actions	Action sub-	Priority species
	category		category		category	affected
Higher frequency of unfavourable climate events as a result of global climate change may affect migration/ reproductive success/ availability of prey (aerial insects)/ nesting phenology	11.5 Other impacts	Reduce the potential impact of climate change on wetland habitats	6.2 Manage for habitat resilience as climate changes	Encourage reduction of greenhouse gas emissions.	6.2 Substitution	Common Nighthawk, Olive-sided Flycatcher, Red Knot (<i>rufa</i>), Red-necked Phalarope.
(warmer climate)						
Lack of knowledge on the extent of subsistence harvest and its impacts on bird populations	5.1 Hunting & collecting terrestrial animals	Ensure adequate levels of subsistence harvest	7.2 Improve harvest monitoring	Study migratory bird take and egg collection by Aboriginal people in order to evaluate the impact on populations.	8.2 Monitoring	Brant, Dunlin, Greater Yellowlegs, Least Sandpiper, Lesser Yellowlegs, Marbled Godwit, Red Knot (<i>rufa</i>), Semipalmated Plover, Semipalmated Sandpiper, Solitary Sandpiper, Wilson's Snipe.

Waterbodies, Snow and Ice

In the "Waterbodies, Snow and Ice" broad habitat class, "waterbodies" theoretically stand for both marine and freshwater habitats. However, marine habitats adjacent to BCR 7-QC fall under the jurisdiction of Nunavut. Therefore, these marine waters are not considered in this Quebec strategy but in Prairie and Northern Region's strategy for BCR 3: Arctic Plains and Mountains. Moreover, no priority species used snow or ice as a habitat in BCR 7-QC. As a result, inland freshwater was the only sub-habitat used by priority species within this broad habitat class.

Waterbodies are defined as streams, rivers, ponds, and small and large lakes. These freshwater habitats represent almost 20% of the total areas covered by BCR 7-QC (Fig. 15), and are visited by a large number of bird species, some of which depend on them at various times during their life cycle. They are used for breeding, brooding, resting and feeding. They also represent important stopover sites during the annual migration for a large number of birds.

In BCR 7-QC, species from all 4 bird groups used waterbodies; 8 shorebirds, 6 waterfowl, 2 waterbirds and 2 landbirds, for a total of 18 priority species (Table 12). Among these are two species at risk: Bald Eagle and Harlequin Duck (Eastern population).

Like the Wetlands broad habitat class, conservation issues stemming from the broad category "3. Energy production and mining" are the ones raised most often in freshwater habitats (Fig. 16). Sub-category "3.1 Renewable energy" has the highest overall rolled-up magnitude (High) and includes 40% of identified threats in this habitat. These conservation issues are mainly addressed with conservation actions calling for the industry to adopt operation standards that minimize their impact on priority species as well as their habitats and also to fully mitigate the residual impacts on them (Table 13).



Sources: Land Cover Map of Canada 2005 (CCRS, 2008), Atlas of Canada 1,000,000 National Framework Data - Hydrology (CCRS, 2008) Projection: UTM 19 (NAD 1983) Couverture du sol du Canada 2005 (CCT, 2008), Données-cadre nationales de l'Atlas du Canada à l'échelle du 1/1 000 000 - Hydrologie (CCT, 2008)

Figure 15. Map of waterbodies, snow and ice in BCR 7 Quebec Region: Taiga Shield and Hudson Plains.

			Reason for priority status		
Priority species	Detailed habitat used	Population objective	At risk ¹	CC ²	S³
American Bittern	Perennial pond/small lake	Assess/Maintain	-	Yes	-
American Black Duck	Perennial pond/small lake	Maintain current	-	-	Yes
Bald Eagle	Perennial large lake; Perennial river	Provincial recovery objective ⁴	Yes	Yes	-
Belted Kingfisher	Perennial pond/small lake; Perennial river	Assess/Maintain	-	-	Yes
Canada Goose (Atlantic pop.)	Inshore herbaceous islands	Maintain current	-	-	Yes
Canada Goose (North Atlantic)	Inshore herbaceous islands	Maintain current	-	-	Yes
Common Loon	Perennial large lake	Assess/Maintain	-	-	Yes
Greater Yellowlegs	Perennial pond/small lake	Assess/Maintain	-	Yes	-
Harlequin Duck (Eastern pop.)	Perennial river	Recovery objective ⁵	Yes	Yes	-
Least Sandpiper	Perennial pond/small lake	Assess/Maintain	-	Yes	-
Lesser Yellowlegs	Perennial pond/small lake	Assess/Maintain	-	Yes	-
Red-breasted Merganser	Perennial river and lake	Maintain current	-	-	Yes
Red-necked Phalarope	Perennial pond/small lake	Increase 50%	-	Yes	-
Semipalmated Plover	Perennial pond/small lake	Increase 50%	-	Yes	-
Short-billed Dowitcher (griseus)	Perennial pond/small lake	Assess/Maintain	-	-	Yes
Solitary Sandpiper	Perennial pond/small lake	Assess/Maintain	-	Yes	-
Surf Scoter	Perennial pond/small lake	Maintain current	-	-	Yes
Wilson's Snipe	Perennial pond/small lake	Increase 50%	-	Yes	-

Table 12. Priority species that use Waterbodies, snow and ice, regional habitat class, population objectives and reason for priority status.

¹ "At risk" includes species considered Endangered, Threatened or Special Concern pursuant to an assessment by COSEWIC; listed on Schedule 1 of SARA as Endangered, Threatened or Special Concern, and listed as Endangered, Vulnerable or Likely to be designated threatened or vulnerable under the *Loi sur les espèces menacées ou vulnérables* (Quebec).

² "CC", or Conservation Concern, includes species considered of concern in the Partners in Flight database downloaded from <u>www.partnersinflight.org</u>, the Canadian Shorebird Conservation Plan (Donaldson et al., 2000), Canadian Shorebird Conservation Plan (Milko et al., 2003), the North American Waterfowl Management Plan (Plan Committee, 2004) or by regional experts.

³ "S", or Stewardship, includes abundant species with a wide range with a large percentage of their range or their continental population located in the conservation unit or sub-unit. These species include landbirds considered by Partners in Flight but also species from other bird groups added by experts.

⁴ Refer to Comité de rétablissement du Pygargue à tête blanche au Québec (2002).

⁵ Consult Environment Canada (2007).



Figure 16. Percent of identified threats to priority species in waterbodies, snow and ice habitat in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat subcategory in waterbodies, snow and ice habitat (for example, if 100 threats were identified in total for all priority species in waterbodies, snow and ice habitat, and 10 of those threats were in the category 1.1 Housing & urban areas, 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 subthreat in waterbodies, snow and ice habitat is shown at the end of each bar. See "Element 4" in Appendix 2 for more details. Table 13. Threats addressed, conservation objectives, recommended actions and priority species affected for waterbodies, snow and ice habitat in BCR 7-QC.

Threats addressed	Threat sub- category	Objectives	Objective sub- category	Recommended actions	Action sub- category	Priority species affected ¹
Contamination of prey by toxics	9.5 Airborne pollutants	Recover species at risk	3.4 Implement recovery strategies for species at risk	Implement the provincial recovery strategy for the Bald Eagle (Comité de rétablissement du pygargue à tête blanche au Quebec, 2002)	3.2 Species recovery	Bald Eagle
Habitat loss and degradation (acidification of waterbodies could influence the food availability and increase mercury poisoning)	9.5 Airborne pollutants	Maintain/ restore the diversity and quality of freshwater habitats across the landscape	2.2 Reduce mortality and/or sub-lethal effects from exposure to contaminants	Encourage reduction of acid rain-generating gas emissions Develop research projects to fill knowledge gaps on lake acidification and ecotoxicology	5.3 Private sector standards and codes 8.1 Research	American Bittern
Habitat loss and degradation (global climate change may modify the number, size and location of waterbodies)	11.1 Habitat shifting & alteration	Reduce the potential impact of climate change on freshwater habitats	6.2 Manage for habitat resilience as climate changes	Encourage reduction of greenhouse gas emissions	6.2 Substitution	American Bittern

¹ Some priority species for this habitat may not be mentioned here if their only threats in this habitat fall under the sub-category "12.1 Information Lacking".

Threats addressed	Threat sub-	Objectives	Objective sub-	Recommended actions	Action sub-	Priority species
_	category		category		category	affected ¹
Habitat loss and	3.2 Mining &	Maintain/	1.1 Ensure land	Restore habitats after completion of projects.	2.3 Habitat	Greater
degradation (mining	quarrying	restore the	and resource-		and natural	Yellowlegs,
projects)		diversity and	use policies and		process	Harlequin Duck
		quality of	practices		restoration	(Eastern), Least
		freshwater	maintain or	Encourage the adoption of more environment		Sandpiper,
		habitats	improve bird	friendly operation standards.	5.3 Private	Lesser
		across the	habitat		sector	Yellowlegs, Red-
		landscape		Implement proper avoidance or mitigation	standards	necked
				measures identified in environmental	and codes	Phalarope,
				assessment of projects.		Semipalmated
					8.2	Plover, Solitary
				Ensure that, once restored, the exploited	Monitoring	Sandpiper,
				sites offer wildlife habitats equivalent to the		Wilson's Snipe.
				originals through pre- and post-operation		
				wildlife monitoring.		
Habitat loss and	3.3 Renewable	Maintain/	1.3 Ensure the	Implement proper avoidance or mitigation	5.3 Private	American
degradation	Energy	restore the	continuation of	measures identified in environmental	sector	Bittern, Bald
(permanent or		diversity and	natural	assessment of projects.	standards	Eagle, Greater
seasonal flooding of		quality of	processes that		and codes	Yellowlegs,
natural habitats)		freshwater	maintain bird	Manage water level so that no nest flooding		Harlequin Duck
		habitats	habitat	will occur during nesting period.		(Eastern), Least
		across the				Sandpiper,
		landscape				Lesser
						Yellowlegs, Red-
						necked
						Phalarope,
						Semipalmated
						Plover, Solitary
						Sandpiper,
						Wilson's Snipe.

Threats addressed	Threat sub-	Objectives	Objective sub-	Recommended actions	Action sub-	Priority species
	category		category		category	affected
Habitat loss and degradation (potential salinity change following hydrological system modification)	3.3 Renewable Energy	Maintain/ restore the diversity and quality of freshwater habitats across the landscape	1.3 Ensure the continuation of natural processes that maintain bird habitat	Implement proper avoidance or mitigation measures identified in environmental assessment of projects.	5.3 Private sector standards and codes	Lesser Yellowlegs
Habitat loss and degradation (possible increase in sedimentation rate may alter habitat)	7.2 Dams & water management/ use	Maintain/ restore the diversity and quality of freshwater habitats across the landscape	1.1 Ensure land and resource- use policies and practices maintain or improve bird habitat	Assess the impacts of sediment deposition rate modification on habitat structure of Cabbage Willows and Boatswain bays in Rupert Bay.	8.1 Research	Least Sandpiper
Lack of knowledge on the extent of subsistence harvest and its impacts on bird populations	5.1 Hunting & collecting terrestrial animals	Ensure adequate levels of subsistence harvest	7.2 Improve harvest monitoring	Study migratory bird take and egg collection by Aboriginal people in order to evaluate the impact on populations.	8.2 Monitoring	Greater Yellowlegs, Least Sandpiper, Lesser Yellowlegs.

Coastal

Habitats defined as "coastal" theoretically include both terrestrial and aquatic habitats that occur along marine shorelines. However, marine habitats adjacent to BCR 7-QC fall under the jurisdiction of Nunavut. Therefore, these coastal marine waters (along with the coastal islands) are not considered in the BCR 7-QC strategy but are included in Prairie and Northern Region's strategy for BCR 3: Arctic Plains and Mountains. It is also important to understand that saltmarshes, being wetlands, were grouped with the wetlands broad habitat class as opposed to the coastal broad habitat class. The remaining habitats considered in this class are mudflats, sandflats, beaches, rocky shoreline and coastal forests.

In BCR 7-QC, the coastline is estimated at 4200 km, and much of this coastal habitat is found at the western border of the BCR subregion, along James Bay and Hudson Bay, but also in the north along Ungava Bay. There are only seven priority species making extensive use of the coastal broad habitat type in this BCR subregion (Table 14). Six of them are shorebirds.

The three most frequent conservation issues in this habitat include bird mortality due to subsistence harvest (30%), habitat loss and degradation through the flooding of large areas and disruption of hydrological systems when impounding reservoirs and operating hydroelectric plants (30%), and loss of productivity on staging sites as a potential result of climate change (25%; Figure 17; Table 15). The overall rolled-up magnitudes of these conservation issues in this habitat are, respectively, low, high and high (Fig. 17).

Main conservation objectives are to maintain/restore the quantity and quality of coastal habitats across the landscape, reduce the potential impact of climate change, and ensure sustainable levels of subsistence harvest (Table 15). These objectives could be achieved by actions regarding site/area protection, encouraging reduction of greenhouse gas emission, and implementing a study of migratory bird take and egg collection by Aboriginal people in order to evaluate the impact on populations of priority bird species.

Detector	Detailed behind used	Population objective		Reason for priority status		
Priority species	Detailed habitat used			CC ²	S³	
Bald Eagle	Coastal	Provincial recovery objective ⁵	Yes	Yes	-	
Dunlin	Bare area (coastal)	Assess/Maintain	-	Yes	-	
Lesser Yellowlegs	Bare area (coastal)	Assess/Maintain	-	Yes	-	
Marbled Godwit	Bare area (coastal)	Increase 50%	-	Yes	-	
Red Knot (<i>rufa</i>) ⁴	Bare area (coastal)	Recovery objective	Yes	Yes	-	
Semipalmated Sandpiper	Bare area (coastal)	Increase 100%	-	Yes	-	
Short-billed Dowitcher (griseus)	Bare area (coastal)	Assess/Maintain	-	-	Yes	

Table 14. Priority species that use coastal habitat, regional habitat class, population objectives and reason for priority status.

¹ "At risk" includes species considered Endangered, Threatened or Special Concern pursuant to an assessment by COSEWIC; listed on Schedule 1 of SARA as Endangered, Threatened or Special Concern, and listed as Endangered, Vulnerable or Likely to be designated threatened or vulnerable under the Loi sur les espèces menacées ou vulnérables (Quebec).

² "CC", or Conservation Concern, includes species considered of concern in the Partners in Flight database downloaded from <u>www.partnersinflight.org</u>, the Canadian Shorebird Conservation Plan (Donaldson et al., 2000), Canadian Shorebird Conservation Plan (Milko et al., 2003), the North American Waterfowl Management Plan (Plan Committee, 2004) or by regional experts.

³ "S", or Stewardship, includes abundant species with a wide range with a large percentage of their range or their continental population located in the conservation unit or sub-unit. These species include landbirds considered by Partners in Flight but also species from other bird groups added by experts.

⁴ Species listed on Schedule 1 of SARA, but for which there are no management plans or recovery strategies. Official documents related to SARA will prevail as soon as they are published; however, the interim population objectives for these species are as follows: Red Knot (*rufa*): Increase 100%. ⁵ Refer to Comité de rétablissement du pygargue à tête blanche au Quebec (2002).

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Figure 17. Percent of identified threats to priority species in coastal habitat in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat subcategory 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 1.1 Housing & urban areas, 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. See Appendix 2 for more details.

Threats addressed	Threat sub-	Objectives	Objective sub-	Recommended actions	Action sub-	Priority species
	category		category		category	affected ¹
Contamination of	9.5 Airborne	Recover	3.4 Implement	Implement the provincial recovery strategy	3.2 Species	Bald Eagle
prey by toxics	pollutants	species at risk	recovery	for the Bald Eagle (Comité de rétablissement	recovery	
			strategies for	du pygargue à tête blanche au Quebec,		
			species at risk	2002).		
Habitat loss and	11.1 Habitat	Reduce the	6.2 Manage for	Encourage reduction of greenhouse gas	6.2	Dunlin, Lesser
degradation (global	shifting &	potential	habitat resilience	emissions.	Substitution	Yellowlegs,
climate change may	alteration	impact of	as climate			Marbled
be responsible for the		climate	changes			Godwit, Red
loss of productivity of		change on				Knot (<i>rufa</i>),
staging coastal		coastal				Semipalmated
habitats)		habitats				Sandpiper.
Habitat loss and	3.3 Renewable	Maintain/	1.3 Ensure the	Protect and secure important staging sites	1.1 Site/area	Dunlin, Lesser
degradation	Energy	restore the	continuation of	through the attribution of legal conservation	protection	Yellowlegs,
(permanent or		quantity and	natural	status or the use of various stewardship		Marbled
seasonal flooding of		quality of	processes that	approaches.		Godwit, Red
natural habitats)		coastal	maintain bird			Knot (<i>rufa</i>),
		habitats	habitat	Implement proper avoidance or mitigation		Semipalmated
		across the		measures identified in environmental	5.3 Private	Sandpiper
		landscape		assessment of projects.	sector	
					standards	
					and codes	

Table 15. Threats addressed, conservation objectives, recommended actions and priority species affected for coastal habitat in BCR 7-QC.

¹ Some priority species for this habitat may not be mentioned here if their only threats in this habitat fall under the sub-category "12.1 Information Lacking".

Threats addressed	Threat sub- category	Objectives	Objective sub- category	Recommended actions	Action sub- category	Priority species affected ¹
Habitat loss and degradation (potential salinity change following hydrological system modification)	3.3 Renewable Energy	Maintain/ restore the quantity and quality of coastal habitats across the landscape	1.3 Ensure the continuation of natural processes that maintain bird habitat	Protect and secure important staging sites through the attribution of legal conservation status or the use of various stewardship approaches. Implement proper avoidance or mitigation measures identified in environmental assessment of projects.	 1.1 Site/area protection 5.3 Private sector standards and codes 	Dunlin, Lesser Yellowlegs, Marbled Godwit, Red Knot (<i>rufa</i>),
Habitat loss and degradation (possible increase in sedimentation rate may alter habitat)	7.2 Dams & water management/ use	Maintain/ restore the diversity and quality of coastal habitats across the landscape	1.1 Ensure land and resource- use policies and practices maintain or improve bird habitat	Assess the impacts of sediment deposition rate modification on habitat structure of Cabbage Willows and Boatswain bays in Rupert Bay.	8.1 Research	Marbled Godwit, Semipalmated Sandpiper.
Lack of knowledge on the extent of subsistence harvest and its impacts on bird populations	5.1 Hunting & collecting terrestrial animals	Ensure adequate levels of subsistence harvest	7.2 Improve harvest monitoring	Study migratory bird take and egg collection by Aboriginal people in order to evaluate the impact on populations.	8.2 Monitoring	Dunlin, Lesser Yellowlegs, Marbled Godwit, Red Knot (<i>rufa</i>), Semipalmated Sandpiper.

Riparian

The riparian broad habitat class is defined as any terrestrial habitat within 15 metres of an inland waterbody. We estimate this habitat at almost 12 000 ha in BCR 7-QC, representing approximately 0.02% of this huge BCR subregion.

Despite the relatively small extent of this land cover type, there are 21 priority species associated with riparian habitats, making it the second most-used habitat in this BCR subregion. Priority species include 4 species at risk and 8 stewardship species (Table 16) which only have conservation issues pertaining to a lack of knowledge of population trends (reported in Section 3: Additional Issues). Moreover, among the 13 species of conservation concern, Rusty Blackbird has only a lack of information and recovery strategy-related issues identified as conservation issues (reported in Section 3). Therefore, Figure 18 and Table 17 account for the conservation issues of only 12 species.

Once again, activities falling under the broad category "3. Energy production and mining" are responsible for the majority of conservation issues in this habitat. Subcategories "3.2 Mining and quarrying" and "3.3 Renewable energy" represent 35% and 38% respectively of all identified threats to priority species when they use riparian habitats. These threats have respective overall magnitudes of Medium and High (Fig. 18).

Conservation objectives and actions applying to riparian habitat are basically the same as for the waterbodies habitat category, as these two habitat types are closely associated through hydrography. Site protection and restoration, adoption of more environment friendly operation standards from the industry, encourage reduction of greenhouse gas emission, and implement a study on migratory bird take and egg collection by Aboriginal people in order to evaluate the impact on populations of some species are the main conservation actions proposed.

			Reason for priority		
Priority species	Detailed habitat used	Population objective	:	status	
	-		At Risk ¹	CC ²	S ³
Alder Flycatcher	Riparian closed shrubland (thicket)	Assess/Maintain	-	-	Yes
American Black Duck	Perennial river and lakes (riparian)	Maintain current	-	-	Yes
Bald Eagle	Riparian forest	Provincial recovery objective ⁴	Yes	Yes	-
Black Scoter	Riparian needleleaved evergreen sparse low trees	Maintain current	-	-	Yes
Bonaparte's Gull	Coniferous (riparian)	Assess/Maintain	-	Yes	-
Greater Yellowlegs	Swamp (riparian)	Assess/Maintain	-	Yes	-
Harlequin Duck (Eastern)	Perennial river (riparian)	Recovery objective ⁵	Yes	Yes	-
Least Sandpiper	Swamp (riparian)	Assess/Maintain	-	Yes	-
Lesser Yellowlegs	Swamp (riparian)	Assess/Maintain	-	Yes	-
Lincoln's Sparrow	Riparian closed schrubland (thicket)	Assess/Maintain	-	-	Yes
Olive-sided Flycatcher ⁶	Riparian mixed or coniferous forest	Recovery objective	Yes	Yes	-
Palm Warbler	Riparian closed schrubland (thicket)	Assess/Maintain	-	-	Yes
Red-breasted Merganser	Perennial river and lakes (riparian)	Maintain current	-	-	Yes
Red-necked Phalarope	Swamp (riparian)	Increase 50%	-	Yes	-

Table 16. Priority species that use riparian habitat, regional habitat class, population objectives and reason for priority status.

⁴ Refer to Comité de rétablissement du Pygargue à tête blanche au Québec (2002).

¹ "At risk" includes species considered Endangered, Threatened or Special Concern pursuant to an assessment by COSEWIC; listed on Schedule 1 of SARA as Endangered, Threatened or Special Concern, and listed as Endangered, Vulnerable or Likely to be designated threatened or vulnerable under the *Loi sur les espèces menacées ou vulnérables* (Quebec).

² "CC", or Conservation Concern, includes species considered of concern in the Partners in Flight database downloaded from <u>www.partnersinflight.org</u>, the Canadian Shorebird Conservation Plan (Donaldson et al., 2000), Canadian Shorebird Conservation Plan (Milko et al., 2003), the North American Waterfowl Management Plan (Plan Committee, 2004) or by regional experts.

³ "S", or Stewardship, includes abundant species with a wide range with a large percentage of their range or their continental population located in the conservation unit or sub-unit. These species include landbirds considered by Partners in Flight but also species from other bird groups added by experts.

⁵ Consult Environment Canada (2007).

⁶ Species listed on Schedule 1 of SARA, but for which there are no management plans or recovery strategies. Official documents related to SARA will prevail as soon as they are published; however, the interim population objectives for these species are as follows: Olive-sided Flycatcher: Assess / Increase 100%; Rusty Blackbird: Increase 100%.

				Reason for priority			
Priority species	Detailed habitat used	Population objective	status				
			At Risk ¹	CC ²	S ³		
Rusty Blackbird ⁶	Riparian forest	Recovery objective	Yes	Yes	-		
Semipalmated Plover	Swamp (riparian)	Increase 50%	-	Yes	-		
Semipalmated Sandpiper	Ponds (riparian)	Increase 100%	-	Yes	-		
Solitary Sandpiper	Swamp (riparian)	Assess/Maintain	-	Yes	-		
Surf Scoter	Riparian needleleaved evergreen sparse low trees	Maintain current	-	-	Yes		
Swamp Sparrow	Riparian closed shrubland (thicket)	Assess/Maintain	-	-	Yes		
Wilson's Snipe	Swamp (riparian)	Increase 50%	-	Yes	-		



Figure 18. Percent of identified threats to priority species in coastal habitat in each threat sub-category.

Each bar represents the percent of the total number of threats identified in each threat subcategory 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 1.1 Housing & urban areas, 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. See Appendix 2 for more details.

Threats addressed	Threat sub-	Objectives	Objective sub-	Recommended actions	Action sub-	Priority species
	category		category		category	affected ¹
Deliberate killing or accidental trapping	5.1 Hunting & collecting terrestrial animals	Recover species at risk	3.4 Implement recovery strategies for species at risk	Implement the provincial recovery strategy for the Bald Eagle (Comité de rétablissement du pygargue à tête blanche au Quebec, 2002).	3.2 Species recovery	Bald Eagle
Habitat loss and degradation (flooding of nest by significant water level fluctuations in reservoirs and rivers)	7.2 Dams & water management/ use	Maintain/ restore the diversity and quality of riparian habitats across the landscape	1.1 Ensure land and resource- use policies and practices maintain or improve bird habitat	Manage water level so that no nest flooding will occur during nesting period.	5.3 Private sector standards and codes	Solitary Sandpiper.
Habitat loss and degradation (mining projects)	3.2 Mining & quarrying	Maintain/ restore the diversity and quality of riparian habitats across the landscape	1.1 Ensure land and resource- use policies and practices maintain or improve bird habitat	Protect and secure important riparian habitats through the attribution of legal conservation status or the use of various stewardship approaches. Protect and secure important breeding/staging habitats through the attribution of legal conservation status or the use of various stewardship approaches. Restore habitats after completion of projects.	1.1 Site/area protection2.3 Habitat and natural process restoration	Greater Yellowlegs, Harlequin Duck (Eastern), Least Sandpiper, Lesser Yellowlegs, Red- necked Phalarope, Semipalmated Plover, Semipalmated
				Encourage the adoption of more environment friendly operation standards. Implement proper avoidance or mitigation measures identified in environmental assessment of projects.	5.3 Private sector standards and codes 8.2	Sandpiper, Solitary Sandpiper, Wilson's Snipe.

Table 17. Threats addressed, conservation objectives, recommended actions and priority species affected for riparian habitat in BCR 7-QC

¹ Some priority species for this habitat may not be mentioned here if their only threats in this habitat fall under the sub-category "12.1 Information Lacking".

Threats addressed	Threat sub-	Objectives	Objective sub-	Recommended actions	Action sub-	Priority species
	category		tatebo y	Ensure that, once restored, the exploited sites offer wildlife habitats equivalent to the original through pre- and post-operation wildlife monitoring.	Monitoring	
Habitat loss and degradation (permanent or seasonal flooding of natural habitats)	3.3 Renewable Energy	Recover species at risk Maintain/ restore the quantity and	3.4 Implement recovery strategies for species at risk 1.3 Ensure the	Protect and secure important riparian habitats through the attribution of legal conservation status or the use of various stewardship approaches. Implement the provincial recovery strategy	1.1 Site/area protection	Bald Eagle, Bonaparte's Gull, Greater Yellowlegs, Harlequin Duck (Eastern), Least
		quality of riparian habitats across the landscape	continuation of natural processes that maintain bird habitat	for the Bald Eagle (Comité de rétablissement du pygargue à tête blanche au Quebec, 2002). Implement the management plan for the Harlequin Duck, Eastern Population, in Atlantic Canada and Quebec (Environment Canada, 2007).	3.2 Species recovery	Sandpiper, Lesser Yellowlegs, Red- necked Phalarope, Semipalmated Plover, Semipalmated Sandpiper, Wilesene Saine
				Manage water level so that no nest flooding will occur during nesting period.	5.3 Private sector standards and codes	Wilson's Shipe.
Higher frequency of unfavourable climate events as a result of global climate change may affect migration/ reproductive success/	11.5 Other impacts	Reduce the potential impact of climate change on riparian	6.2 Manage for habitat resilience as climate changes	Encourage reduction of greenhouse gas emissions.	6.2 Substitution	Olive-sided Flycatcher
Table 17 continued

Threats addressed	Threat sub- category	Objectives	Objective sub- category	Recommended actions	Action sub- category	Priority species affected ¹
availability of prey (aerial insects)/ nesting phenology (warmer climate)		habitats				
Lack of knowledge on the extent of subsistence harvest and its impacts on bird populations	5.1 Hunting & collecting terrestrial animals	Ensure adequate levels of subsistence harvest	7.2 Improve harvest monitoring	Study migratory bird take and egg collection by Aboriginal people in order to evaluate the impact on populations.	8.2 Monitoring	Greater Yellowlegs, Least Sandpiper, Lesser Yellowlegs, Solitary Sandpiper.

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
- Pollution/pesticides/oil spills
- 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

Power Lines

Birds may be killed by colliding with power lines, or they may be electrocuted. Species with high wing-loading and thus low manoeuvrability, such as waterfowl, appear particularly at risk for collisions (Bevanger 1998). Electrocutions are most likely for large birds such as raptors and herons, whose bodies are large enough to span the distances between wires and create a short-circuit. Raptors' habit of using power poles as perches further increases their risk. However, estimates of total mortality due to collisions and electrocutions can vary widely (Manville 2005) and population-level impacts are difficult to determine. Canadian estimates are that 161 000 – 802 000 birds are killed annually by electrocution and another 5.3–20.6 million birds are killed each year by colliding with electrical transmission lines (Calvert et al. 2013).

As BCR 7-QC is one of the least populated areas of Quebec, power lines are relatively scarce and are basically used to deliver electricity from plants in the north to populations in the south. Waterfowl and large raptors such as Bald Eagle and Golden Eagle could be affected by this threat but its overall magnitude can be considered low. See Table 18 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 Lehikoinen 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. See Table 18 for conservation objectives and actions.

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 18 for conservation objectives and actions.

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). 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 water-proofing 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 18 for summary and objectives.

Table 18. Conservation objectives and actions associated with bird mortality from collisions and contaminants.

Threats addressed	Threat sub- category	Objective	Objective sub-category	Recommended actions	Action sub-category	Example priority species affected
Collision mortality	1	1			1	
Collisions with power lines and accidental electrocution cause bird mortality.	4.2 Utility and service lines	Reduce mortality from collisions with utility lines/ transmission towers	2.7 Reduce incidental mortality from collisions.	In high-risk areas, retrofit power lines so that the risk of electrocution of raptors is minimized. Use markers or paint to increase visibility of power lines in high-strike areas. Avoid siting lines over or near wetlands.	2.1 Site/area management	Bald Eagle, Golden Eagle.
Population effects of collisions are unknown.	12.1 Information lacking	Improve understanding of population effects of mortality from collisions	7.4 Improve understandin g of causes of population declines.	Assess the biological importance of bird kills from all sources of collisions.	8.1 Research	All species
Environmental Cont	aminants					
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.	Work with hunters, anglers and industry to eliminate the exposure of birds to shot, sinkers and jigs made of lead. 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.	4.3 Awareness and communications5.4 Compliance and enforcement	Bald Eagle, Black Scoter, Canada Goose, Common Loon.
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 contaminants.	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 regulations	Heavy metals: Common Loon, Surf Scoter. Other contaminants: Peregrine Falcon (anatum/tundrius)
Mortality of waterbirds from oil pollution.	9. Pollution	Reduce mortality from oil pollution	2.3 Reduce mortality and/or sublethal effects of oil	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	5.4 Compliance and enforcement	Lethal and sublethal effect of oil exposure: Bald Eagle, Black Scoter, Brant, Canada Goose, Common Loon, Harlequin

Table 18 continued						
Threats addressed	Threat sub- category	Objective	Objective sub-category	Recommended actions	Action sub-category	Example priority species affected
			pollution. 5.1 Maintain natural food webs and prey sources.	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.	4.3 Awareness and communications	Duck, Red Knot, Red-necked Phalarope, Short-billed Dowitcher, Surf Scoter.
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. Evaluate the extent to which pesticides are reducing prey availability for aerial insectivores. Improve the ability to monitor and understand the effects of contaminant concentrations in birds.	8.1 Research	All species
				Continue to acquire information on oiling of waterbirds through programs like Birds Oiled at Sea.	8.2 Monitoring	

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 that alter habitat structure and community composition (North American Bird Conservation Initiative, U.S. Committee 2010). See Tables 19 and 20 for a summary of impacts of climate change and conservation objectives.

A recent exercise used bioclimatic modeling 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. In BCR 7-QC, the model predicts a gain of 72 species, a loss of 11 species for a total turnover (% species gained + % species lost) of approximately 57%.

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 19. Examples of the current and anticipated effects of climate change on bird populations in Canada and some affected bird species.

(**Note:** The species shown here do not represent an exhaustive list; rather, they provide examples of species for which 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)	American Bittern, White-winged Crossbill
Increase in severe weather events	Canada Goose, Red Knot
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	Black Scoter
Thawing of permafrost and increased evaporation will result in vegetation shifts and loss of wetlands in arctic habitat	Rusty Blackbird, Yellow Rail

Table 20. Proposed conservation objectives and actions to address climate change.

Threats addressed	Threat sub- sub- category	Objective	Objective sub- 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 Mitigate the effects of climate change on bird habitat	6.1 Support efforts to reduce greenhouse gas emissions6.2 Manage for habitat resilience as climate changes	Support efforts to reduce greenhouse gas emissions. 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. Manage buffer areas and the matrix between protected areas to enhance movement of species across the landscape. Manage ecosystems to maximize carbon storage and sequestration while simultaneously enhancing bird habitat.	 5.2 Policies and regulations 1.1 Site/area protection 2.1 Site/area management 	All, but more specifically: American Bittern, Dunlin, Greater Yellowlegs, Least Sandpiper, Lesser Yellowlegs, Marbled Godwit, Red Knot (rufa), Semipalmated Plover, Semipalmated Sandpiper, Solitary Sandpiper, Sora, Yellow Rail.
				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	
Population- level effects of climate change are	12.1 Information lacking	Improve understanding of climate change on birds and their habitats	7.5 Improve understanding of potential effects of climate	Evaluate which species are most vulnerable to climate change. Investigate the cumulative effects	8.1 Research	All

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Table 20 continued

Threats addressed	Threat sub- sub- category	Objective	Objective sub- category	Recommended Actions	Action sub-category	Priority species affected
unknown			change	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. Undertake monitoring to evaluate the effectiveness of mitigation activities.	8.2 Monitoring	

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 population trend (PT) score. These species were typically assigned a population objective of "assess/maintain." The 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.

Gaps in knowledge are common in BCR 7-QC. Commonly used monitoring programs such as the Breeding Bird Survey are not feasible in BCR 7-QC because of a lack of roads and volunteers. 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 52 species, a lack of information about population status was determined to be a significant conservation concern. These species and recommendations for improving the monitoring of their population status appear in Table 21.

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

• complete a first round of Arctic PRISM (Program for Regional and International Shorebird Migration) breeding shorebird surveys to obtain reliable population estimates and baseline distribution information across the Arctic;

- 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; and
- realign resources for eider and scoter monitoring to a more efficient suite of surveys.

Table 21. Categories of poorly monitored species, possible monitoring approaches, and example priority species in BCR 7-QC for which there are currently insufficient data to reliably estimate population trend at the BCR scale.

Category	Possible monitoring approaches	Example priority species
Shorebirds	 At staging sites: capture and band adults and juveniles, and do field work to do band reading. At staging sites: monitor abundance and distribution of adults and juveniles. Delineate breeding distribution and characterise preferred breeding habitat. Develop and implement regular (every 5 years) aerial 	Dunlin, Greater Yellowlegs, Least Sandpiper, Red Knot (<i>rufa</i>), Red-necked Phalarope, Semipalmated Plover, Semipalmated Sandpiper, Short-billed Dowitcher (<i>griseus</i>), Solitary Sandpiper, Wilson's Snipe.
	surveys of potential and known staging and breeding sites in coastal regions.	
Diurnal raptors	Develop and implement a cliff nesting bird monitoring program.	Peregrine Falcon (anatum/tundrius)
Nocturnal raptors	Develop and implement nocturnal surveys.	Common Nighthawk, Northern Hawk Owl, Short- eared Owl.
Waterfowl	 Develop and implement monitoring of breeding waterfowl. Maintain the current Canada Goose banding program and extend it to include the other priority waterfowl species in northern BCRs of Quebec. Maintain the WSNO (Breeding Waterfowl survey of Northern Quebec). Develop and implement a banding program for priority species. 	American Black Duck, Black Scoter, Canada Goose, Harlequin Duck (Eastern population), Red-breasted Merganser, Surf Scoter.
Multiple	Develop and implement specific surveys.	Black-backed Woodpecker, Bonaparte's Gull, Gray Jay, Le Conte's Sparrow, Nelson's Sparrow, Northern Hawk Owl, Northern Shrike, Short-eared Owl, Spruce Grouse, Yellow Rail.
Landbirds	Develop and implement the existing migration monitoring program (Canadian Migration Monitoring Network) by initiating and supporting stations. Increase Breeding Bird Survey (BBS) coverage. Set up a boreal forest breeding bird survey.	Alder Flycatcher, Belted Kingfisher, Black-backed Woodpecker, Blackpoll Warbler, Boreal Chickadee, Fox Sparrow, Gray-cheeked Thrush, Lincoln's Sparrow, Merlin, Olive-sided Flycatcher,
		Palm Warbler, Peregrine Falcon (<i>anatum/tundrius</i>),

Table 21 continued

Category	Possible monitoring approaches	Example priority species
		Pine Grosbeak, Rusty
		Blackbird, Spruce Grouse,
		Swamp Sparrow, Tennessee
		Warbler, White-throated
		Sparrow, White-winged
		Crossbill.

Research

The focus of this section is to outline the main areas where a lack of information hindered the ability to understand conservation needs and make conservation recommendations. Research objectives presented here are bigger picture questions, and not necessarily a schedule of studies, that are needed to determine the needs of individual species (Table 22). 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.

Table 22. General research objectives in BCR 7-QC.

Objective	Priority species affected
Develop research projects to fill knowledge gaps on links between breeding, migration and overwintering sites in order to identify to which wintering population, Florida/US or South America, the birds belong.	Dunlin, Lesser Yellowlegs, Red Knot (<i>rufa</i>), Semipalmated Sandpiper.
Develop research projects to fill knowledge gaps on links between breeding, molting and overwintering sites in order to delineate different populations among individual species.	Black Scoter, Brant, Harlequin Duck (Eastern population), Red-breasted Merganser, Surf Scoter.
 Continue to engage in and support climate change research with respect to: links between climate, forage species, and priority seabirds; and model potential responses to changes in climatic conditions. alteration and loss of coastal habitat with predicted sea-level rise, particularly estuaries, saltmarsh, beach/dunes and mud/sand flats; and effects on priority species. alteration and loss of terrestrial habitats, particularly shifting forest types and loss of alpine habitats. range expansion or contraction of priority bird species. identification of vulnerable species. 	All priority species.
Assess the potential effects of coastal and offshore wind power developments on birds, including both direct (collision mortality) and indirect (habitat loss due to avoidance of turbine installations) effects. Identify particularly vulnerable species.	All birds found in coastal and offshore areas, including migrating individuals/flocks.

Threats Outside Canada

Many bird species found in Canada spend a large portion of their lifecycle outside of the country (Fig. 19). 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 54 priority species in BCR 7-QC, 49 (91%) are migratory and spend part of their annual cycle—up to half the year or more—outside Canada.



Figure 19. Percent of Canadian breeding birds that migrate to regions outside of Canada for part of their life cycle (North American Bird Conservation Initiative 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 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 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. 20). Priority birds from BCR 7-QC face the loss or degradation of key migration, and wintering habitats. The primary sources of habitat loss and degradation are conversion of grasslands and wetlands to agriculture (threat sub-category 2.1), residential and commercial development (threat sub-categories 1.1 and 1.2), and dams/water management (threat sub-category 7.2). The threat of loss and degradation of stopover or overwinter habitat is greater for species that have relatively small and concentrated wintering ranges. Others, such as Red Knot (*rufa*) are particularly vulnerable as large numbers of the 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 in Quebec are also affected by increased mortality from human sources during migration and over-wintering. Collisions with structures such as buildings were frequently reported (threat sub-category 1.2). Several shorebird and waterfowl species are affected by hunting (threat sub-category 5.1), and many priority birds from BCR 7-QC are subject to lead poisoning (threat sub-category 5.1). Other sources of lethal and sub-lethal impacts to priority birds from BCR 7 in Quebec include exposure to industrial contaminants such as oil pollution and heavy metals (threat sub-category 9.2) and agricultural pesticides (threat sub-category 9.3).



Figure 20. Percent of identified threats to priority species (by threat sub-category) in BCR 7-QC when they are outside Canada.

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

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 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 <u>Environment Canada</u> at any time for inclusion in subsequent versions.

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Appendix 1

List of All Bird Species in BCR 7 Quebec

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

Common Name	Scientific Name	Bird group	Breeding	Migrant	Wintering	Seasonal	Priority
Alder Flycatcher	Empidonax alnorum	Landbird	Х				Х
American Bittern	Botaurus lentiginosus	Waterbird	Х				Х
American Black Duck	Anas rubripes	Waterfowl	Х	Х			Х
American Crow	Corvus brachyrhynchos	Landbird	Х				
American Kestrel	Falco sparverius	Landbird	Х				
American Pipit	Anthus rubescens	Landbird	Х				
American Redstart	Setophaga ruticilla	Landbird	Х				
American Robin	Turdus migratorius	Landbird	Х				
American Three-toed Woodpecker	Picoides dorsalis	Landbird	Х				
American Tree Sparrow	Spizella arborea	Landbird	Х				
American Wigeon	Anas americana	Waterfowl	Х	Х			
Arctic Tern	Sterna paradisaea	Waterbird	Х				
Bald Eagle	Haliaeetus leucocephalus	Landbird	Х				Х
Bank Swallow	Riparia riparia	Landbird	Х				
Barrow's Goldeneye (Eastern)	Bucephala islandica	Waterfowl				Х	
Bay-breasted Warbler	Setophaga castanea	Landbird	Х				
Belted Kingfisher	Megaceryle alcyon	Landbird	Х				Х
Black Guillemot	Cepphus grylle	Waterbird	Х				
Black Scoter	Melanitta americana	Waterfowl	Х	Х			Х
Black Tern	Chlidonias niger	Waterbird	Х				
Black-and-white Warbler	Mniotilta varia	Landbird	Х				
Black-backed Woodpecker	Picoides arcticus	Landbird	Х				Х
Blackpoll Warbler	Setophaga striata	Landbird	Х				Х
Black-throated Green Warbler	Setophaga virens	Landbird	Х				

Common Name	Scientific Name	Bird group	Breeding	Migrant	Wintering	Seasonal	Priority
Bohemian Waxwing	Bombycilla garrulus	Landbird	Х				
Bonaparte's Gull	Chroicocephalus philadelphia	Waterbird	Х				Х
Boreal Chickadee	Poecile hudsonica	Landbird	Х				Х
Boreal Owl	Aegolius funereus	Landbird	Х				
Brant	Branta bernicla	Waterfowl		Х			Х
Brown Creeper	Certhia americana	Landbird	Х				
Bufflehead	Bucephala albeola	Waterfowl	Х	Х			
Cackling Goose	Branta hutchinsii	Waterfowl		Х			
Canada Goose (Atlantic)	Branta canadensis	Waterfowl	Х	Х			Х
Canada Goose (North Atlantic)	Branta canadensis	Waterfowl	Х	Х			Х
Canada Goose (Temperate-breeding in Eastern Canada)	Branta canadensis	Waterfowl				Х	
Cedar Waxwing	Bombycilla cedrorum	Landbird	Х				
Chipping Sparrow	Spizella passerina	Landbird	Х				
Common Eider (<i>borealis</i>)	Somateria mollissima borealis	Waterfowl	Х	Х			
Common Eider (<i>sedentaria</i>)	Somateria mollissima sedentaria	Waterfowl	Х	Х			
Common Goldeneye	Bucephala clangula	Waterfowl	Х	Х			
Common Loon	Gavia immer	Waterbird	Х				Х
Common Merganser	Mergus merganser	Waterfowl	Х	Х			
Common Nighthawk	Chordeiles minor	Landbird	Х				Х
Common Raven	Corvus corax	Landbird	Х				
Common Redpoll	Acanthis flammea	Landbird	Х				
Common Tern	Sterna hirundo	Waterbird	Х				
Common Yellowthroat	Geothlypis trichas	Landbird	Х				
Connecticut Warbler	Oporornis agilis	Landbird	Х				
Dark-eyed Junco	Junco hyemalis	Landbird	Х				
Double-crested Cormorant	Phalacrocorax auritus	Waterbird	Х				
Dunlin	Calidris alpina	Shorebird		Х			Х
Eastern Bluebird	Sialia sialis	Landbird	Х				
European Starling	Sturnus vulgaris	Landbird	Х				

Common Name	Scientific Name	Bird group	Breeding	Migrant	Wintering	Seasonal	Priority
Fox Sparrow	Passerella iliaca	Landbird	Х				Х
Golden Eagle	Aquila chrysaetos	Landbird	Х				Х
Golden-crowned Kinglet	Regulus satrapa	Landbird	Х				
Gray Jay	Perisoreus canadensis	Landbird	Х				Х
Gray-cheeked Thrush	Catharus minimus	Landbird	Х				Х
Great Black-backed Gull	Larus marinus	Waterbird	Х				
Great Blue Heron	Ardea herodias	Waterbird	Х				
Great Gray Owl	Strix nebulosa	Landbird	Х				
Great Horned Owl	Bubo virginianus	Landbird	Х				
Greater Scaup	Aythya marila	Waterfowl	Х	Х			
Greater Yellowlegs	Tringa melanoleuca	Shorebird	Х				Х
Green-winged Teal	Anas crecca	Waterfowl	Х	Х			
Harlequin Duck (Eastern)	Histrionicus histrionicus	Waterfowl	Х	Х			Х
Hermit Thrush	Catharus guttatus	Landbird	Х				
Herring Gull	Larus argentatus	Waterbird	Х				
Hooded Merganser	Lophodytes cucullatus	Waterfowl	Х	Х			
Horned Lark	Eremophila alpestris	Landbird	Х				
Killdeer	Charadrius vociferus	Shorebird	Х				
King Eider	Somateria spectabilis	Waterfowl		Х			
Lapland Longspur	Calcarius lapponicus	Landbird	Х				
Le Conte's Sparrow	Ammodramus leconteii	Landbird	Х				X
Least Sandpiper	Calidris minutilla	Shorebird	Х				Х
Lesser Scaup	Aythya affinis	Waterfowl	X	Х			
Lesser Yellowlegs	Tringa flavipes	Shorebird	Х				Х
Lincoln's Sparrow	Melospiza lincolnii	Landbird	Х				Х
Long-tailed Duck	Clangula hyemalis	Waterfowl	Х	Х			
Magnolia Warbler	Setophaga magnolia	Landbird	Х				
Mallard	Anas platyrhynchos	Waterfowl	Х	Х			
Marbled Godwit	Limosa fedoa	Shorebird	Х				Х
Merlin	Falco columbarius	Landbird	Х				Х

Common Name	Scientific Name	Bird group	Bird group Breeding		Wintering	Seasonal	Priority
Mourning Dove	Zenaida macroura	Landbird	X				
Nashville Warbler	Oreothlypis ruficapilla	Landbird	X				
Nelson's Sparrow	Ammodramus nelsoni	Landbird	Х	X			Х
Northern Flicker	Colaptes auratus	Landbird	Х				
Northern Goshawk	Accipiter gentilis	Landbird	Х				
Northern Harrier	Circus cyaneus	Landbird	Х				
Northern Hawk Owl	Northern Hawk Owl	Landbird	Х				Х
Northern Pintail	Anas acuta	Waterfowl	Х	Х			
Northern Shoveler	Anas clypeata	Waterfowl	Х	Х			
Northern Shrike	Lanius excubitor	Landbird	Х				Х
Northern Waterthrush	Parkesia noveboracensis	Landbird	Х				
Olive-sided Flycatcher	Contopus cooperi	Landbird	Х				Х
Orange-crowned Warbler	Oreothlypis celata	Landbird	Х				Х
Osprey	Pandion haliaetus	Landbird	Х				
Palm Warbler	Setophaga palmarum	Landbird	Х				Х
Peregrine Falcon (anatum/tundrius)	Peregrine Falcon (anatum/tundrius)	Landbird	Х				Х
Philadelphia Vireo	Vireo philadelphicus	Landbird	Х				
Pine Grosbeak	Pinicola enucleator	Landbird	Х				Х
Pine Siskin	Spinus pinus	Landbird	Х				
Purple Finch	Carpodacus purpureus	Landbird	Х				
Red Knot (<i>rufa</i>)	Calidris canutus rufa	Shorebird		Х			Х
Red-breasted Merganser	Mergus serrator	Waterfowl	Х	Х			Х
Red-eyed Vireo	Vireo olivaceus	Landbird	Х				
Red-necked Phalarope	Phalaropus lobatus	Shorebird	Х				Х
Red-tailed Hawk	Buteo jamaicensis	Landbird	Х				
Red-throated Loon	Gavia stellata	Waterbird	Х				
Red-winged Blackbird	Agelaius phoeniceus	Landbird	Х				
Ring-billed Gull	Larus delawarensis	Waterbird	Х				
Ring-necked Duck	Aythya collaris	Waterfowl	Х	Х			
Rock Ptarmigan	Lagopus muta	Landbird	Х				

Common Name	Scientific Name	Bird group	Breeding	Migrant	Wintering	Seasonal	Priority
Rough-legged Hawk	Buteo lagopus	Landbird	X				
Ruby-crowned Kinglet	Regulus calendula	Landbird	X				
Ruffed Grouse	Ruffed Grouse	Landbird	X				
Rusty Blackbird	Euphagus carolinus	Landbird	X				Х
Sandhill Crane	Grus canadensis	Waterbird	X				
Savannah Sparrow	Passerculus sandwichensis	Landbird	Х				
Semipalmated Plover	Charadrius semipalmatus	Shorebird	X				Х
Semipalmated Sandpiper	Calidris pusilla	Shorebird	X				Х
Sharp-shinned Hawk	Accipiter striatus	Landbird	Х				
Sharp-tailed Grouse	Tympanuchus phasianellus	Landbird	Х				
Short-billed Dowitcher (griseus)	Limnodromus griseus griseus	Shorebird	Х				Х
Short-eared Owl	Asio flammeus	Landbird	Х				Х
Snow Bunting	Plectrophenax nivalis	Landbird	X	X			
Snow Goose	Chen caerulescens	Waterfowl		Х			
Solitary Sandpiper	Tringa solitaria	Shorebird	Х				Х
Song Sparrow	Melospiza melodia	Landbird	Х				
Sora	Porzana carolina	Waterbird	Х				Х
Spotted Sandpiper	Actitis macularius	Shorebird	Х				
Spruce Grouse	Falcipennis canadensis	Landbird	Х				Х
Surf Scoter	Melanitta perspicillata	Waterfowl	Х	Х			Х
Swainson's Thrush	Catharus ustulatus	Landbird	Х				
Swamp Sparrow	Melospiza georgiana	Landbird	Х				Х
Tennessee Warbler	Oreothlypis peregrina	Landbird	Х				Х
Tree Swallow	Tachycineta bicolor	Landbird	Х				
Tundra Swan	Cygnus columbianus	Waterfowl	Х	Х			
White-crowned Sparrow	Zonotrichia leucophrys	Landbird	Х				
White-throated Sparrow	Zonotrichia albicollis	Landbird	Х				X
White-winged Crossbill	Loxia leucoptera	Landbird	Х				X
White-winged Scoter	Melanitta fusca	Waterfowl	Х	Х			
Willow Ptarmigan	Lagopus lagopus	Landbird	Х				

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Common Name	Scientific Name	Bird group	Breeding	Migrant	Wintering	Seasonal	Priority
Wilson's Phalarope	Phalaropus tricolor	Shorebird	Х				
Wilson's Snipe	Gallinago delicata	Shorebird	Х				Х
Wilson's Warbler	Cardellina pusilla	Landbird	Х				
Winter Wren	Troglodytes hiemalis	Landbird	Х				
Wood Duck	Aix sponsa	Waterfowl	Х	Х			
Yellow Rail	Coturnicops noveboracensis	Waterbird	Х				Х
Yellow Warbler	Setophaga petechia	Landbird	Х				
Yellow-bellied Flycatcher	Empidonax flaviventris	Landbird	Х				
Yellow-rumped Warbler	Setophaga coronata	Landbird	Х				

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 life-cycle)
- 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 subregion. 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 initiatives.¹

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.

Element 2: Habitats Important to Priority Species

Identifying the broad habitat requirements for each priority species in the breeding and nonbreeding 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, nor 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 (FAO 2000). Some modifications were made to the LCCS scheme to reflect habitat types that are important to birds 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 (e.g., 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.

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. 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", and a monitoring objective is set. Harvested waterfowl and stewardship species that are already at desired population levels are 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.

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 using 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 subregion, for broad habitat categories.

Each threat was categorized following the IUCN-CMP threat classification scheme (Table A2; 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 subregion 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 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.

Threat no.	Threat category and sub-category
1	Residential & commercial development
1.1	Housing & urban areas
1.2	Commercial & industrial areas
1.3	Tourism & recreation areas
2	Agriculture & aquaculture
2.1	Annual & perennial non-timber crops
2.2	Wood & pulp plantations
2.3	Livestock farming & ranching
2.4	Marine & freshwater aquaculture
3	Energy production & mining
3.1	Oil & gas drilling
3.2	Mining & quarrying
3.3	Renewable energy
4	Transportation & service corridors
4.1	Roads & railroads
4.2	Utility & service lines
4.3	Shipping lanes
4.4	Flight paths
5	Biological resource use
5.1	Hunting & collecting terrestrial animals
5.2	Gathering terrestrial plants
5.3	Logging & wood harvesting
5.4	Fishing & harvesting aquatic resources
6	Human intrusions & disturbance
6.1	Recreational activities
6.2	War, civil unrest & military exercises
6.3	Work & other activities

Table A2. Threats categorisation scheme following IUCN-CMP (adapted from Salafski et al. 2008).

7	Natural system modifications				
7.1	Fire & fire suppression				
7.2	Dams & water management/use				
7.3	Other ecosystem modifications				
8	Invasive & other problematic species & genes				
8.1	Invasive non-native/alien species				
8.2	Problematic native species				
8.3	Introduced genetic material				
9	Pollution				
9.1	Household sewage & urban waste water				
9.2	Industrial & military effluents				
9.3	Agricultural & forestry effluents				
9.4	Garbage & solid waste				
9.5	Air-borne pollutants				
9.6	Excess energy				
10	Geological events				
10.1	Volcanoes				
10.2	Earthquakes/tsunamis				
10.3	Avalanches/landslides				
11	Climate change & severe weather				
11.1	Habitat shifting & alteration				
11.2	Droughts				
11.3	Temperature extremes				
11.4	Storms & flooding				
11.5	Other impacts				
12	Other direct threats				
12.1	Information lacking				

Element 5: Conservation Objectives

Overall, conservation objectives represent the desired conditions, within the subregion 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 subregion (the quantity, quality and configuration of priority habitats)
- non-habitat objectives within the BCR subregion (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.

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 subregion. 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.

Appendix 3

Species Added to or Removed from the Priority List and Their Assessment Features for BCR 7-QC

Table A3: List of the species that were added or removed from the priority species list for BCR 7-QC and their assessment features.

Species ¹	Presence ²	Sta Legal Fed.	ndardiz status ³ Prov.	ed assessment Bird group score ⁴	Justification for addition or removal of species (when it d pass the standardized assessment) following expert revie		
ADDED							
LANDBIRDS							
Le Conte's Sparrow	Br	-	-	-	Might be affected by energy development		
Gray-cheeked Thrush	Br	-	-	-	Significant proportion of provincial breeding area in the BCR		
Northern Hawk Owl	Br	-	-	-	Significant proportion of provincial breeding area in the BCR		
Orange-crowned Warbler	Br	-	-	-	Significant proportion of provincial breeding area in the BCR		
SHOREBIRDS							
Greater Yellowlegs	Br	-	-	3b	Potential for habitat loss is high in BCR 7-QC for the species		
Least Sandpiper	Br	-	-	3e	Potential for habitat loss is high in BCR 7-QC for the species		
Lesser Yellowlegs	Br	-	-	2a	Potential for habitat loss is high in BCR 7-QC for the species		

¹ Species are sorted by alphabetical order within their bird group. Species names follow the AOU's Check-list of North American Birds, 7th edition and its supplements up to the 51st supplement.

² Br = breeding, Mi = migration, Mo = molting, and Wi = wintering.

³ Federal: Schedule 1 of the *Species at Risk Act* (EN = endangered, TH = threatened, SC = special concern). Provincial: *Loi sur les espèces menacées ou vulnérables* (Quebec) (TH = threatened, V = vulnerable, L = likely to be designated threatened or vulnerable).

⁴ Landbirds: CC = continental concern, RC = regional concern (whole BCR 7), CS = continental stewardship, RS = regional stewardship (whole BCR 7). This information was provided in the databases downloaded from <u>www.partnersinflight.org</u> (see Panjabi *et al.* 2005 for assessment methods). Shorebirds: Conservation concern at the level of USA and Canada as it was identified in the Canadian Shorebird Conservation Plan (Donaldson *et al.* 2000). Score 5 is "Highly imperilled" and score 1 is "Not at risk". Refer to Donaldson *et al.* (2000) for the complete description of each category of conservation concern. Waterbirds: Priority tiers at the country level as it was identified in "Wings Over Water", Canada's waterbird conservation plan (Milko *et al.* 2003). Waterfowl: Breeding or nonbreeding conservation needs as it was identified in the North American Waterfowl Management Plan (2004). Refer to Kennedy *et al.* (2012) for the threshold score (different for each bird group) beyond which a species qualifies for the priority list.
Table A3 continued

Species ¹		Standardized assessment			lustification for addition or removal of species (when it did
	Presence ²	Legal : Fed.	status ³ Prov.	Bird group score ⁴	pass the standardized assessment) following expert review
Semipalmated Plover	Br	-	-	2a	Potential for habitat loss is high in BCR 7-QC for the species
Solitary Sandpiper	Br	-	-	3b	Potential for habitat loss is high in BCR 7-QC for the species
Wilson's Snipe	Br	-	-	Зе	Potential for habitat loss is high in BCR 7-QC for the species
WATERFOWL					
Red-breasted Merganser	Br-Mi	-	-	Moderate	High proportion of QC occurrences in BCR 7 QC
REMOVED					
LANDBIRDS					
Harris's Sparrow	Br	-	-	CC	No. of individuals too scarce in BCR 7-QC
Smith's Longspur	Br	-	-	CC	No. of individuals too scarce in BCR 7-QC
SHOREBIRDS					
Killdeer	Br	-	-	3a	Insignificant population size in BCR 7-QC compared to whole QC
Wilson's Phalarope	Br	-	-	4a	No. of nesting couples too scarce in BCR 7-QC
WATERBIRDS					
Arctic Tern	Br	-	-	Tier 2	Bird group score lowered by local experts
Black Tern	Br	-	-	Tier 1	No. of nesting couples too scarce in BCR 7-QC
Common Tern	Br	-	-	Tier 2	Bird group score lowered by local experts
Herring Gull	Br	-	-	Tier 2	Insignificant population size in BCR 7-Qc compared to whole QC
WATERFOWL					
Barrow's Goldeneye (Eastern pop.)	Mo	SC	V	Mod high	No. of individuals too scarce in BCR 7-QC
Common Eider (borealis)	Br-Mi-Mo	-	-	Highest	No. of nesting couples too scarce in BCR 7-QC
Common Eider (sedentaria)	Br-Mi-Mo	-	-	Highest	No. of nesting couples too scarce in BCR 7-QC
Common Goldeneye	Br-Mi-Mo	-	-	High	No. of nesting couples too scarce in BCR 7-QC
Long-tailed Duck	Br-Mi-Mo	-	-	High	No. of nesting couples too scarce in BCR 7-QC
White-winged Scoter	Br-Mi-Mo	-	-	Mod high	No. of nesting couples too scarce in BCR 7-QC

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